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MULTINATIONALS AND LOCAL INDIGENOUS DEVELOPMENT

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Abstract

We investigate in how far foreign multinationals have fostered local indigenous development in Ireland. Specifically, we examine whether foreign presence has induced indigenous net plant entry within the same regions and in bordering regions. To this end we employ an entry rate model on an exhaustive panel level data set for Irish manufacturing plants. Our results show that multinationals can foster local development both within and in surrounding regions, although the extent of these effects varies between policy preferential and non-preferential regions.

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Section I - Introduction

Multinational firms have attracted substantial attention both from academics and policy makers given that they have often been viewed as potential major catalysts for local industrial development. Specifically, it has been argued (see Blomström and Kokko, 1998), that because multinationals are usually considered to be higher performance firms than their local counterparts, they may help local firms to improve their production process through three main channels, generally referred to as 'spillovers'. These are: (1) the movements of highly skilled staff from, and trained in, multinational to domestic firms; (2) "demonstration effects" through arm's-length-relationships between multinational and domestic firms in which domestic firms learn superior production technologies from multinationals; and, (3), competition from multinationals forcing domestic rivals to update production technologies and techniques to become more productive, although the competition effect, as Aitken and Harrison (1999) point out, may also reduce productivity in local firms if multinationals attract demand away from their domestic counterparts.

Although there are now a number of studies examining the effect of such spillovers on domestic firms, the evidence thus far has been sparse (see for instance Blomström and Kokko (1998)). One should note, though, that almost all of these studies have exclusively focused on whether the presence of multinationals affects domestic firms' *productivity*.

In a related strand of literature, Markusen and Venables (1999) have shown theoretically that multinationals may also induce the entry of new domestic suppliers through their *input-output linkages*, rather than spillovers of the kind described above.

Using data on entry of firms in manufacturing, Görg and Strobl (2001), show empirically that this was indeed the case for Ireland.

More importantly with respect to this paper, a review of the empirical literature on the impact of multinationals on local development reveals that most of the studies have focused on how the presence of foreign direct investment has impacted nationally on countries, without regard to its within-country regional dispersion. Nevertheless, there is a fair amount of evidence, however, that linkages, between production units are mostly local in nature. This is the case in Alfred Weber's (1929) early contribution, as well as in Krugman's (1991) forward/backward linkages. In fact, the kind of externalities discussed in the FDI literature are very similar to the one discussed in the New Economic Geography (NEG) and Urban Economics literature. More or less explicitly, those strands of research draw upon a common source that is Marshall's (1898) famous chapter X, 'The concentration of specialized industries in particular localities'. Accordingly, the Urban Economics literature as well as the NEG have basically had recourse to three types of externalities to explain the spatial distribution of economic activity and, in particular, agglomeration: forward/backward linkages as those described by Krugman (1991), Fujita et al. (1999); labour market pooling as in Combes and Duranton (2001) and Monfort and Ottaviano (2000); and technological externalities as in Henderson (1974, 1988).

The few studies that have examined the regional impact of multinationals on regional development seem to find some support for this. For instance, using sectoral level data Driffeld (1999) finds evidence of regional level spillovers, albeit small. Similarly, using UK firm level data Girma and Wakelin (2000, 2001) also find evidence of regional spillovers. In contrast, Sjohölm (1998) and Aitken and Harrison (1999) find

no significant regional element to spillovers from multinationals for Indonesia and Venezuela, respectively. One must note, however, that again these studies have explicitly focused on productivity spillovers to *existing* local firms and have thus not taken account of the possibility that foreign direct investment presence may induce the *start-up* of local industry.

In contrast to previous studies the present paper explicitly investigates how multinationals may affect firm start-up in a regional context. Specifically, we extend the empirical framework applied by Görg and Strobl (2002) at the national level, to examine the spatial nature of the impact of multinationals on domestic firms' entry rates due to input/output linkages. As in Görg and Strobl (2002) our case study is the manufacturing sector of the Republic of Ireland. Using the same data source, we however take account of the location of firms within Ireland. In doing so, we focus on both spillovers arising from multinationals located within the same county as well as neighbouring counties. Given the importance of foreign direct investment in Ireland, it arguably provides an ideal case study for such analysis as it is now common to attribute Ireland's economic growth and image as the 'Celtic Tiger' to its success in attracting vast amounts of foreign direct investment that is likely to have also stimulated domestic industry (see for instance, Barry and Bradley, 1997). Moreover, Irish industrial policymakers put considerable effort into attracting multinationals into new, i.e., previously non-existent industries, in order to 'jump-start' local production in these sectors.[2] What is less well known is that Irish industrial policy has also taken considerable steps, by offering a variety of

[2] There were two reasons for this. Firstly, this avoided the potential negative competition effect mentioned earlier. Secondly, most of Irish industry until the 1970s had been in traditional sectors and hence Irish policy makers were keen to attract multinationals that would be able to foster the development of more modern industries.

incentives for locating in certain 'designated areas', to ensure that multinationals dispersed across the country in order to facilitate local development in the less developed regions.[3] These features provide us with a rich scenario with which to investigate the link between local development and the presence of multinationals.

