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of Leading Firms in the EU**

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Abstract

Geographical diversification describes the degree to which a firm's operations in a particular industry are dispersed across countries. This paper presents evidence on the geographical diversification within the EU of the 290-odd largest manufacturing firms in Europe. We also explore how geographical diversification changed with the introduction of the Single Market. We highlight differences between firms' home and foreign operations and study the variation across sectors and across EU countries. Ireland, which began its rapid FDI-fuelled convergence on average EU living standards over our data period, emerges as a special case and receives particular attention.

Keywords: Single Market, Geographical Diversification, FDI, Multinational Corporations.

JEL Classification: F15, F23, O52.

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Introduction

Dunning (1997a, 1997b) summarises the literature on the effects of intra-European trade liberalisation on aggregate FDI inflows in the region. He finds that both the original formation of the Common Market and the development of the Single Market were accompanied by substantial net increases in both intra- and extra-EU FDI inflows. Intra-EU flows as a proportion of total EU outflows rose from 31 per cent to 51 per cent between the mid- and late 1980s, in the run-up to the Single Market, while the proportions of US and Japanese flows attracted to the EU rose from 39 to 45 per cent and from 17 to 21 per cent respectively over this period. Pain and Lansbury (1996), furthermore, calculate that the Single Market Programme raised the constant-price stock of UK outflows to the rest of the EU by around 30 per cent, and the German stock by around 6 per cent.

There is little known as yet however about the changes in firm-level behaviour that underlie these aggregate statistics. Were the increased flows generated by firms “going multinational” within Europe for the first time? Was there a general increase in the geographical diversification of existing multinational firms or, conversely, could it have been that multinational firms reduced the number of foreign production facilities they operated whilst increasing their aggregate foreign production levels?

Theory typically focuses on the incentives faced by firms outside an emerging free trade area (FTA) to service the area by exports or alternatively to set up production facilities within the FTA by engaging in foreign direct investment. Thus Markusen (1998) notes that the increase in market size consequent on trade liberalisation favours the high fixed-cost option of servicing the market via FDI, as against the high marginal-cost option of exporting.

Neary (2002), however, points to two other aspects of the development of an FTA that can lead to a reduction in the number of foreign plants. Firstly, reductions in inter-FTA tariffs reduce the tariff-jumping incentive to set up more than one FDI plant in the area, and secondly, reduced internal tariffs also lead to increased competition from EU firms, which works against extra-EU FDI inflows.

This literature, which focuses on horizontal or “market seeking” FDI, does not provide a motive for further geographical diversification on the part of firms which are already

multinational within Europe. It suggests, to the contrary, that rationalisation is the more likely outcome because of the disappearance of the "tariff-jumping" motive.

In the case of vertical FDI, however, which entails fragmenting the production process, trade liberalisation will allow firms reap the benefits of the differing comparative advantages of the regions within the FTA. If foreign direct investment is of this type, we would typically expect an expansion in the number of plants each firm will operate.

Exploration of the empirical consequences of the Single Market at this level requires firm-level data. We bring one such database to bear on the issue. Our dataset contains information on the EU production locations of (both EU- and non-EU-owned) firms that are amongst the top five leaders in EU production in each of 96 (three-digit NACE 0) manufacturing industries.

Our database reveals a substantial increase in the number of leading firms that can be classified as multinational within Europe between the years 1987 and 1993 (the two years spanning the emergence of the Single Market for which we have data). We also find a substantial increase in the degree of geographical diversification of production facilities on the part of firms that were already multinational. This runs contrary to the standard theory of horizontal FDI as outlined above. While there is no universally accepted way of distinguishing empirically between horizontal and vertical FDI, our sense is that a lot of the firm-level activity in our database is of a horizontal nature. Thus our results point to a lacuna in the theory.

The paper is structured as follows. Section 2 introduces the dataset and presents some summary statistics that emerge. Section 3 presents our statistical measures of geographical diversification. Section 4 discusses the changes that took place over the Single Market era, illustrating that these were particularly sizeable in the Irish case. Since our data period coincides with the beginning of the period of rapid real convergence that saw the country come to be dubbed "the Celtic Tiger", we subject the Irish experience to somewhat closer scrutiny. Section 5 concludes.

