**Efficiency Spillovers from Foreign Direct
Investment in the EU Periphery: A Comparative
study of Greece, Ireland and Spain***

by

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DOCUMENTO DE TRABAJO 2002-02

January 2002

- * The authors acknowledge support from a TMR grant on Foreign Direct Investment and the Multinational Corporation (FMRX-CT-98-0215). They would also like to thank H. Görg for valuable comments.
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Abstract

Despite a growing number of empirical studies on efficiency spillovers arising from the presence of multinational firms for a number of countries, general conclusions on this issue have been inhibited by differences in the data sets and estimation techniques used across studies. In this paper we conduct a comparative empirical study for Greece, Ireland and Spain by creating comparable data sets and estimating identical models. Our results show evidence of spillovers in Ireland and Spain only, although these positive spillovers seem to depend on whether firms have the absorptive capacity to capture technological spillovers and the criteria used to classify them as foreign affiliates.

JEL classification: F23; O30.

Keywords: FDI, multinationals, productivity growth, spillovers.

Introduction

The continuously growing role of foreign direct investment (FDI) in international production has prompted considerable interest in its effects on host economies.¹ One of the most frequently referred to positive effects of FDI is efficiency spillovers emanating from multinational to domestic firms in the host country. Accordingly, since multinational firms often use a higher level of technology than domestic firms, and technology, or knowledge, has certain characteristics of public goods (Markusen, 1995), there is scope for positive externalities and indigenous firms may benefit from these by becoming more efficient. Such spillovers can occur via three main channels (Blomström and Kokko, 1998): (1) 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 up-date production technologies and techniques to become more productive.²

Although there are now a considerable number of studies for a variety of countries, both developed and developing, the evidence on FDI-related efficiency spillovers has been mixed. In their extensive review of the literature, Blomström and Kokko (1998) conclude that spillovers depend mainly on the sector and the country under consideration. Using meta-analysis techniques on the literature's empirical findings, Görg and Strobl (2001) show that the nature of the data and estimation technique also play an important role.

Given the mixed findings of the literature and that this diversity is likely at least in part to depend on differences in the studies themselves rather than just differences in FDI efficiency spillovers across countries, it becomes clear that rather more general conclusions regarding spillovers arising from FDI will rest on conducting comparative studies across countries. This constitutes the purpose of the present paper.

Specifically, we create comparable firm-level data sets which allow us to contrast the impact of FDI presence on domestic productivity levels and growth

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¹ See Blomström and Kokko (1998) and Pack and Saggi (1997) for recent concise reviews of the literature on host country effects, in particular, productivity spillovers and technology flows of multinationals.

² As Aitken and Harrison (1999) point out, however, this competition effect may also reduce productivity in domestic firms, if multinationals attract away demand from their domestic competitors.

rates for Greece, Ireland and Spain between 1992 and 1997. These countries share many characteristics, not least their initial low level of GDP per capita and the low level of productivity in manufacturing compared to EU averages until the mid-1980ies. The magnitude of foreign direct investment in the aftermath of the Single Market Program (SMP) in particular in Ireland and Spain is likely to have had important effects on local industries. FDI may then be seen as a major catalyst for the industrial development and the integration of these countries to the EU. Our results indicate that significant spillovers from FDI only took place in Ireland and Spain in the 1990ies. In addition, such effects seem to depend on when a firm is considered to be foreign owned and whether domestic firms have the technological absorptive capacity to capture spillovers from multinationals.

The paper is organised as follows. In the following section we describe and contrast general features of FDI in Greece, Ireland and Spain. The construction of our comparable data sets and summary statistics are outlined in Section II. Section III contains the econometric analysis of FDI spillovers in the three countries, while section IV investigates whether these spillovers are affected by the absorptive capability of firms. Concluding remarks are provided in the final section.