The rest of the paper is organized as follows. In section 2, we present our data sets and some stylised facts about the evolution of indigenous and foreign employment at the national and regional level. Section 3 describes our empirical specification. Results are provided in Section 4 and Section 5 concludes.

Section II – Data Set and Descriptive Statistics

As in Görg and Strobl (2002), our plant level data source is the annual Employment Survey collected since 1972 by Forfás, the policy and advisory board for industrial development in Ireland, and we have access to this data up until and including the year 2000. The response rate to this survey is estimated by Forfás to be generally well over 98 percent, i.e., our data can be seen as including virtually the whole population of manufacturing firms in Ireland. Information at the plant level include the nationality of ownership, level of employment, NACE 4-digit sector of production, and detailed regional location, amongst other identifiers, of each plant. Forfás defines foreign firms as firms which are majority-owned by foreign shareholders, i.e., where 50 percent or more of the shares are owned by foreign shareholders. While arguably, firms with lower foreign ownership should possibly still be considered foreign owned, this is not necessarily a problem for the case of Ireland since almost all foreign direct investment in

[3] These measures mostly consisted of higher grant levels, but until the mid-1980s the Irish Industrial Authority also purchased building sites and built advanced factories. For a review of Irish regional

Ireland has been greenfield investment rather than acquisition of local firms; see Barry and Bradley (1997). In terms of the regional location of plants we chose to use a classification system based mainly on administrative criteria, namely the county. Any more detailed classification seemed to divide Ireland into too small geographic units given the country's overall size. Moreover, most of the counties are defined around some larger city, as, for instance, Dublin, Galway, Limmerick etc. Ireland has actually 26 counties, but for administrative purposes the Industrial Development Authority breaks county Tipperary into two regions (North and South), and we similarly use a regional breakdown along these lines. Moreover, some of Cork's sub-regions are classified as designated areas and we hence divide Cork into two geographical units. Overall, this division left us with classifying Ireland into 28 regions. The average size of a county is about 2600skm (min.: 826skm; max.: 7500skm). Thus Irish average county size is comparable to the smallest US state Rhode Island. For the remaining part of this paper, we restrict ourselves to the sole manufacturing industries.

We can use this data set to establish a number of stylised facts. Specifically, calculating the share of manufacturing employment due to foreign multinationals over time, one can see from Fig.1 that it has grown from relatively moderate levels to now represent almost half of total employment. Apparent from Fig.2 is that this continuous rise in the foreign share of employment can be divided in two forces: the increase in foreign employment and the stagnation/decrease in indigenous employment. Specifically, in 1972 employment by domestically owned plants was about 138,000, but only 128,000 in 2000, which amounts to an average annual decrease of –0.3% (with however variations

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industrial policy see Meyler and Strobl (2000).

through time). On the contrary, foreign employment started with around 68,000 in 1972 and by 2000 had reached almost 122,000 - a 2.2% average annual increase.

Moreover, as can be seen from our summary statistics in Table 1, there are considerable differences in foreign shares and their changes across space. While only a few regions experienced a negative relative loss of foreign employment, namely, Kerry, Longford, and Monaghan, there is considerable variation in those regions in which foreign presence increased, ranging from a one to forty percentage points increase. At the same time the net indigenous plant start-up rate, calculated as the total net births relative to initial plant population (in 1973), also varies substantially across space. Overall only two regions, namely Laois and Tipperary South-Ridding, experienced a fall in the number of plants in the regions. Those regions that experienced an increase in the plant population have done so at substantially different rates. Calculation of a simple correlation coefficient does not suggest that the overall increase of their plant population in regions is related to changes in foreign presence, although, of course, this fails to take account of the sectoral and temporal differences and of other factors that may influence the net rate of start-up within a region. More conclusive statements in this regard thus necessitate an econometric analysis.