2 The Dataset

The dataset describes the EU manufacturing production of the “leading firms” in the EU. A firm is so classified if it occupies a place among the five firms with the largest EU production in a (three-digit NACE 0) manufacturing industry. There are 96 industries included and so a maximum of 480 firms can enter the sample. If some firms are leaders in more than one industry, however, a smaller number of firms will appear in the dataset. Once a firm is included, all its manufacturing production – i.e. including its performance in sectors in which it is not a leader – is described in the data. Each firm’s production is disaggregated across both industries and across countries which were EU members prior to the enlargement of 1995.¹

This mapping of firm-level production is the outcome of a multi-centred research project to generate an ‘EU Market Share Matrix’ for both 1987 and 1993.² The firm-level information is drawn from company reports and business directories, while industry and country data comes from national statistical sources and from Eurostat.³

We begin by presenting some summary statistics regarding the dataset. Table 1 shows the number of firms that are included in the sample in each year. It also provides a breakdown by nationality and indicates how many of the firms are present in each country. Of the 290-odd firms, the plurality are of German origin, followed in descending order by firms from the UK, France, Italy and the US. US firms represented the largest increase in numbers in the sample over the 1987-1993 period. Germany played host to more leading firms than did any other country; it was followed in this, respectively, by France, the UK and Italy.

Each EU country played host to more of the leading firms in 1993 than it did in 1987, indicating a substantial increase in the foreign operations of the leading firms over the period. The largest percentage increases in numbers of firms hosted were recorded by Greece, Denmark, Portugal and Ireland respectively.

¹ These include the UK, Germany, France, Italy, Spain, The Netherlands, Belgium/Luxembourg, Greece, Denmark, Portugal and Ireland.

² See Davies and Lyons (1996). Participating institutions included the University of East Anglia (Norwich), CERIS-CNR (Torino), University of Navarra (Barcelona) and Katholieke Universiteit Leuven.

³ Checks are carried out to ensure that estimates of a particular firm’s presence in a particular industry and country are consistent with the more aggregate data sources.

Table 1: Number of firms in the sample (by nationality) and numbers present in each EU country

	SOURCE		HOST		Percentage increase in firms hosted
	1987	1993	1987	1993	
UK	59	52	134	156	16
Germany	69	64	154	187	21
France	54	48	151	183	21
Italy	44	47	124	154	24
Spain	5	5	95	138	45
Holland	10	8	65	92	42
Bel/Lux	11	11	77	86	12
Greece			15	33	120
Denmark		3	17	33	94
Portugal	2	1	28	48	71
Ireland			17	28	65
Australia	1	1			
Canada	3	3			
Japan	1	5			
Norway		1			
Sweden	2	4			
Switzerland	5	6			
USA	24	33			
TOTAL	290	292			

Table 2 illustrates the degree of industrial diversification exhibited by these firms, and how it varies across EU countries.

Table 2:
The average number of manufacturing industries in which sample firms are active, by host country

	1987	1993
TOTAL	5.13	4.87
UK	3.66	2.96
Germany	3.58	3.66
France	2.93	2.61
Italy	3.19	3.08
Spain	1.67	1.78
Holland	1.71	1.70
Bel/Lux	1.94	1.95
Greece	1.27	1.24
Denmark	1.29	1.82
Portugal	1.32	1.23
Ireland	1.29	1.14

This illustrates that a firm with a production facility in Ireland will concentrate on producing only a narrow range of products there (i.e. its Irish production will be concentrated in a single industrial segment) while it will produce a broader range of products (spanning 4 different industries) in its production facilities in Germany. It is clear from the table that range of products produced in a country depends on the size of the country's market.

We now focus on the production that takes place outside a firm's home country. By concentrating on foreign operations, we restrict the sample to include only firms that are multinational within the EU (by which we mean non-EU firms plus those EU firms which have operations in EU countries other than their home base). 115 of the leading firms in 1987 were not multinational in this sense. By contrast, this was the case for only 83 of the leading firms in 1993. There is thus a general rise in multinationality over the period under discussion.