I. FDI in Greece, Ireland and Spain

FDI has been often considered an important way with which to promote the modernization of new entrants to the EU (European Commission, 1996) and in the countries considered here has undoubtedly played a considerable role in this regard, although this has differed across countries. For example, in the case of Spain, the period 1988-1992 was especially intense in FDI with flows representing on average 2% of Gross Domestic Product (GDP). For Ireland, the period 1990-1996 saw the highest FDI inflows, comprising 6% of GDP on average. FDI in Greece is notably inferior in this regard with FDI/GDP shares rarely going beyond 1% and reaching a maximum of 1.6% of GDP in 1995.³

The differences in FDI experience across countries are in part attributable to different economic policy choices, and the Irish case certainly provides the most relevant example of an active role played by policy-makers in attracting FDI as a catalyst for industrial development. Prior to its entry to the EU, Ireland had been characterized by low levels of FDI. Also, most multinational companies located in Ireland at the time were UK owned companies that functioned there under the protectionist cover of the Irish government, serving solely the domestic market. Access to the European market, a surplus of low cost, but highly skilled labour and

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³ Sources: International Financial Statistics (IMF) and authors' computations.

generous industrial policy offering extensive grants and export tax relief saw a large influx of new multinationals into Irish manufacturing since its membership to the EU. Given the government's efforts on explicitly attracting companies operating in modern sectors that previously did not exist in Ireland, most of these tended to be technology intensive, thus providing an ideal setting for productivity spillovers to occur. Ireland's well known success as the 'Celtic Tiger' in terms of economic growth is generally attributed to the success of this industrial strategy.

Greece has also adopted a policy encouraging inward FDI since the early 1950ies. The main tools were tax relieves and institutional changes allowing almost free capital movements, especially full profit repatriation under certain conditions. Despite such measures FDI in Greece in the 1950ies was non-impressive. It picked up in the 1960ies for a short time and remained rather limited until the beginning of the 1990ies. Since then, and in agreement with the SMP, it shows an increasing presence reaching 10 and 14 percent of domestic fixed capital formation in 1994 and 1995, respectively. Recent changes in the government policy offering extra support to multinational firms mainly through institutional changes are thought to also have helped in attracting more FDI, which in spite of all efforts remains relatively limited (Barbosa and Louri, 2002).

The Spanish experience was, in contrast, quite different and FDI inflows after 1986 are to a greater extent more part of a broader financial and trade liberalization process of the economy rather than explicit policy incentives. After the initial steps taken at the end of the 1950ies, FDI has been progressively liberalized from the mid-1980ies in most sectors of the economy reaching the standards imposed by the SMP and the Economic and Monetary Union. While Spain's recent accession to the EU market has undeniably played an important role for FDI inflows, its large and growing market compared to other EU peripheral countries has been the major factor in attracting foreign investors (Bajo et al., 1994; Herce et al., 1998).

II. Data construction and summary statistics

The data sources used in this paper are the Irish Economy Expenditure survey (IEE), the Spanish Encuesta Sobre Estrategias Empresariales (ESEE), and the Greek ICAP Directory. The IEE is an annual firm level survey conducted by an agency of the Irish Industrial Authority – Ireland's main industrial governing body. It surveys firms that at the time of their first (written) interview have at least 20 employees and its response rate is generally good, covering around 60 to 80 per cent of such firms.

The ESEE is conducted by the *Fundación Empresa Pública* (FUNEP) and the Spanish Ministry of Industry and includes almost all manufacturing companies with more than 200 employees, and is a representative sample of manufacturing firms with less than 200 employees. The Survey covers around 22% of total employment in manufacturing, see Barrios and Strobl (2002). The unit of observation is at the firm-level, including firms with more than 10 employees, providing an annual panel of approximately 2100 Spanish manufacturing firms.

The ICAP Directory includes annual information from the accounts of all manufacturing Plc. and Ltd. firms in Greece and provides also information on employment, location, age and share of foreign ownership. Although there is no size limit, the firms included are rather large, the mean of employment in our sample exceeding 50 employees, while the respective mean of the total manufacturing population is 5 employees. Still, these firms form a very important part of the manufacturing sector, reportedly producing more than three quarters of manufacturing sales.

Given the different sources of data for Greece, Ireland and Spain our main task was to make the data sets for our empirical analysis as comparable as possible across countries. There are two aspects we considered in this regard. Firstly, the Greek data only covers continuing firms and hence we only included firms of this type in the other two data sets. Secondly, there are size differences in the three samples. While the Greek data is a sample of firms of all sizes, the Irish data only includes firms that in their first sample year have at least 20 employees (although it continues to sample them if they fall below that, so that many are below 20), whereas the Spanish sample oversamples firms with at least 200 employees and generally does not cover firms with less than ten employees. We thus excluded all firms in the Greek data set that had less than ten employees in 1997, and hence all data sets exclude the very small firms.⁴ Finally, we only included those firms for which there was information on employment, sales, capital stock and foreign ownership in both years. This left us with information on a total number of 2301, 407, and 658 firms for Greece, Ireland, and Spain, respectively. Information on sales, output and the capital stock was relatively comparable across countries and such variables were converted to 1992 US\$ for our analysis. From the nature of the questionnaires, a comparable distinction between indigenous and foreign firms was restricted by the Irish data source according to which only firms with at least 50 per cent foreign ownership are deemed to be multinationals. Subsequently, as a