Section III – Econometric Specification

Generally, most of the empirical empirical studies have used discrete choice type econometric models (ex: nested multinomial logit, conditional logit, etc.) to model firm location, where each firm is viewed as having a set of alternative choices; see, for

instance, Carlton (1983) and Hansen (1987). More recently, Guimarães et al. (2000) have argued that the Poisson model, which considers the number of (gross) entries by location choice, may provide an attractive alternative methodology.[4] Given that we are interested in the total 'net' effect of multinationals on local indigenous start-ups, i.e., we want to take account of both the positive spillovers as well as the possible negative competition effects, these techniques would not suffice for the purpose there. Instead, we, in line with Görg and Strobl (2002), Mata and Machado (1996) and others, employ a simple empirical model of firm entry in order to determine the impact of multinationals on local development. More specifically:

$$E_{ijt} = X_{ijt}\beta + e_{ijt}$$

where β is our vector of coefficients to be estimated, X_{ijt} is a matrix of explanatory variables specific to region i and sector j at time t, that can be decomposed into $X_{ijt} = \left(X_{it}\ X_{jt}\ X_{ijt}\right)$, i.e., county specific variables, NACE 3-digit sector specific variables and county-sector specific variables. Our dependent variable E_{ijt} is the net sector-county entry rate, defined as the number of entries minus exits occurring between t and t+1 relative to the total number of existing plants in a sector at time t within a region. Using the net, rather than gross entry rate allows one to take account of the number of exits that may have simultaneously occurred, and hence of the potential negative competition effect of multinational presence noted earlier. Thus, any results on spillovers from multinationals must be interpreted as net spillovers.

[4] For this use of this method one, however, needs, unlike our case, a large choice set and relatively short time period, otherwise estimation becomes unfeasible.

Furthermore, the error term e_{ijt} is assumed to contain time invariant county-sector specific effects (α_{ij}) not captured by our explanatory variables, a year specific effect (υ_t), and a remaining term ε_{ijt}, assumed to be independent across sectors and over time. By using a fixed effects estimator in all our regressions we are able to purge the county-sector fixed effects (α_{ij}). In addition, in order to control for time-specific effect (υ_t) we include a set of time dummies in all the estimations. This finally leaves us with the following specification:

$$E_{ijt} = \beta_0 + \beta_1 MES_{jt} + \beta_2 AGE_{jt} + \beta_3 GR_{jt} + \beta_4 GR_{it} + \beta_5 FS_{jt} + \beta_6 FS_{ijt} + \alpha_{ij} + \nu_t + \varepsilon_{ijt} \qquad (1)$$

where GR_{jt} and GR_{it} denote the employment growth rates of sector j and county i respectively, and are intended to capture sectoral and county level cyclical effects, respectively. The employment growth rates within a sector is expected to have a positive effect on the entry rate because a growing market offers a higher probability of survival for an entrant and makes entry, therefore, more likely. This follows from the possibility that incumbent firms may be able to maintain their relative position in a growing market even after the entry of new firms, which reduces the likelihood of retaliation on part of the incumbent (Mata and Machado, 1996). Similarly, growing employment at the county level, regardless of the sector, may serve as indicator of local demand or other factors that are associated with booming counties.

MES_{jt} is measured as the average plant size of existing plants in sector j and represents the minimum efficient scale within a sector.[5] Minimum efficient scale serves as a proxy for barriers to entry in the sector. When MES is high, new entrants may be

deterred from entering the market because capital requirements may be too high. Thus, we would expect a negative relationship between MES and the rate of entry (see Geroski, 1991).

AGE_{jt} represents average age of all existing plants in industry j. We take this as a proxy to identify traditional industries in which long-established incumbents may be expected to have absolute cost advantages vis-à-vis entrants. This, thus, creates an additional barrier to entry for new firms and one would, a priori, predict a negative relationship between this variable and the rate of entry of indigenous firms.

Our primary variables of interest are those relating to multinational presence, namely, FS_{jt} and FS_{ijt}, which signify the degree of presence of multinationals at the sectoral level, i, and the sectoral level within the region, ij, respectively, where each of these are measured as the share of multinationals in the appropriate total level of employment. While FS_{ijt} is our primary variable of interest, we include FS_{jt} in order to take account of sectoral level spillovers arising from multinationals that may occur regardless of the location of both the domestic and foreign plants. Specifically, not controlling for these could seriously bias the results as our regional level indicator on its own may simply be capturing nation-wide spillovers if multinationals are reasonably dispersed. Thus, our regional level variable(s) captures spillovers once national, i.e., non-spatially limited, spillovers are taken account of.

Section IV - Results

Within Region Spillovers

[5] We also experimented using median size as a proxy for MES but found that the results were qualitatively similar.

Column (1) of Table 2 presents results of estimating (1) examining within county spillovers only. First, in terms of our explanatory variables other than foreign presence we find that, as expected, the sectoral and regional level growth rates act to increase the sectoral entry within a region. Minimum efficient scale and average industry age are not found to be significant determinants of net plant entry, although it must be remembered that these are measured at the national rather than regional level. As can be seen, national sectoral foreign presence, FS_{3N}, acts to significantly increase the indigenous plant entry rate within a region by 6.1 per cent, hence providing evidence of spillovers on the entry rate at the national level, as was found by Görg and Strobl (2002). [6] While the extent of localised spillovers are not as large as the national ones, a one percentage point increase in the foreign share variable still increases net entry rate by 1.9 per cent, as can be seen from the coefficient on $FS_{3N,C}$.

