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The Single Market and the Geographical Diversification 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 roughly 290 largest manufacturing firms in Europe. We explore how geographical diversification changed over the period when the Single Market came into effect, finding that it increased substantially. We also study the variation across sectors and across EU countries. Ireland – which began its rapid convergence on average EU living standards over this period – emerges as a special case and receives particular attention.

I 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 European Economic Community 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

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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) either 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 such as the Single Market that can lead to a reduction in the number of foreign plants. First, reductions in inter-FTA tariffs reduce the tariff-jumping incentive to set up more than one FDI plant within the EU, and second, reduced internal tariffs 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 erosion 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 various 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 II introduces the dataset and presents some relevant summary statistics. Section III presents our statistical measures of geographical diversification. Section IV 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 Ireland's rapid real convergence on EU15 living standards, we subject the Irish experience to somewhat closer scrutiny. Section V concludes.

II 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 – 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 countries.[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 come from national statistical sources and from Eurostat.[3] The power of the methodology employed lies in the joint use of firm-, industry- and country-level data. The estimation of each firm's manufacturing output in each country (principally indicated by the disaggregation of turnover presented in the company report) is made more precise by the need for consistency with more aggregated data

[1] The countries included in our analysis are those which were EU members before the enlargement of 1995; i.e., 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 Navarro (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.

(such as concentration ratios and the share of industry output accounted for by foreign multinationals).[4]

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 roughly 290 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.

Table 1: *Number of Firms in the Sample (by Nationality) and Numbers Present in Each EU Country*

	Source		*Host*		
	1987	*1993*	*1987*	*1993*	*Percentage Increase in Firms Hosted*
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
Belgium/Luxembourg	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			

[4] Each firm's presence in a country is measured by the value of manufacturing output. Therefore, transfer pricing may lead to a distortion of the underlying pattern in activities. However, this would not distort the measure of geographical diversification that derives from the number of countries in which each firm is active. In relation to the Irish case, upon which we subsequently focus, transfer pricing is often assumed to raise recorded output levels because of the country's low rate of corporation tax. However, the Irish share of the EU production by foreign multinationals recorded in our dataset is approximately the same as the Irish share of EU GDP in 1990 (around 0.7 per cent). Thus, it seems that any distortion due to transfer pricing is not overwhelming.

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 leading firms over the period. The largest percentage increases in numbers of firms hosted were recorded by Greece, Denmark, Portugal and Ireland respectively.

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
Belgium/Luxembourg	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 the 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). Of the leading firms in 1987, 115 were not multinational in this sense. By contrast, only 83 of the leading firms in 1993 could be so described. There is thus a general rise in multinationality over the Single Market era.

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 Foreign Production	*1993 Share of Total Foreign Production*	*Foreign Production*	*Share of Total Foreign Production*	*Percentage Increase in Share, 1987-1993*
UK	39,714	19.0	55,715	17.7	–6.8
Germany	54,668	26.2	86,392	27.5	5.0
France	34,562	16.6	52,867	16.8	1.2
Italy	22,696	10.9	35,627	11.3	3.7
Spain	22,144	10.6	32,374	10.3	–2.8
Netherlands	8,546	4.1	16,919	5.4	31.7
Belgium/ Luxembourg	18,658	8.9	21,605	6.9	–22.5
Greece	2,014	1.0	2,475	0.8	–20.0
Denmark	1,667	0.8	3,419	1.1	37.5
Portugal	2,522	1.2	3,952	1.3	8.3
Ireland	1,492	0.7	2,549	0.8	14.3
TOTAL	208,684	100	313,893	100	0

III GEOGRAPHICAL DIVERSIFICATION

We wish to separate out two aspects of geographical diversification. These are the degrees of diversification associated with: (i) the activites in which these firms are engaged at their home locations; and (ii) the subcategory of these activities in which firms are engaged in their operations abroad.

