Export Activities of Irish-Owned Firms

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ABSTRACT

Recent years have seen a trend in empirical research in international economics towards the analysis of firm-level data to gain a better understanding of the processes underlying international trade. The initial decision of a firm to become an exporter has been the subject of particular analysis. However, more detailed examination of firm exports and in particular the question of where firms export to, has generally not been possible due to lack of data. This paper addresses this gap by using a unique survey of Irish exporting firms over a five-year period with information on over fifty destinations. The data show that many firms only export to a very small number of markets, while others export to a large number. Firm involvement in individual export markets is found to be much more dynamic than export status. Entry and exit to markets is shown to be a quantifiably important component of overall export flows. The paper also examines whether firms tend to enter export markets according to a particular hierarchy.

1. Introduction

The export performance of the Irish economy since the early 1990s has shown spectacular growth, although this has slowed somewhat in more recent years. The Economic Commentary of the previous Quarterly Bulletin (No. 4, 2006) pointed to some positive signs for future export performance, whilst expressing concern about competitiveness issues and stressing the central role of export activity to the Irish economy. Figures from the Central Statistics Office's Census of Industrial Production show that the recent growth in exports was driven primarily by foreign-owned firms using Ireland as an export base. The export performance of indigenous companies has not been as strong, particularly when compared to that of multinationals based in Ireland.

The Enterprise Strategy Group, set up to develop a national enterprise strategy and prioritise policy, has paid particular attention to this difference in export performance between domestic and foreign firms. In its 2004 report, it discussed the weakness of the real export growth of Irish firms, which it described as ''negligible'' from 1990-2002, a period of dramatic growth in almost every other aspect of the economy. The Enterprise Strategy Group suggested the promotion of export sales from domestic firms could be done through increasing their access to information about various international markets. This

approach would reduce one potential cost for firms in becoming an exporter and subsequently expanding this activity, namely the research required prior to entry into exporting to specific markets.

For any such policies to be implemented successfully, it is vital to have a good understanding of how firms get into exporting and then subsequently expand their exporting activity. This paper presents evidence from a unique new dataset from surveys of Irish exporters, carried out from 2000 to 2004 by Enterprise Ireland. In addition to the policy importance in an Irish setting of understanding how exporting firms operate and make decisions about destinations, this paper also forms part of a wider research literature on firm level exporting.

A particularly useful feature that of the Enterprise Ireland survey is that it provides information for each firm on its exports to over fifty individual markets. In contrast, most previous firm-level studies of exporting tend to report only whether a firm is an exporter and the total value of its exports. This availability of firm-level information on exports by destination over a period of years allows for a deeper understanding of the exporting process. These data allows us to analyse patterns of diversification of firm exports across markets, the frequency with which firms make changes in their portfolio of export markets, and the typical patterns underlying these changes. The data can be used to assess the contribution to overall export growth due to firms entering new markets. In addition, one can also assess the relative importance for growing firms of adding new destinations versus increasing sales in existing destinations.

The contents of the rest of the paper are as follows. Section 2 of the paper places the analysis in context by reviewing some of the international literature in this area. The dataset is described in Section 3. Section 4 reports summary statistics describing the characteristics of exporting firms, focusing in particular on the number of markets exported to. Section 5 exploits the time dimension available in the Enterprise Ireland dataset to examine changes over time in firms' market coverage; entry and exit rates to and from markets are calculated and the contribution of entrant and exiting firms to total export flows are quantified. Section 6 looks in more detail at how firms make changes in their export coverage and Section 7 looks at patterns of exporting to ask if a hierarchy of destinations exists. Section 8 discusses potential policy implications of the findings and Section 9 concludes.

2. Literature

Recent years have seen a trend in empirical research in international economics towards the analysis of firm-level data to

gain a better understanding of the processes underlying international trade. This literature has provided substantial insights into the characteristics of exporting firms. For instance, exporting firms tend to be more productive than non-exporting firms and the exporting process is very persistent, so that firms who export rarely change their export status. This evidence has suggested a process in which individual firms face substantial barriers to engaging in trading activity, so that only the most productive can afford to do so.

Perhaps the best-known study of firm-level data on exporting is Roberts and Tybout (1997). This paper examined firm export decisions for a sample of 650 Columbian firms throughout the 1980s. Roberts and Tybout found that, controlling for other firm-level characteristics, previous participation in exporting increased the probability of currently being an exporter by up to sixty percent. This persistence in exporting activity has commonly been interpreted as implying that substantial ''sunk costs'' are encountered in becoming an exporter. Examples of sunk costs in exporting are costs associated with gathering information on new markets, setting up new distribution networks, marketing and possibly repackaging of the product to appeal to new consumers.

Because most of the examples of potential sunk costs appear to have a market-specific element to them, this raises the question of whether such sunk costs are encountered in entering each new market or if they may be reduced if the firm has experience of already supplying a similar market. However, while the literature on sunk costs and the persistence of exporting activity is now a relatively large one, there is very little research on differences across exporters in terms of the number of markets engaged in. This is because most of the existing datasets report information on whether a firm exports and, if so, how much it exports. Information on the destination of exports has generally been missing from these studies.

Beyond the debate about sunk costs, the omission of information on exports by destination from firm-level datasets has been unfortunate because geography is clearly a crucial element in international trade. While traditional trade theory generally stresses differences in factor content as an explanation for which countries trade with each other, in reality geographic distance tends to exert a huge influence on the direction of trade. In addition, languages, cultures and other elements unrelated to factor content tend to influence the direction of trade. Understanding how these geographic factors affect the exporting process requires data on the destination of firm exports, and such evidence has generally been missing.