The kind of externalities discussed in detail earlier may arguably also occur at a broader sector level. For example, Hanson (1998) uses relative employment shares in 2-digit ISIC sectors of four digits ISIC sectors as measuring the influence of backward-forward linkages on Mexican industries employment growth. The idea is that such linkages occur within broad industry classifications since firms mainly use intermediates from other firms in related industries. In the Irish case, evidence presented by Barry and Bradley (1997) suggests in fact that backward linkages are the most important channel for spillovers from multinationals since domestic firms generally provide part of the intermediates to multinationals located in Ireland. We thus also experimented with a

[6] A more detailed comparison between our work and Görg and Strobl (2002) can hardly been made since the period covered as well as the number of sectors used here are different from the one used by the previous authors. More importantly, given that our measure of domestic firms' entry is region-sector

measure that encompasses not only *intra-sectoral* but also *inter-sectoral* spillovers (although limited to those that occur within the same broader sectoral category). To do so, we included a measure of county-sector foreign employment share, at a more aggregate level, namely 2-digit NACE code, instead of our 3-digit variable – this more aggregate variable is denoted as $FS_{2N,C}$.[7,8] The result of this exercise are being reported in column (2) of Table 2. As can be seen, allowing for inter-sectoral level spillovers changes little in terms of the extent of nation-wide spillovers. Moreover, while the effect of the broader spillovers measure does increase the coefficient on within county spillovers, a simple t-test reveals that this difference is not significant.[9] One of the problems with using this broader sectoral definition is, of course, that many of the sectors within the broader sector category may be unlikely candidates for inter-mediate linkages, and hence muddle its ability to capture the true linkages. In order to create a more reliable proxy one would need detailed regional input-output tables which are unfortunately not available for Ireland.

Across Regions Spillovers

Thus far we have only examined localised spillovers that occur within the same region. Our choice of regional breakdown seemed the most natural one as it corresponded in essence to the administrative regional division of Ireland. Nevertheless, this spatial break-down does not guarantee that we are capturing all localised spillovers from

specific, the coefficients obtained for the foreign presence variable are hardly comparable with the one obtained by Görg and Strobl (2002) given that their variables are only sector-specific.

[7] We end up with 23 broad NACE 2 digits industries compared to 101 NACE 3 digits industries.

[8] We excluded the 3 digit within region variable because of its high correlation to the broader measure. As such, the broader measure must be interpreted as capturing both types of spillovers.

[9] For the t-test zero we made the assumption of zero covariance between the error terms of the two equations.

multinationals if these span beyond the county boundaries. In particular, given that our spatial units are essentially administratively determined they may not perfectly encompass the precise boundaries associated with economic reality. To consider this possibility, we re-estimated equation (1) including a measure of foreign presence for all of a county's surrounding (bordering) counties. For example, as can be seen from Map 1, for Kilkenny the sectoral foreign presence in surrounding regions is the total foreign employment relative to total employment in that sector in regions Carlow, Wexford, Waterford, Tipperary North and South Riding, and Laois. This was first calculated at the 3 digit NACE level, the corresponding variable being $FS_{3N,S}$, and the 2 digits NACE level, the variable being $FS_{2N,S}$. The results of these additional regressions are reported in columns (3) and (4) in Table 2. First of all, one should note that the coefficients of $FS_{3N,C}$ and FS_{3N} are only marginally affected by the inclusion of the surrounding regions' foreign presence. Most importantly, the positive and significant coefficient for our surrounding regions' foreign presence proxy stands as evidence that spillovers from multinationals may reach beyond our regional boundaries. Moreover, the coefficients are essentially the same for within and surrounding regions' externalities, implying that there is little decay effect when the source of foreign-presence related spillovers is located in bordering areas. We repeated this exercise using broader sectoral definitions in column (4) of Table 2. The results for the NACE 2 digits sectors confirm the results of the narrower definition, and a simple t-test comparing the two suggests that they are not significantly different. Given this and the aforementioned results and drawbacks of these broader proxies, we exclusively focus on the narrower sectoral definition for our subsequent analysis.[10]

[10] Results for the t-test as well as results using the broader definition, which were in general very similar,

Long-Term Effects

Until now we have implicitly made the assumption that positive spillovers occurred within a year, that is, foreign presence at time t only influences net domestic plants entry rate over the period t to t+1. This assumption is quite restrictive if the kind of externalities discussed need several years to take place. Thus, we have, like Görg and Strobl (2002), built our foreign presence variables as averages of up to three years preceding t. Results of this exercise are reported in the last two columns of Table 1. Here we find that, even measured over a longer horizon, within region spillovers are significant determinant of local indigenous plant start-up rate. There is, however, no significant difference in the magnitude relative to the short-term impact. Moreover, when measured over the long term, inter-regional spillovers from bordering regions are no longer significant, suggesting that such externalities may be short-lived.