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 – 'degree of multinationality' and 'home share'. The *degree of multinationality (DoM)* 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 DoM 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. *Home 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 DoM and home share values for each EU country.[5]

Table 4: *The Average Degree of Multinationality and Home Share Associated with Home Operations, by Home Location*

	1987			*1993*			*Changes*	
	No. Obs.	*DoM*	*Home Share*	*No. Obs.*	*DoM*	*Home Share*	*DoM Change*	*Home 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
Belgium/ Luxembourg	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 multinationality 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 particular industry, it is also active in that industry in, on average, 0.5 to 1 other EU country. Typical average home shares are around 90 per cent: if a domestically-owned firm has domestic operations in a particular industry, these comprise, on average, 90 per cent of the firm's total EU production in that industry.

Dutch firms are an exception. These have higher degrees of multinationality (above 3) and lower home shares (around 65 per cent). Thus there appears to be an unusually strong tendency among Dutch firms for

[5] As "degree of multinationality" measures the number of countries in which a firm has a presence while "home 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.

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. Leading 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 multinationality and home 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 "degree of multinationality" 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 active within their borders. *If firm i's foreign activities in country m include industry j, then the "home 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 multinationality and home 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 related 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.

Comparison of Tables 4 and 5 reveals that firms tend to engage in a broader range of activities at home than they do abroad, and suggests that their foreign operations concentrate on their core activities; in every country, apart from The Netherlands, the degree of multinationality is lower and home

Table 5: *The Average Degree of Multinationality and Home Share Associated with Foreign Operations, by Host Location*

	1987			*1993*				
	No. Obs.	*Average DoM*	*Average Home share %*	*No. Obs.*	*Average DoM*	*Average Home Share %*	*DoM Change*	*Home Share Change %*
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
Belgium/ Luxembourg	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

shares higher for industries in which the firm produces at home than for industries in which it produces abroad. [6]

3.3 Geographical Diversification by Sector

Besides these differences across countries there are also interesting differences in the degrees of multinationality and home share across industrial sectors. Table 6 provides evidence of the level of geographical diversification in each sector.[7]

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.

It is clear that certain sectoral characteristics will influence the degree of geographical diversification. The sectors exhibiting a high degree of multinationality are highly R&D and/or advertising intensive, as attested to by Davies and Lyons (1996). It is reasonable to propose that the link between

[6] The Netherlands bucks the trend by exhibiting a higher average degree of multinationality associated with industries in which it produces at home, as discussed earlier. The country falls back into line by exhibiting higher average home shares among these industries however.

[7] 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.

Table 6: *Geographical Diversification Across all Sample Countries, by Manufacturing Sector*

		1987		*1993*	
		No. Obs.	*DoM*	*No. Obs.*	*DoM*
	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

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 aeroplanes? This exhibits a substantially lower degree of multinationality than does the Motor Vehicles sector, NACE 35. This is likely to do with the nature of the scale effects involved. Economies of scale for aircraft are very high, of course, and will lead to strongly concentrated production (reducing the degree of multinationality), while shipbuilding remains quite geographically dispersed and, as an industry, tends to remain under local ownership; Midelfart *et al.* (2000).

IV 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. Indeed, the extent of the increase is, to some degree, concentrated in those industries that were identified as likely to be particularly affected by the move towards a Single Market (Buigues, *et al.,* 1990). The Buigues-Ilzkovitz-Lebrun classification identifies 40 industries (of the 96) as especially sensitive to the Single Market programme. In these industries, we find a greater increase in the average degree of multinationality associated with foreign operations than we find in other industries (+0.45 and +0.37, respectively).

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 degree of multinationality and a fall in the home share value for each country. This fits in well with our earlier discussion of the evidence on the increase in FDI flows into EU 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 degree of multinationality and fall in home 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 was the case in 1987.

This latter feature seems surprising at first glance since the country was, in this period, just beginning its subsequently rapid FDI-fuelled 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 had risen to 28 by 1993. The first issue is to determine the extent to which the change in multinationality and home share values may be a consequence of

firm-level turbulence.

We can divide Irish-based multinational firms into three groups: those 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 may 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 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 degree of multinationality for the continuing firms was 3.33 in 1987, rising to 4.92 in 1993; while their average home share fell from 51 per cent to 24 per cent. 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 degree of multinationality of 3.00 whereas in 1993 the average value for entrants was 4.59. Thus firm turbulence acted to replace firms with relatively low degrees of multinationality (and high home shares), with a much larger group of firms with the opposite characteristics. Thus, the changes in the indexes for Ireland arise as a result both of a change in the behaviour of firms that remained 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.