Table 3 shows the levels of foreign production in 1987 and 1993, as well as its cross-country distribution. Foreign production levels by leading firms in each EU country increased (in nominal terms at least) over the period. The Danish share grew most, followed by the Dutch,

Irish and Portuguese shares respectively. The largest declines in share, on the other hand, were recorded by Belgium/Luxembourg and Greece.

Table 3:
Total EU foreign production by leading firms in each host country (in ECU million and as a percentage of firms' total foreign production in the EU)

	1987		1993		Percentage increase in share, 1987-1993
	foreign production	Share of total foreign production	Foreign production	Share of total foreign production	
UK	39714	19.0	55715	17.7	-6.8
Germany	54668	26.2	86392	27.5	5.0
France	34562	16.6	52867	16.8	1.2
Italy	22696	10.9	35627	11.3	3.7
Spain	22144	10.6	32374	10.3	-2.8
Netherlands	8546	4.1	16919	5.4	31.7
Bel/Lux	18658	8.9	21605	6.9	-22.5
Greece	2014	1.0	2475	0.8	-20.0
Denmark	1667	0.8	3419	1.1	37.5
Portugal	2522	1.2	3952	1.3	8.3
Ireland	1492	0.7	2549	0.8	14.3
TOTAL	208684	100	313893	100	0

3. Geographical Diversification

We wish to separate out two aspects of geographical diversification. These are the degrees of diversification associated with: (i) the activities in which these firms are engaged in at home; and (ii) the subcategory of these activities in which firms are engaged in production abroad. These aspects may diverge significantly because home and foreign operations are typically associated with different sets of industries.

3.1 Comparing the Geographical Diversification of Home and Foreign Operations

To examine the degree to which the home activities of leading firms are geographically diversified, we introduce two measures – count and share. Count is the number of countries

in which a firm has a presence in a particular industry. This can be found for each country as follows: *if firm i's activities in its home country k include industry j, then "count" records the total number of EU countries in which firm i has industry j operations.* By averaging across observations, we derive a measure of the geographical diversification of country k-owned firms.

We can also describe how this production is distributed across countries. "Share" is the percentage of a firm's total EU production in an industry that is accounted for by production in its home base. *If firm's i's home activities include industry j, then the share for its home base, country k, records the percentage of firm i's total EU production in industry j that its country k operations represent.*

Table 4 presents the average count and share values for each EU country.⁴

Table 4:
The average count and share associated with home operations, by home location

	1987			1993			Changes	
	no. obs.	count	share	no. obs	count	share	count change	share change
UK	326	1.49	92%	221	1.94	84%	+0.45	-8%
Germany	371	1.50	94%	398	1.72	92%	+0.22	-2%
France	247	1.70	92%	190	2.48	84%	+0.78	-8%
Italy	222	1.31	96%	225	1.67	89%	+0.36	-7%
Spain	5	1.00	100%	7	1.14	97%	+0.14	-3%
Nether.	35	3.40	69%	24	4.00	65%	+0.60	-4%
Bel/Lux	39	1.41	94%	36	2.00	85%	+0.59	-9%
Denmark				6	1.50	92%		
Portugal	2	1.00	100%	1	1.00	100%	0.00	0%

Average count values for countries other than the Netherlands run from around 1.50 to 2.

The interpretation is as follows: if a domestically-owned firm has domestic operations in a

⁴ As "count" measures the number of countries in which a firm has a presence while "share" measures the proportion of its total production that is undertaken in the firm's home economy, these two measures will typically be inversely related.

particular industry, it is also active in that industry in, on average, 0.5 to 1 other EU countries. Typical average shares are around 90%: if a domestically-owned firm has domestic operations in a particular industry, these comprise, on average, 90% of the firm's total EU production in that industry.

Dutch firms are an exception. These have higher counts (above 3) and lower shares (around 65%). Thus there appears to be an unusually strong tendency among Dutch firms for production to be carried out abroad (at least in those industries in which they produce at home). This may be as a result of the Dutch firms in our sample having a relatively low level of industrial diversification in their domestic operations. The Dutch firms are domestically active in, on average, 3.5 industries in 1987 and 3 industries in 1993. That contrasts with the domestic activities of the firms from the most common source countries – the UK, Germany, France and Italy. Firms from these countries are domestically active in, on average 5.2 industries in 1987 and 4.9 industries in 1993. Dutch firms therefore tend to concentrate more on core activities and to diversify geographically rather than across industries.