Spillovers Within and Across Designated and Non-Designated Regions

As noted in the Introduction, Ireland's industrial policy has always had a strong regional component to it.[11] In particular, throughout the sample period that we consider the Industrial Development Authority (IDA) has offered greater incentives, in terms of higher grants and for some of the period by purchasing building sites and building advanced factories on these, to firms that agreed to locate in certain designated areas.[12] While the higher grants were available to both indigenous and foreign firms, the IDA

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are available from the authors.

[11] For a detailed description of this see Meyler and Strobl (2001).

[12] These designated areas were Cavan, Clare, Donegal, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Roscommon, Sligo and part of Cork.

envisioned that the location of foreign multinationals in the designated areas was the key to inducing indigenous firm start-up in these. Barrios et al (2002) present some evidence that this regional policy was at least in part successful in attracting foreign multinationals to the designated areas. However, the previous authors do not provide any evidence concerning the possible impact of foreign presence on the local industrial development by regions' status. It thus is arguably of interest to study whether there is any difference in the impact of the presence of multinationals on indigenous plant start-up across these two groups of regions.

With this in mind, we split our sample and re-ran our main specifications for non-designated and designated areas' net sectoral regional entry rates, as shown in columns (1), (2) and (3) for non-designated and (4), (5) and (6) for designated areas of Table 3. First of all, one can see from the positive and significant coefficient on FS_{3N} that both designated and non-designated areas benefit from the non-spatially limited spillovers generated by foreign multinationals. For non-designated areas we also find that multinational presence acts to increase net indigenous plant start-up rate locally within a region. If we now include a measure of foreign presence in surrounding regions, as in columns (2) and (5), one discovers that intra-regional spillovers are not prelevant for non-designated areas. These results differ markedly from those found for designated areas, however. For the latter we find foreign presence in bordering regions has a positive and significant impact on domestic start-up while foreign presence within the country has no significant influence.

It may seem somewhat peculiar that foreign plants located within a designated region do not spark indigenous start-up in that region, but those located in surrounding

regions do. One must note, however, that in the specifications just discussed our sample split simply allows for a different effect of foreign presence on indigenous plants according to the indigenous plants' location as defined by preferential policy treatment. Implicitly it is thus assumed that the effect from multinationals is homogenous within each region group. However, a foreign plant's decision of whether to locate in a designated rather than non-designated region will be based on its expected benefits relative to its expected costs. Benefits of locating in designated areas will include both the incentive offered by policymakers, as well as the possibility of reduced congestion costs that are typical of the more advanced areas, such as Dublin. In contrast, costs are likely to be the distance to intermediate suppliers, airports/ports or potential agglomeration economies, etc. Thus, ceteris paribus, multinationals that locate in designated areas must differ in preferences for these factors relative to those choosing to locate in non-designated areas.[13]

In the Irish context one might suspect that foreign firms that use less locally produced goods have less of an incentive to locate where there are likely to be more (at least initially) intermediate suppliers, that is, in non-designated areas. In order to at least roughly see whether this may be the case we use supplementary information from the non-exhaustive *Irish Economy Expenditure* Survey[14], where we can calculate for multinationals located in Ireland an indicator of the percentage of their raw materials that

[13] While domestic plant start-ups will face a similar trade-off in their location decision, they are likely to also have factors determining their location decision. Specifically, most Irish start-ups have been small entrepreneurial firms (see Görg and Strobl, 2001) and arguably entrepreneurs may choose to keep their business close to their normal residence to take advantage of fostered informal relationships to the local community, bank, etc. in order to reduce uncertainty, see Figueiredo et al. (2001 and 2002).

[14] Unfortunately, the Irish Economy Expenditure Survey is not an exhaustive data set, covering about 60 to 80 per cent of all plants with at least 30 employees, and only covers the period 1983-98. Moerover, the figures calculated must be viewed with some caution as transfer pricing appears to be a relatively common

have been manufactured locally (within Ireland). For the time period for which this information is available, 1983-98, we found that on average this ratio was 25 per cent higher in non-designated areas. Thus, on average foreign firms in designated areas have lower linkages to intermediate suppliers in Ireland.[15] We also calculated the plant average of the percentage of raw materials that have been manufactured locally in each region type for each 3 digit NACE sector over the available time period. Using this variable as the independent variable and a set of time dummies as well as a designated area dummy as explanatory variables, we ran a simple OLS specification and found that the coefficient on the designated area dummy was negative and significant. Thus even at the sectoral level we find on average that foreign firms in designated areas have weaker linkages to Irish based intermediate suppliers.