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⁴ Our choice of the ten rather than twenty employees threshold was based on the observation that there were a significant number of firms in the Irish data that had between ten and twenty employees.

first step, we identified foreign firms in the Greek and Spanish data in a similar manner.

We have provided a number of summary statistics, calculated as the average of firm level measures, for domestic and foreign firms in Table 1. Accordingly, on average domestic and foreign firms are in terms of employment largest in Spain, while domestic firms are smallest in the Greek sample and foreign firms are smallest in Ireland. Domestic and foreign labour productivity are fairly similar in Ireland and Spain and nearly twice as large as in Greece. In terms of capital intensity, the measure is highest on average in Ireland for both the domestic and foreign sectors, whereas it is lowest in Greece. For all three countries, the size, productivity and capital intensity is higher, as would be expected, for multinational relative to domestic firms.

Another obstacle in creating comparable data is that sectoral classifications differed across data sets. In particular, Greek firms were defined according to 2 digit ISIC, Irish firms according to NACE Rev. 2, while Spanish firms were categorized according to a specific Spanish industrial classification derived from the European Nace 70. Given that the main focus of this paper is to compare spillovers from FDI arising within sectors, we were careful to create sectoral groupings that strictly corresponded across countries. Accordingly, we were able to classify firms into 14 sectors, namely, (1) Food, Drink, and Tobacco, (2) Textiles, (3) Clothing, Leather, and Footwear, (4) Paper, Printing, and Publishing, (5) Wood, Furniture, and Cork, (6) Rubber and Plastics, (7) Chemicals, (8) Transport, (9) Computing and Electrical Supplies, (10) Metal Products, (11) Industrial Machinery, (12) Basic Metal Industries, (13) Non-Metallic Mineral Products, and (14) Other Manufacturing.

The degree of foreign presence, measured as employment share of foreign firms within a sector, distributed across sectors in the two years for Greece, Ireland and Spain is given in Table 2. Accordingly, one finds that foreign presence has marginally declined in all three countries.⁵ Examining these measures in individual sectors, however, reveals that there is considerable diversity within the three countries. By 1997 foreign presence is highest in Chemicals and Computing and Electrical Supplies in Ireland and Greece, while in Spain the Chemicals and Transport sectors are characterized by the highest level of FDI. Most importantly, however, there were changes in the degree of foreign presence within sectors across all countries, rising in some and declining in others, hence allowing us to

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⁵ One should note that we are only considering the share of employment of continuing firms in our samples. Allowing for entry and exit over this period may feasibly alter these trends.

study the spillovers associated with such changes. Additionally, we calculated the sectoral FDI distribution in terms of employment across sectors for the three countries. As can be seen from Table 3, in Greece the Food, Drinks and Tobacco sector has the highest share of multinational employment, while in Ireland and Spain the Computing and Electrical Supplies and the Transport sector, respectively, have attracted most FDI. If one considers Rubber and Plastics, Chemicals, Computing and Electrical Supplies, and Industrial Machinery as the more technology intensive sectors, then the figures from Table 3 imply that on average in our sample period two thirds of FDI was in technology intensive sectors in Ireland and Spain, while the comparable figure of Greece was only about 40 per cent.

Domestic labour productivity across sectors and countries for 1992 and 1997 (in 1992 US \$) was also calculated and presented in Table 4. As can be seen, over time domestic labour productivity has increased in Greece and Spain, while, in contrast, it has remained fairly stable in Ireland. We also find that within sectors there have been considerable changes over our five year period across all countries – most sectors experiencing an increase, while only 5 (of the 42) experienced a fall in domestic labour productivity.