3.2 Geographical Diversification of Foreign Operations

To examine the degree of geographic diversification of the *foreign* operations of the leading firms in the EU, we again employ measures of count and share. Our measures are defined differently in the present case however.

If firm i's foreign activities in country m include industry j, then the "count" for country m records the total number of EU countries (not including firm i's home country) in which firm i has industry j operations. By averaging across observations, one gains a measure of the degree to which countries differ with respect to the geographical diversification of the foreign firms which are active within their borders. If firm i's foreign activities in country m include industry j, then the "share" for country m records the percentage of firm i's total foreign EU production in industry j that country m operations represent. This shows how centralised or dispersed are these firms' foreign operations across the EU countries. Table 5 presents these average count and share measures for the EU countries in our database. The table shows for example that foreign firms operating in Portugal in 1993 have, on average, operations in 4 other foreign production bases in the EU.

The larger countries such as the UK, Germany, France and Italy typically host less

geographically diversified operations than do smaller countries such as Greece, Denmark, Portugal and Ireland. This implies that the average foreign firm with a production facility in Greece or Denmark is likely to have more subsidiaries elsewhere in the EU than is the average foreign firm in the UK or Germany. This is to be expected because the former production facilities are likely to be less important than the latter.

Table 5:
The average count and share associated with foreign operations, by host location

	1987			1993			count change	share change
	no. obs.	average count	average share	no. obs	average count	Average share		
UK	165	2.99	55%	252	3.65	43%	+0.66	-11%
Germany	180	3.06	56%	286	3.42	54%	+0.36	-2%
France	196	2.90	55%	287	3.27	50%	+0.37	-5%
Italy	174	3.07	48%	249	3.68	40%	+0.61	-8%
Spain	154	3.30	41%	238	4.00	30%	+0.70	-11%
Holland	76	3.03	48%	125	3.77	41%	+0.74	-8%
Bel/Lux	110	3.35	41%	132	4.20	33%	+0.84	-8%
Greece	19	5.11	18%	41	5.10	21%	-0.01	+3%
Denmark	22	4.36	29%	54	4.87	24%	+0.51	-5%
Portugal	35	4.43	25%	58	5.00	22%	+0.57	-3%
Ireland	22	3.09	51%	32	4.81	20%	+1.72	-31%

Comparison of tables 4 and 5 reveals a clear tendency for home operations to be less geographically diversified than are foreign operations: in every country, apart from The Netherlands, the counts are lower and shares higher for domestic operations than for foreign operations.⁵ This can be taken to indicate that firms engage in a broader range of activities at home than they do abroad, and that their foreign operations concentrate on their core activities.

⁵ The Netherlands bucks the trend by exhibiting a higher average count for its home operations, as discussed earlier. The country falls back into line by exhibiting higher average shares among home operations however.

3.3 Geographical Diversification by Sector

Besides these differences across countries there are also interesting differences in the measures of count and share across industrial sectors. Table 6 provides evidence of the level of geographical diversification in each sector.⁶

Table 6:
Geographical diversification across all sample countries, by manufacturing sector

		1987		1993	
		no. obs	count	no. obs	count
	TOTAL	558	2.07	715	2.45
22	iron and steel/tubes	12	1.67	28	2.04
24	non-metallic mineral products	30	2.13	42	2.71
25/6	chemicals, man-made fibres	99	2.72	109	2.99
31	forging/metal engineering	29	1.48	48	1.96
32/3	industrial/office machinery	69	1.68	89	1.96
34	electrical engineering/products	56	2.36	72	2.90
35	motor vehicles and parts	23	2.43	22	3.00
36	ship/train/aeroplane manufacture	8	1.13	10	1.50
37	instrument engineering	25	1.60	25	1.84
41/2	food drink and tobacco	89	2.27	123	2.91
43	textiles	25	1.40	34	1.53
44/5	clothing and footwear	13	1.15	18	1.83
46	timber and wooden products	7	1.14	15	1.47
47	paper/paper products/printing	28	1.75	26	2.35
48	plastics and rubber	33	2.09	41	2.34
49	other manufacturing	12	2.17	13	2.38

High-count sectors include Chemicals, Electrical Goods, Motor Vehicles and Food, Drink and Tobacco, while low-count sectors include Other Transport Equipment, Textiles and Timber and Wood Products.