Taken in the context of the results found by Görg and Ruane (2001) that the demand for Irish produced inputs by multinationals in the electronics sectors positively affected indigenous plant's size, our results provide some suggestive evidence that the demand for locally produced intermediate goods by multinationals may be lower in designated areas and thus may be a reason why there only spillovers to indigenous plants in designated areas from multinationals located outside their region. We thus split the surrounding regions' foreign presence measures into that in designated and that in non-designated surrounding regions. The results of including these for designated and non-designated areas are given in the third and sixth column of Table 3, respectively.

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phenomena in Ireland, although a priori it is difficult to argue that this may differ across our regional groups.

[15] Unfortuantely one cannot distinguish between whether these locally produced goods have been made by indigenous or other foreign firms.

Accordingly, for the non-designated areas these measures are insignificant.[16] In contrast, we find for designated areas that foreign presence in bordering regions within the same sector positively affects the net indigenous start-up rate, but only if it originates in non-designated areas. Thus, this provides some support for the possibility that indigenous plants locate in designated reasons for reasons other than to capture within region spillovers, but can still benefit from multinationals outside their region as long as these are on average relatively higher demanders of Irish produced intermediate goods.

Section V - Conclusion

In this paper, we investigate whether foreign presence can foster local industrial development using the case study of Ireland. Specifically, estimating an empirical entry rate model on an exhaustive plant level data set for Irish manufacturing covering the period since Ireland's accession to the EU, we show that, even after taking account of spatially non-restricted (i.e., nation-wide) externalities arising from multinational firms, the location of foreign multinationals in Ireland has impacted on where indigenous firms have started their business. We also examined whether such externalities may spill over to other bordering regions and found this indeed to be the case.

Given that Irish regional industrial policy has actively tried to disperse industrial activity, in particular foreign multinationals, to its lesser developed regions by offering greater incentives to firms locating in these, we also examined whether there are differences in our results across preferential treatment type. Our results show that, in general, the impact of foreign presence on indigenous start-up is restricted to regions'

[16] This may suggest that the aggregate surrounding region's effect at the broader sectoral level may suffer from aggregation bias as inlcuding these two measures separately produces the same insignificant result

boundaries if the region in question does not enjoy preferential policy treatment. In contrast, domestic businesses starting in the policy preferred areas react only to the location of multinationals in bordering non-favoured regions. Supplementary evidence suggests that this may be because multinationals agreeing to locate in the less developed regions have lower linkages to Irish intermediate suppliers.

and hence is not due to correlation.

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Figure 1: Evolution of average foreign employment share