III. Econometric analysis

Our base empirical specification for measuring the potential impact of spillovers on domestic firm productivity arising from FDI is, as in most of the empirical literature, as follows:

$$(1) \quad \log(Y_i/L_i) = \alpha + \beta \log(K_i/L_i) + \beta FOR_j + \phi_j + \mu_i + \varepsilon_i$$

where a domestic firm i 's labour productivity, Y/L , is assumed to be dependent on its capital intensity, K/L , and foreign presence, FOR . The terms μ and ϕ are intended to capture time invariant unobserved firm (i) and sector (j) level effects, respectively, while ε is a standard error term (Machin, 1991). Our main variable of interest is FOR and is intended to control for the degree of foreign presence and hence potential productivity spillovers emanating from multinationals. We measure foreign presence as the share of employment within a firm's sector j , and hence only allow for intra-sectoral spillovers.⁶

⁶ We chose to use the share of employment rather than the share of output given that in Ireland some have argued that there is likely to be substantial transfer pricing and hence output figures are inaccurate. Note also that there may be inter-sectoral spillovers. However, given the fairly aggregate sectoral classification used in this paper, the possibility of inter-sectoral spillovers is likely to be small.

We first estimated (1) on our two years of firm level data using standard OLS and did not control for time invariant firm and sector specific fixed effects – the results of which are given for the three countries in Table 5.⁷ Accordingly, we find that capital intensity acts in all three countries to increase labour productivity, as one is likely to expect. More importantly, however, we find that foreign presence acts to increase labour productivity only in Greece and Spain, thus suggesting the existence of (positive) productivity spillovers in these countries. These spillover effects are considerably larger in Greece, as confirmed by a simple t-test of the difference.⁸ In contrast, we find no positive spillovers for Irish manufacturing plants as the coefficient is negative and insignificant at standard levels of statistical significance.

We also estimated (1) and included time invariant industry dummies since foreign presence may be higher in sectors that are naturally more productive, as, for instance, high technology sectors.⁹ The results of this exercise are given in Table 6, and, as can be seen, the positive and statistically significant effect of foreign presence now vanishes for all three countries, while the null hypothesis of industry dummies being jointly equal to zero can be rejected at standard significance levels.¹⁰

Another problem with running simple OLS on (1) is that one does not control for unobserved time invariant firms specific effects, μ , that could very well be correlated with the explanatory variables, in particular foreign presence, and hence render their estimates biased. For instance, the more productive domestic firms are likely to start up in sectors in which high productivity is important, regardless of whether multinationals are there or not, but these sectors may also attract multinationals.¹¹ As was shown by Aitken and Harrison (1999) and Görg and Strobl (2001), allowing for such factors can produce dramatically different results than under a simple OLS specification, usually eliminating any positive

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⁷ In this table and all subsequent tables standard errors are heteroscedasticity corrected.

⁸ Such a t-test is only valid under very stringent assumptions about the error structure of the two samples, namely that they come from the same distribution.

⁹ Aitken and Harrison (1999) argue foreign firms may be more likely to locate in certain sectors so that foreign presence may be correlated with time invariant industry characteristics that affect productivity levels in and of themselves.

¹⁰ One possibility is that there is not enough time variation in foreign presence at the sectoral level in all three countries in the time period considered. However, as will be shown later (Table 8), there are some groups of firms, at least for Ireland and Spain, that have experienced positive spillovers.

¹¹ There is, of course, the possibility that multinationals trigger start-ups of indigenous firms; see, for instance, Markusen and Venables (1998) and Görg and Strobl (2001).

spillovers found under OLS. We thus used the panel nature of our data and first differenced (1) which allows us to purge any time invariant firm and sectoral effects from the specification, the results of which are displayed in Table 7. Accordingly, in the first differenced model we again find no evidence of significant spillovers arising from the presence of foreign companies for any of the three countries.¹²

Overall, therefore, the above results support the view that increased foreign share in an industrial sector may not produce statistically significant spillovers to domestic firms productivity levels or their growth rates.¹³ At first glance, this evidence is in accordance with recent studies for the UK and some developing countries, but contrasts with a number of other studies supporting the existence of strong positive (or negative) productivity spillovers from FDI.¹⁴ It should be made clear though that our results are not quite comparable to those of previous studies for the reason that we have considered as foreign only those firms with majority foreign holdings (i.e. at least 50 per cent). Also, only relatively large domestic and foreign firms are included in our cross-country samples. This was primarily driven by the constraints of the Irish data and is, of course, somewhat arbitrary since it may very well be that even firms with much smaller foreign ownership are more like multinationals than domestic firms. Additionally, smaller firms, not included in our samples, may be more responsive to spillovers. Actually, Dimelis and Louri (2002) when estimating the effect of foreign presence on domestic productivity levels in Greece using the complete (all firms sizes) ICAP 1997 cross-sectional sample found that spillovers stem only from minority held foreign firms (with less than 50 percent foreign ownership). It may be that more intensive interaction between foreign and domestic firms takes place in the latter case. On the contrary, majority held foreign firms may be more independent and hence more isolated from the host country environment, causing less technology transfer. Furthermore, the estimated spillover effects were differentiated among different size quantiles with larger firms showing less responsiveness.¹⁵