⁶ The figures presented in this table include firms which entered or exited the sample in 1993 since we are concerned here not with an analysis of firm entry or exit but with the broad tendency for sectoral variation across the sample as a whole.

It is clear that certain sectoral characteristics will influence the degree of geographical diversification. The high count sectors are highly R&D and/or advertising intensive; Davies and Lyons (1996). It is reasonable to propose that the link between these characteristics and geographical diversification stems in turn from the well-established link between intangible firm-specific assets and multinational production; Markusen (1995, 1998). Briefly stated, firm-specific assets enable the servicing of foreign markets via FDI (by overcoming the disadvantage foreign firms would otherwise face relative to indigenous firms), and also make it more attractive to internalise any foreign production within the firm (owing to the difficulty of arm's-length transactions in intangible assets). Thus, *ceteris paribus*, firms in sectors with high levels of advertising and/or R&D expenditures will tend to exhibit greater geographical diversification because the firm-specific assets generated make it more attractive to have foreign operations.

Sectors such as Textiles and Wood Products stand in contrast to this. What, though, of the Other Forms of Transport sector, NACE 36, which comprises production of trains, boats and airplanes? In comparison to Motor Vehicles (NACE 35) one can posit (a) that the higher ratio of value-added to transport costs makes exporting more attractive than foreign production in NACE 36 than in NACE 35, and (b) that lower unit numbers in NACE 36 make it more likely that plant-level economies of scale will be exploited best by more concentrated production.⁷

4. The Single Market and Changes in Geographical Diversification

4.1 *Aggregate Trends*

We have already seen that a greater number of firms in our dataset were multinational in 1993 than was the case in 1987, suggesting a general rise in the degree of multinationality over the period.

Further aspects of the changes that took place over the Single Market era are evident from Tables 4 and 5. Comparison of the data for the two years in both tables shows an almost universal increase in the “count” value and a fall in the “share” value for each country. This fits in well with our earlier discussion of the evidence on the increase in FDI flows into EU

⁷ See Midelfart-Knarvik et al. (2000) for further analysis of these issues.

countries over the Single Market era. Indeed, it provides evidence that the increased FDI activity has, at least to some degree, occurred as a result of leading firms increasing their geographical diversification within individual industries.

4.2 Ireland as Outlier: A Closer Analysis

Inspection of Table 5 shows that the rise in count and fall in share values for Ireland is far larger than that experienced by any other EU country. Put simply, the average leading firm with an operation in Ireland in 1993 had substantially more operations in other EU countries than had been the case in 1987. This meant that Ireland in 1993 exhibited a stronger similarity to other small economies than it did in 1987.

This latter feature seems surprising at first glance since the country was, in this period, just beginning its subsequently rapid FDI-fuelled real convergence on average EU living standards. These considerations suggest that a closer look at the Irish case may be warranted, and may throw up issues of more general interest.

The Changing Mix of Foreign Firms in Ireland

In 1987 there were 17 foreign leading firms manufacturing in Ireland; this rises to 28 in 1993. The first issue is to determine the extent to which the change in count and share values may be a consequence of firm-level turbulence.

We can divide Irish-based multinational firms into three groups: those that are present in Ireland in both years (continuing firms, of which there are 11), those that are present only in 1987 (departing firms, of which there are 6), and those that are present only in 1993 (entrants, of which there are 17).

Turbulence can occur not only because of changes in the Irish production decisions of firms, but also because of firms entering or exiting the sample. For example, a departing firm can be so classified either because it has shut down its Irish operations *or* because it has departed from the sample of leading firms. A similar consideration applies to new entrants. It transpires that, of those exiting, 2 of the 6 left the sample. Of the 17 entrants, however, only 2 were new to the sample in 1993. So turbulence attributable to changes in the sample of firms accounts for only 5 of the 34 firms that are present in Ireland in one or both years. The observations associated with these 5 firms are excluded from the discussion that follows,

leaving us to concentrate on firms that enter or leave Ireland rather than entering or leaving the sample.