How did these changes in the nationality of firms with Irish operations affect Ireland's multinationality and home share measures? Table 8 provides the answer to this question. UK firms exhibit particularly low degrees of

multinationality and non-EU firms particularly high degrees (with corresponding differences in home share values) in both years.

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

Table 8: *Geographical Diversification of Foreign Firms in Ireland by Source Country*

	1987		*1993*	
	Average DoM	*Average Home Share %*	*Average DoM*	*Average Home 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 relate the sectoral shift to the low and high degrees of multinationality of the individual sectors, as discussed earlier with reference to Table 6.[8] Amongst the high multinationality sectors, four observations show firms withdrawing from Ireland while thirteen observations show entry. Among the low multinationality sectors, there is one exit and one entry. Thus, foreign firms in Ireland are increasingly located in sectors exhibiting high

[8] The sectoral data for Ireland reveal the same multinationality patterns as the EU-wide aggregate data presented in Table 6.

rather than low degrees of multinationality.

This analysis suggests then that the fact that Ireland appeared to grow more similar to the other small EU states in terms of both of our 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 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 the degree of multinationality exhibited by Ireland 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. 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 over our data period.[10] 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.[11]

[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 threats). Restrictive public procurement policies were outlawed under the Single Market.

[10] Indeed, industrial classifications such as we employ are updated only relatively infrequently, e.g. once a decade or so. Therefore, at certain points in time, reliance on such a classification can bring a bias towards older sectors, rather than newer growing ones. It is worth noting that, given the manner in which our sample of firms is selected, this study is somewhat susceptible to such a bias.

[11] The firms that record an Irish presence in our dataset (in both years unless stated) are: ABB (1993); Allied Lyons, American Brands (1993); Bekaert (1993); BOC (1987); BPB, BSN (1993); Cadbury Schweppes, Carnaud Metalbox (1993); Coats Viyella, Continental, Courtaulds Textiles (1987); CPC (1993); Eastman Kodak (1993); Ferrero (1993); Feruzzi Finanziaria, Gillette (1993); Glaxo (1987); Grand Metropolitan (1987); Guinness, Hasbro (1993); Heineken, Hillsdown (1993); Koninkluke Embrallage (1993); Liebherr International (1993); Nestle, Pechiney (1993); Pernod Ricard (1993); Procter & Gamble (1993); Reed International (1987); RMC, Rowntree (1987); Shell (1993); Smithkline Beecham.

V 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 leading 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.

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 measure of "degree of multinationality" 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 was found to arise from three sources. First, the firms which remained in Ireland over the period increased their degree of multinationality. Second, UK firms which tend to have relatively low multinationality indexes were replaced by US firms which tend to have relatively high indexes. Third, lower-technology sectors, which have low degrees of multinationality, were replaced in Ireland by higher-technology sectors which exhibit higher degrees.[12]

[12] Given the multiplicity of factors that have conspired to generate the change in geographical diversification, it appears that some form of multivariate regression analysis offers an interesting avenue for future research in this area. It would permit one to measure the impacts of these three factors on geographical diversification in the EU, and so also to control for these influences in a search for other determinants of the phenomenon.

The replacement of UK by US firms would appear to have contributed to the recent economic boom, as the former, in their Irish operations, have always been much less export-oriented than the latter and are less dynamic along a range of other indicators as well; Barry and Bradley (1997). Part of the reason for the influx of US firms, we have suggested, was related to the outlawing of restrictive public procurement practices throughout the Single Market.

What are the implications of the general EU-wide 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 that wages bear an inverse relationship to the number of plants.[13] Trade liberalisation, however, is typically modelled as a reduction in 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 is likely to be horizontal. The literature on horizontal FDI, however, does not provide a ready rationale for our results which show an increase in diversification. It is possible that the Single Market could have reduced the fixed costs of setting up and monitoring foreign operations, through a reduction in bureaucracy for example, though this is not the way integration has typically been modelled. Contemporaneous developments in information technology of course would have contributed to a reduction in the fixed costs that all firms face, and this could indeed be driving some of the increased geographical diversification unearthed here.

[13] It will be clear that these results are dependent on the absence of international co-ordination in union activities.

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