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¹² One possible explanation of this result is that there was little variation in the degree of foreign presence within sectors.

¹³ We also ran our spillover equations for foreign firms only, but again found no evidence of negative or positive spillovers arising from FDI and benefiting foreign firms only.

¹⁴ See Table 1 in Görg and Strobl (2001) for a summary of various spillover results obtained in the literature.

¹⁵ One should note that access to only 1997 information prohibited the authors from controlling for time invariant firm specific unobservables.

The choice of cut-off point can, in fact, be important in the sense that it both defines the degree of foreign presence and the sample of firms for which we investigate whether foreign presence produces any spillover effects, and thus may significantly affect the measurement of spillover effects. In the Irish case the choice of cut-off point is unlikely to be important given that most FDI has been greenfield investment and not acquisitions and mergers.¹⁶ This is not, however, so for Greece and Spain, where for those firms with at least some foreign ownership, the means and standard deviations of the share in firms with at least some foreign ownership are 63 and 36 per cent and 84 and 27 per cent for Greece and for Spain, respectively.

In order to investigate whether our definition of foreign ownership is driving our lack of empirical support for productivity spillovers for Greece and Spain, we considered, in separate exercises, firms with at least 10 and firms with at least 30 per cent of foreign ownership as foreign, defining the sample of domestic firms and calculating foreign presence within a sector accordingly. The results of estimating the growth equations [i.e. the first differenced version of (1)] for these samples are provided in Table 8. Examining the 30 per cent samples first, we find that there are now positive spillovers for Spain. Further broadening the definition of foreign firms to those with at least ten per cent foreign ownership, which increases the degree of foreign ownership within a sector but reduces the number of potential domestic recipients of spillovers, slightly reduces the coefficient on foreign presence for the Spanish sample, although it still remains statistically significant. In the case of Greece, lowering the cut-off point on the degree of foreign ownership resulted in an overturn of the previous negative effect into a positive one, though still insignificant.¹⁷ The results from the above exercise indicate that, for some countries, it matters whether minority foreign holdings are included in the definition of foreign share when estimating FDI spillover effects.

IV. FDI spillovers and absorptive capability

Blomström and Kokko (1998) argue that “*the positive effects of foreign investment are likely to increase with the level of local capability (of absorbing these)*” (p.247). Support for this contention was found by Kokko et al (1996) in a study of Uruguayan firms for which they found evidence of productivity spillovers only to domestic firms with moderate technology gaps vis-à-vis foreign firms, i.e., domestic firms with at least some capability of being able to make use of the

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¹⁶ As a matter of fact, Irish industrial policy has been to only support multinationals locating in Ireland if these did not involve acquisitions of domestic firms (Barry and Bradley, 1997).

¹⁷ This result still held even when we considered a firm with any share of foreign ownership.

spillover effects. It is, of course, difficult to measure a firm's "absorptive capacity" and we, as in other attempts, are faced with using only a proxy that is arguably correlated with a firm's ability to avail of spillovers from foreign presence within a sector. In particular, we use, as in Barrios and Strobl (2002), two potential measures of absorptive capacity, namely whether a firm conducts R&D and/or whether a firm exports. The fact that a firm already undertakes R&D is clearly suggestive of the possibility that a firm deems it important and is capable of absorbing new technologies and production techniques if these are available. A firm's R&D activity may also suggest its need for highly skilled workers, and these are arguably more likely to first acquire the required skills in foreign firms. For the case of using export activity as a proxy, one could similarly argue that exposure to foreign markets is likely to have made participating firms more likely to already have higher levels of technology relative to those firms that only operate on the local market and evidence of this is provided in Kokko et al (1996).