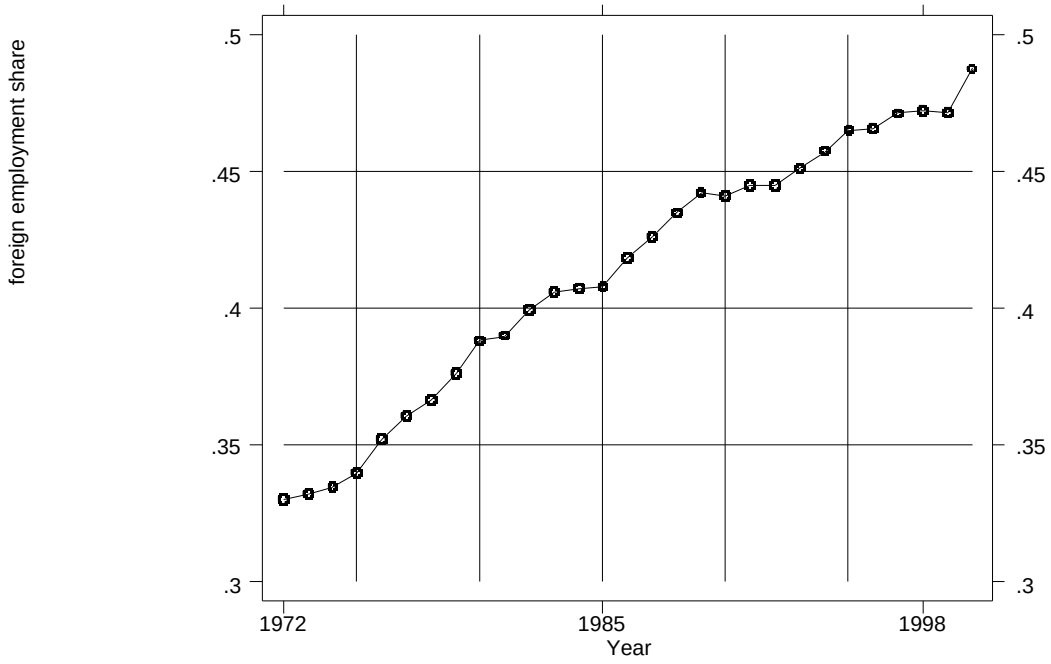
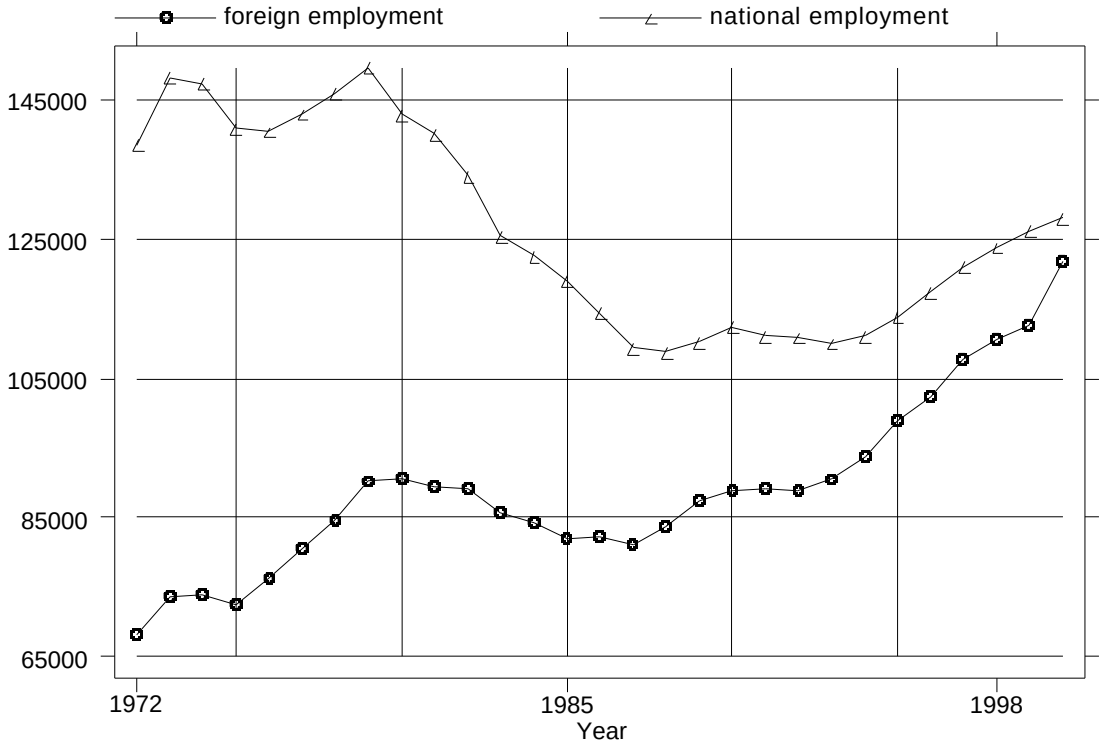


Figure 2: Evolution of foreign and domestic total employment



Map 1

Note: Cork is divided into two sub-regions given that part of Cork is considered as a designated area while the other part as non-designated area.

Table 1: Summary Statistics

Region	Average Net Indigenous Plant Entry Rate 1973-2000	Average Foreign Employment Share 1973-2000	Foreign Employment Share 2000	Δ Foreign Employment Share
Carlow	0.29	0.04	0.33	0.29
Cavan	0.40	0.19	0.26	0.07
Clare	1.46	0.53	0.74	0.20
Cork (DA)	0.50	0.22	0.33	0.11
Cork (NA)	0.33	0.35	0.58	0.23
Donegal	1.14	0.17	0.38	0.21
Dublin	0.03	0.36	0.46	0.10
Galway	0.75	0.40	0.58	0.18
Kerry	2.40	0.63	0.46	-0.16
Kildare	0.87	0.32	0.72	0.40
Kilkenny	0.10	0.10	0.11	0.01
Laois	-0.21	0.27	0.28	0.01
Leitrim	0.06	0.19	0.46	0.27
Limerick	2.41	0.44	0.69	0.25
Longford	0.39	0.27	0.20	-0.07
Louth	0.56	0.50	0.52	0.01
Mayo	0.33	0.29	0.54	0.25
Meath	0.34	0.20	0.22	0.02
Monaghan	0.63	0.21	0.12	-0.10
Offaly	0.40	0.05	0.44	0.39
Roscommon	0.26	0.16	0.44	0.27
Sligo	0.72	0.37	0.63	0.26
Tipperary (N)	2.07	0.22	0.29	0.07
Tipperary (S)	-0.09	0.26	0.50	0.23
Waterford	0.26	0.19	0.50	0.30
Westmeath	0.50	0.34	0.58	0.24
Wexford	0.47	0.27	0.37	0.10
Wicklow	0.40	0.16	0.29	0.14
NA	*0.26*	*0.33*	*0.50*	*0.16*
DA	*0.76*	*0.34*	*0.47*	*0.13*
TOTAL	**0.39**	**0.33**	**0.49**	**0.16**