The Geographical Diversification of Continuing, Departing and Entering Firms

What of the geographical diversification of these three sets of firms? The average count for the continuing firms was 3.33 in 1987, rising to 4.92 in 1993; while their average share fell from 51 percent to 24 percent. So, the overall changes are attributable in part to a change in the non-Irish production decisions of firms with a continuing presence in Ireland. On the other hand, in 1987 departing firms exhibited an average count of 3.00 whereas in 1993 the average count for entrants was 4.59. Thus firm turbulence acted to replace firms with relatively low counts (and high shares), with a much larger group of firms with high counts and low shares. Thus, the changes in Ireland's count and share measures arise as a result of both a change in the behaviour of firms that remain in Ireland over the period *and* firm-level turbulence - most notably the influx of relatively highly geographically diversified entrants.

Geographical Diversification and the Source Country Mix

The main feature of the change in the source-country mix of leading foreign firms in Ireland is the prevalence of UK firms among those departing, and the prevalence of other EU and US firms among the entrants, as seen in Table 7.

Table 7:
Leading firms present in Ireland, by nationality

	1987	1993	Continuing firms	departing firms	entrants
TOTAL	17	28	11	6	17
UK	13	9	7	6	2
Germany	1	1	1		
France		4			4
Italy	1	2	1		1
Holland	1	2	1		1
Bel/Lux		1			1
Switzerland	1	3	1		2
USA		6			6

How did these changes in the nationality of firms with Irish operations affect Ireland's count and share measures? Table 8 provides the answer to this question. UK firms exhibit particularly low count values and non-EU firms particularly high count values (and corresponding differences in share values) in both years.

Table 8:
Geographical diversification of foreign firms in Ireland by source country

	1987		1993	
	average count	average share	Average count	average share
UK	2.46	65%	3.50	38%
Other EU	4.67	13%	5.89	13%
Non-EU	6.50	1%	4.91	12%

The Sectoral Shift amongst Foreign Firms in Ireland

Of the twelve NACE 0 manufacturing sectors displaying a foreign presence in Ireland, seven exhibit an increase in the number of observations of foreign presence, two exhibit a decrease and three show no change. Thus there is some movement across sectors.

Now we need to relate the sectoral shift to the low and high count status of the individual sectors, as discussed earlier with reference to Table 6.⁸ Amongst the high count sectors, four observations show firms withdrawing from Ireland while thirteen observations show entry. Among the low count sectors, there is one exit and one entry. Thus, foreign firms in Ireland are increasingly located in high as opposed to low count sectors.

This analysis suggests then that the fact that Ireland appeared to grow more similar to the other small EU states in terms of our count and share measures over the 1987-1993 period should not be regarded in any adverse light.

Barry, Bradley and Hannan (2001) argue that Ireland may have gained substantially more than other EU countries from the Single Market primarily because of the increased FDI

⁸ The sectoral data for Ireland reveal the same count value pattern as the EU-wide aggregate data presented in Table 6.

inflows it attracted from the US over this period.⁹ At the same time, as is well known, Ireland was attracting fewer and fewer UK firms. (Thus the Irish Census of Industrial Production shows the ratio of US to UK firms in Ireland rising from 1.5 to 2.4 between 1987 and 1993). Our analysis here has shown how these developments are related to the strong increase in Ireland's overall count measure over this period.

We need to ask furthermore however how our present results are to be squared with the anecdotal evidence that Ireland emerged over this period as *the* important European production facility for a number of (primarily US) flagship companies in a range of high-tech sectors.¹⁰ It transpires that many of these developments are not, in fact, captured in our data. Companies such as Dell and Intel, which have important production facilities in Ireland, do not appear amongst the leading firms in their sector, as other office and data processing equipment such as photocopiers comprised a more significant part of the industry than did personal computers and computer chips. Furthermore, while Ireland has attracted nine of the largest ten pharmaceuticals companies in the world, most of these firms also do not make it into the database because their production is concentrated outside the EU.