Our main problem in using R&D and exporting activity as proxies for absorptive capacity for the comparative study here is that we only have information on these variables for the Irish and Spanish data sets. Nevertheless we divided these two samples into those with absorptive capacity (AC), i.e., those that undertook R&D and/or exported, and those that did not (N-AC) and ran the growth equations on these subsamples which are presented in Table 9.¹⁸ Accordingly, we now find evidence of statistically significant positive spillovers for Ireland in the AC group of firms that have, as proxied by R&D and/or exporting activity, absorptive capacity. A similar result is obtained for Spain, but only when using the more flexible definition of ownership.¹⁹ These results, thus, lend some credence to the aforementioned argument on the necessity of domestic firms needing some minimum level of technological capacity to benefit from spillovers from multinationals.

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¹⁸ One should note that the individual samples do not add up to the total in the previous regressions as for some firms data on R&D and/or exports was missing.

¹⁹ Given our lack of data on proxies for absorptive capacity for Greece we also experimented with dividing sectors into export intensive and non-intensive for all three countries and running the spillover regressions separately for these two sectoral groupings. Under the assumption that firms are homogenous within sectors in this regard, one should be able to proxy for absorptive capacity accordingly without explicit firm level information on this aspect. Doing so, we found no evidence for Greece for either the export intensive or the non-intensive sectors of spillovers, regardless of how we defined foreign ownership. Similarly, we did not find any evidence of positive spillovers when we divided the Greek sample into broad technology intensive and non-intensive sectors. However, it must be noted, that a similar result was found for Ireland and Spain, which lies in contrast to our regressions with firm level measures of absorptive capacity, thus implying that such a homogeneity assumption is not valid. Detailed results are available from the authors.

V. Conclusions

There are now a sizeable number of studies of developing and developed countries investigating whether there are positive productivity spillovers to the host economy arising from the presence of multinationals. While the empirical evidence has clearly been mixed, reviews of the literature indicate that this is at least in part due to differences in the nature of data and estimation techniques used across the studies conducted making it difficult to draw any more general conclusions. In this paper we set out to avoid these problems by creating comparable data sets for Greece, Ireland and Spain, to estimate the possibility of spillovers emanating from the presence of multinationals in the host country and referring mainly to large firms.

We find evidence of positive efficiency spillovers arising from FDI in Ireland and Spain only, although positive spillovers in these countries seem to depend on two factors. Firstly, only firms with the technological ability to absorb spillovers are likely to benefit from multinationals operating in their sector. Secondly, the choice of cut-off point in terms of foreign participation for which a firm is considered to be ‘foreign’ is important in terms of measuring spillovers, as it determines both when a firm is considered a potential recipient and potential creator of technological spillovers. In particular, the latter is indicative of the crucial role the joint ventures with minority foreign holdings may play for Spain and Greece in the way technology is diffused in such economies.

The estimated lack of significant positive spillovers arising from FDI in Greece may be due to many reasons. The large size of firms examined, already found not to be highly interactive with foreign firms in contrast to small firms, which are much more responsive, may be one of them. The stress on majority foreign owned firms may be another. And, finally, the sectoral distribution of FDI may be important, as we find that, in contrast to Ireland and Spain, FDI in Greece is predominantly located in more traditional, low technology, sectors. In these latter type sectors one may suspect that the possibility of technology spillovers is less likely to occur.

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TABLE 1
SUMMARY STATISTICS (MEANS) FOR DOMESTIC AND FOREIGN FIRMS:
GREECE, IRELAND AND SPAIN

	Greece		Ireland		Spain	
	<i>Domestic</i>	<i>Foreign</i>	<i>Domestic</i>	<i>Foreign</i>	<i>Domestic</i>	<i>Foreign</i>
L	65	227	90	186	201	647
Y/L	69	126	134	247	137	247
K/L	32	51	67	143	48	97

Note: Figures are means of firm level figures.