Table 2: Impact of FDI on Regional Net Entry Rates by Sector

	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbf{FS_{3N,C}}$	0.019*		0.020*		0.036***	0.037***
	(0.011)		(0.011)		(0.012)	(0.012)
$\mathbf{FS_{2N,C}}$		0.037***		0.038***		
		(0.011)		(0.011)		
$\mathbf{FS_{3N,S}}$			0.020*			0.023
			(0.012)			(0.015)
$\mathbf{FS_{2N,S}}$				0.033**		
				(0.015)		
$\mathbf{FS_{3N}}$	0.061***		0.052***		0.070***	0.060***
	(0.018)		(0.019)		(0.022)	(0.023)
$\mathbf{FS_{2N}}$		0.064*		0.040		
		(0.033)		(0.035)		
$\mathbf{GR_C}$	0.262***	0.261***	0.262***	0.261***	0.252***	0.252***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.034)	(0.034)
$\mathbf{GR_{3N}}$	0.040***	0.038***	0.040***	0.038***	0.122***	0.121***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.015)	(0.015)
MES	-0.760	-0.582	-0.840	-0.593	-0.529	-0.625
	(2.273)	(2.273)	(2.274)	(2.273)	(2.635)	(2.636)
AGE	-2.295	-4.376	-2.409	-4.096	-7.540	-7.711
	(17.392)	(17.387)	(17.392)	(17.386)	(18.340)	(18.340)
Obs.	33016	33016	33016	33016	28435	28435
$\mathbf{F_{\beta=0}}$	18.19***	18.23***	17.74***	17.84***	17.63***	17.14***
$\mathbf{R^2}$	0.02	0.02	0.02	0.02	0.02	0.02

Notes: Standard errors in parentheses. ***, **, and * signify 1, 5, and 10 per cent significance levels. All specifications performed using a fixed effects panel estimator. MES and AGE are divided by 1,000,000. Columns five and six measure long-term effects.

Table 3: Impact of FDI on Net Regional Sectoral Entry Rates by Policy Treatment

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	*NA*	*NA*	*NA*	*DA*	*DA*	*DA*
$FS_{3N,C}$	0.024*	0.024*	0.024*	0.010	0.008	0.007
	(0.013)	(0.013)	(0.013)	(0.019)	(0.019)	(0.019)
$FS_{3N,S}$		0.007			0.042**	
		(0.015)			(0.019)	
$FS_{3N,S,\ NA}$			-0.002			0.019**
			(0.004)			(0.009)
$FS_{3N,S,\ DA}$			-0.002			0.021
			(0.016)			(0.018)
FS_{3N}	0.058***	0.055**	0.059***	0.071**	0.054	0.061*
	(0.022)	(0.023)	(0.022)	(0.032)	(0.033)	(0.032)
GR_C	0.214***	0.214***	0.214***	0.319***	0.319***	0.320***
	(0.034)	(0.034)	(0.034)	(0.050)	(0.050)	(0.050)
GR_{3N}	0.061***	0.061***	0.060***	0.030***	0.030***	0.030***
	(0.013)	(0.013)	(0.013)	(0.010)	(0.010)	(0.010)
MES	-0.152	-0.188	-0.141	-1.320	-1.386	-1.333
	(2.655)	(2.656)	(2.655)	(4.233)	(4.233)	(4.232)
AGE	-19.453	-19.460	-19.478	23.887	23.425	23.593
	(20.813)	(20.813)	(20.816)	(30.908)	(30.904)	(30.906)
Obs.	20547	20547	20547	12469	12469	12469
$F_{\beta=0}$	12.71***	12.34***	11.99***	10.14***	9.98***	9.73***
R^2	0.02	0.02	0.02	0.03	0.03	0.03

Notes: Standard errors in parentheses. ***, **, and * signify 1, 5, and 10 per cent significance levels. All specifications performed using a fixed effects panel estimator. MES and AGE are divided by 1,000,000. NA: Non-designated areas; DA: Designated areas.