5 Concluding Comments

We have used firm-level data, disaggregated by industry and country, to explore the geographical diversification of leading firms in the EU. Amongst the findings which have emerged are (a) that firms engage in a broader range of industrial activities at home than they do abroad, presumably concentrating in their foreign operations on their more core activities, and (b) that Dutch firms differ from most other EU leading firms in attaching greater relative weight to geographic than to industrial diversification. We also identify sectoral differences in the degree of geographical diversification: as would be expected from the theory of the multinational corporation, firms in R&D- and advertising-intensive sectors are found to produce in a broader range of countries than do firms in most other sectors.

⁹ The US Department of Commerce Survey of Current Business in March 1991 did indeed attribute much of this to the Single Market initiative. A clue as to why Ireland's share of EU investments by US companies should have increased so much is provided by Mac Sharry and White (2000), who describe how several larger EU countries, in the pre-Single Market era, "had suggested to potential investors that publicly funded purchases of their products might be blacklisted if the new investment was located in Ireland" (rather than in the countries issuing the threatening noises).

¹⁰ On this see Mac Sharry and White (2000), whose book is subtitled "The Inside Story of Ireland's Boom Economy". Mac Sharry was Finance Minister in the late 1980s when Ireland's rapid convergence began, and White was Managing Director of the Irish Industrial Development Authority at that time.

Some important changes in firms' behaviour over the Single Market era were also identified. There was a strong increase in multinationality between 1987 and 1993, with many more of the leading firms maintaining production operations in EU countries other than their home bases in the latter period. Furthermore, each EU country played host to more of the leading firms in 1993 than it had in 1987. The increasing geographical diversification on the part of both pre-existing and newly multinationalised companies over the period 1987 to 1993 accounts in part for the increased FDI flows charted by Dunning.

Ireland, of all EU incumbents at that time, was found to experience the greatest increase in our "count" measure between 1987 and 1993 – i.e. firms located in Ireland recorded a higher increase in the number of other EU countries in which they maintained production operations than was the case for firms in any other host location. This finding led us to look in more detail at the Irish experience. The increase in count was found to arise from three sources. Firstly, the firms which remained in Ireland over the period increased their average count levels. Secondly, UK firms which tend to have relatively low count levels were replaced by US firms which tend to have relatively high count levels. Thirdly, lower-technology low-count sectors were replaced in Ireland by higher-technology high-count sectors.

These latter two developments in particular are consistent with what is known about the role of FDI in Ireland's recent boom. UK firms in Ireland have always been much less export-oriented than US firms, and are less dynamic along a range of other indicators; Barry and Bradley (1997). Part of the reason for Ireland's success in increasing its share of US FDI inflows to the EU, we suggested, was related to the outlawing of restrictive public procurement practices throughout the Single Market. The influx of US firms in turn hastened Ireland's climb up the technology ladder.

What are the implications of the general increase in geographical diversification that we have recorded here? One possibility is that the bargaining position of firms could be strengthened relative to that of host-country workers and governments, as the threat of shifting production abroad is more credible when firms have already undertaken the fixed costs of setting up alternative plants; Cowling and Sugden (1987, pp 61-79), Caves (1996, pp 123-131).

This argument is unlikely to provide a rationale for the increased diversification seen over the Single Market era however. For horizontal FDI, an extra plant raises fixed costs while

reducing the transport costs associated with servicing a market. In Huizinga (1990), cost savings from an extra plant generate rents that are liable to capture by local unions; the greater the number of plants, the less are the transport cost savings per plant, so the wage falls as the number of plants increases.¹¹ Trade liberalisation, however, as represented by the Single Market, reduces transport and trading costs and so would appear to reduce rather than increase the optimal number of plants.

This points again to the theoretical lacuna identified earlier. Much of the geographical diversification seen in our data, we feel, is horizontal, yet the theory of horizontal FDI does not provide a ready rationale for why the Single Market should generate these effects.

¹¹ It will be clear that these results are dependent on the absence of international coordination in union activities.

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