TABLE 2
FDI PRESENCE IN GREECE, IRELAND AND SPAIN BY SECTOR:
1992 and 1997

Sector	Greece		Ireland		Spain	
	1992	1997	1992	1997	1992	1997
Food and Tobacco & Beverages	12.6	12.0	39.8	31.1	38.0	36.9
Textiles	2.4	1.7	69.1	68.3	20.7	18.9
Clothing, Leather, & Footwear	8.0	7.5	25.4	30.9	0.0	0.0
Paper, Printing & Publishing	5.8	5.7	14.6	14.9	12.8	10.2
Wood, Furniture, & Cork	0.6	0.6	15.5	12.3	24.8	35.0
Rubber and Plastics	11.6	12.1	57.7	54.1	59.9	56.2
Chemicals	34.3	31.8	88.9	85.5	57.0	58.3
Transport	5.6	7.8	70.2	73.8	64.2	63.0
Computing & Electrical Supplies	22.8	21.7	90.7	89.1	61.3	56.6
Metal Products	4.4	4.0	40.7	33.2	15.6	18.2
Industrial Machinery	0.0	0.0	69.9	66.2	58.3	54.2
Basic Metal Industries	26.9	21.3	82.1	66.7	5.6	7.7
Non-Metallic Mineral Products	18.0	16.0	48.7	22.4	37.9	37.7
Other Manufacturing	20.0	14.0	83.6	58.6	26.7	19.7
TOTAL	12.3	11.2	58.9	57.2	45.0	44.6

Note: FDI presence is the share of employment in foreign firms over total employment in each sector.

TABLE 3
FDI SECTORAL DISTRIBUTION IN GREECE, IRELAND AND SPAIN BY SECTOR:
1992 and 1997

Sector	Greece		Ireland		Spain	
	1992	1997	1992	1997	1992	1997
Food and Tobacco & Beverages	28.4	29.8	15.5	11.9	13.1	11.8
Textiles	1.6	1.0	6.9	5.4	2.7	2.7
Clothing, Leather, & Footwear	6.6	5.8	1.7	1.9	0.0	0.0
Paper, Printing & Publishing	3.8	4.1	2.1	1.6	0.2	0.3
Wood, Furniture, & Cork	0.2	0.2	0.6	0.6	2.2	4.0
Rubber and Plastics	3.1	4.0	4.0	3.8	3.0	3.8
Chemicals	20.5	21.1	16.4	16.2	11.6	11.3
Transport	2.1	2.7	8.5	6.6	40.6	38.8
Computing & Electrical Supplies	7.6	8.1	29.1	40.1	13.9	14.1
Metal Products	2.6	2.7	3.1	2.7	1.7	2.2
Industrial Machinery	0.0	0.3	6.2	5.3	5.5	5.0
Basic Metal Industries	5.9	4.2	0.9	0.4	1.1	1.1
Non-Metallic Mineral Products	12.5	10.8	2.5	1.6	4.2	4.6
Other Manufacturing	5.1	5.1	2.4	2.0	0.3	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: FDI sectoral distribution is foreign employment in each sector over foreign employment in all sectors

TABLE 4
DOMESTIC LABOUR PRODUCTIVITY IN GREECE, IRELAND AND SPAIN
BY SECTOR: 1992 and 1997

Sector	Greece		Ireland		Spain	
	1992	1997	1992	1997	1992	1997
Food and Tobacco & Beverages	73.3	100.9	299.3	264.4	173.9	209.3
Textiles	63.4	90.4	61.9	74.0	100.3	97.2
Clothing, Leather, & Footwear	37.1	65.8	49.8	59.1	99.4	124.9
Paper, Printing & Publishing	46.9	71.7	103.4	106.9	89.9	96.0
Wood, Furniture, & Cork	41.8	56.4	84.2	97.6	118.5	135.8
Rubber and Plastics	51.9	72.8	94.3	121.2	122.5	128.9
Chemicals	85.4	116.3	137.4	150.0	192.8	246.3
Transport	33.0	46.5	92.2	80.7	109.1	132.1
Computing & Electrical Supplies	63.0	71.5	88.8	102.7	123.0	124.3
Metal Products	49.2	71.6	73.9	82.0	105.7	111.1
Industrial Machinery	43.1	63.3	100.1	112.0	123.5	129.8
Basic Metal Industries	109.0	201.7	109.5	123.1	211.9	304.8
Non-Metallic Mineral Products	58.8	73.3	101.8	119.7	118.0	110.6
Other Manufacturing	111.1	82.0	164.1	137.7	86.7	103.9
TOTAL	60.5	80.9	134.6	133.9	129.6	141.3

TABLE 5
IMPACT OF FDI SPILLOVERS ON DOMESTIC LABOUR PRODUCTIVITY:
OLS model at levels

	Greece	Ireland	Spain
Log(K/L)	0.230*** (0.011)	0.446*** (0.025)	0.196*** (0.015)
FOR	1.098*** (0.114)	-0.087 (0.073)	0.338*** (0.101)
Constant	3.329*** (0.036)	3.012*** (0.101)	4.055*** (0.063)
Observations	4602	814	1316
F($\beta_i=0$)	261.31	153.60	93.96
R²	0.15	0.40	0.16

Notes: (1) Robust standard errors in parantheses (2) ***, **, * signify 1, 5, and 10 per cent significance levels, respectively.

TABLE 6
THE IMPACT OF FDI SPILLOVERS ON DOMESTIC LABOUR PRODUCTIVITY:
OLS model at levels with Industry Dummies

	Greece	Ireland	Spain
Log(K/L)	0.212*** (0.012)	0.353*** (0.023)	0.175*** (0.014)
FOR	-1.608 (1.035)	-0.213 (0.430)	0.226 (0.860)
Constant	3.229*** (0.102)	3.564*** (0.381)	3.962*** (0.226)
Observations	4602	814	1316
F($\beta_i=0$)	49.29	53.65	27.58
F(IND=0)	9.80	20.35	14.18
R²	0.17	0.58	0.26

Notes: (1) Robust standard errors in parantheses (2) ***, **, * signify 1, 5, and 10 per cent significance levels, respectively.

TABLE 7
IMPACT OF FDI SPILLOVERS ON DOMESTIC LABOUR PRODUCTIVITY GROWTH:
OLS first differenced model

	Greece	Ireland	Spain
$\Delta \log(K/L)$	0.256*** (0.026)	0.103*** (0.029)	0.025 (0.020)
ΔFOR	-0.219 (0.880)	0.212 (0.223)	0.252 (0.363)
Constant	-0.042*** (0.015)	0.126*** (0.024)	0.094** (0.042)
Observations	2301	407	658
$F(\beta_i = 0)$	51.69	6.78	0.92
R^2	0.11	0.05	0.00

Notes: (1) Robust standard errors in parantheses (2) ***, **, * signify 1, 5, and 10 per cent significance levels, respectively.

TABLE 8
IMPACT OF FDI SPILLOVERS ON DOMESTIC LABOUR PRODUCTIVITY GROWTH:
The degree of foreign ownership

	Greece		Spain	
	10 %	30 %	10 %	30 %
$\Delta \log(K/L)$	0.253*** (0.026)	0.254*** (0.026)	0.022 (0.020)	0.022 (0.020)
ΔFOR_{10}	0.226 (0.609)	---	0.616* (0.369)	---
ΔFOR_{30}	---	0.152 (0.766)	---	0.720** (0.349)
Constant	0.048*** (0.016)	0.046*** (0.016)	0.097** (0.042)	0.098** (0.042)
Observations	2265	2283	623	641
$F(\beta_i = 0)$	48.55	49.62	1.90	2.49
R^2	0.11	0.11	0.01	0.01

Notes: (1) Robust standard errors in parantheses (2) ***, **, * signify 1, 5, and 10 per cent significance levels, respectively.

TABLE 9
THE IMPACT OF FDI SPILLOVERS ON DOMESTIC LABOUR PRODUCTIVITY
GROWTH: Absorptive Capacity

	Ireland		Spain			
	AC	N-AC	AC	N-AC	AC	N-AC
$\Delta \log(K/L)$	-0.009	-0.005	0.200** *	0.059*	-0.006	0.059*
	(0.160)	(0.046)	(0.071)	(0.034)	(0.024)	(0.034)
ΔFOR	1.876** (0.736)	0.302 (0.675)	-0.008 (0.485)	0.587 (0.624)	--	--
ΔFOR10	--	--	--	--	0.826* (0.430)	0.070 (0.625)
Constant	0.227* (0.124)	0.218** (0.093)	0.008 (0.048)	-0.055 (0.064)	0.190*** (0.053)	-0.059 (0.065)
Observations	57	234	52	197	429	194
$F(\beta_j=0)$	3.71	0.17	4.30	2.37	1.96	1.55
R^2	0.06	0.00	0.18	0.03	0.01	0.03

Notes: (1) Robust standard errors in parantheses (2) ***, **, * signify 1, 5, and 10 per cent significance levels, respectively (3) For Spain the effect of ΔFOR30 was similar to of ΔFOR10 .

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