One important exception has been the work of Eaton, Kortum and Kramarz (2004) on the export destinations of French

exporters. Using a cross-section of data from 1986, they find great heterogeneity in firms' involvement in exporting. Most firms sell only in the domestic market. Amongst exporters, the most frequent occurrence is a firm exporting to only a single foreign market, with a fairly small fraction of firms exporting to a large number of markets. This pattern holds across all sixteen industries in the data.

3. Data

The data used in this paper come from a survey of Irish firms undertaken by Enterprise Ireland and Forfás, which is the Irish national policy advisory board for enterprise, trade and technology and operates under the Government Department of Enterprise, Trade and Employment. The focus of the survey is on Irish-owned and predominantly exporting firms. Of the 751 firms in the sample, 83% are exporters, compared to 44% of all Irish-owned firms (Central Statistics Office 2004). As such the dataset is better suited to understanding the dynamics of exporting firms, rather than the determinants of export status per se, which has been the focus of most of the existing literature in this area. In terms of sectoral coverage, most of the firms are in manufacturing, with services firms accounting for approximately one-fifth of the sample.

The Enterprise Ireland survey records information on a number of firm characteristics such as employment, sales, inputs and exporting activity. More importantly for our analysis, the survey records detailed information on exports to over fifty individual markets. Also, in contrast to the French dataset used by Eaton, Kortum and Kramarz (2004), which is a single cross-section, the Enterprise Ireland survey provides firm-level data on five years of exporting activity (2000-2004). Together, these two features allow for a far more detailed analysis of firm export decisions than has been possible to date. For instance, one can use these data to track changes over time in individual firms' portfolios of export markets.

Comparing the total exports of the firms covered by this survey to the census totals from the Irish Central Statistics Office (2000-2004), our data cover approximately two-thirds of exports from Irish-owned firms. This was a period during which exports from these firms did not change much: The aggregate data show export growth of 3% in 2000-2001, followed by a significant decline over the next three years, falling by over 10% in 2001-2002 for example. The survey data used in this paper follow a similar but slightly less extreme pattern, the decline in 2001-2002 is 5% and a return to positive growth is observed by the end of the sample. This difference is likely due to a slight under-representation of small firms in our sample: Gleeson and Ruane (2006) show that the export participation pattern of these firms tends to be more volatile.

An aspect of the Enterprise Ireland dataset that should be emphasised is that its coverage is restricted to Irish-owned firms. This is important because foreign-owned firms dominate aggregate Irish exports; this is primarily due to a history of economic policy focused on encouraging export platform foreign direct investment (FDI). This should not be a reason to underestimate the economic significance of indigenous firms or of indigenous exporters in particular. Of all manufacturing exporters in 2004, domestically owned firms accounted for three-quarters of firms, and 40% of employment. Foreign owned companies, however, tend to export a higher percentage of their output and accounted for just over 90 per cent of exports (Central Statistics Office, 2004). It should perhaps be noted that some proportion of earnings from foreign firms' exports is likely to be repatriated to their countries of ownership, so these figures potentially understate the contribution of the domestic firms from an income point of view.

Therefore, although the current sample can be considered representative of indigenous Irish exporting firms, this constitutes only a small proportion of overall Irish exports. Although having similar data on foreign-owned exporters would extend the scope of the analysis, the Irish experience of FDI-dominated exports is far from being a common occurrence. So, it is probably fair to conclude that understanding the export decisions and patterns of indigenous Irish firms is more likely to yield conclusions that apply more broadly across countries.

4. Characteristics of Exporting Firms

International engagement by firms tends to be very concentrated. Bernard, Jensen and Schott (2005) find that the top 1% of US trading (i.e. both exporting and importing) firms accounted for 81% of US trade in 2000. In the case of the Irish data, exporting activity is also concentrated amongst a fairly small number of larger firms. Dividing the firms into six groups based on number of employees, the percentage of total exports from each group and the average firm exports are reported in Table 1. Firms with over 500 employees generated 31% of the total exports over the period 2000-2004 even though they make up less than 3% of the firms in the sample. The smallest firms, although the most numerous at almost 33% of the sample, export only 3% of the total. The proportion of total exports originating from each group of firms grows fairly smoothly with size, as does the average amount exported by each firm.

Table 1 also presents summary information on the market coverage of the firms, both overall and by the different size groups. The distribution of the number of export markets is also shown in Figure 1. Consistent with the findings of Eaton, Kortum and Kramarz (2004) for France and of Bernard, Jensen and Schott

(2006) for US firms, most firms export to only a small number of markets, with over one-third exporting to a single market.

Table 1: Exports, Market Coverage and Firm Size (Averages 2000-2004)

	All Firms	Firm Employment					
		<25	25-49	50-99	100-249	250-499	500+
Proportion of Total Exports	1.00	0.03	0.08	0.10	0.22	0.25	0.31
Average Firm Exports	9,006	1,023	2,727	4,802	14,342	59,241	103,704
Average Exports per Market	1,526	186	517	772	1,744	4,708	10,318
Average Markets	5.93	4.70	4.87	5.93	8.05	12.29	9.88
Median Markets	2.80	2.00	2.00	3.20	5.40	9.20	7.10
% Exporting to 1 Market	0.34	0.43	0.40	0.28	0.23	0.16	0.13
% Exporting to 2-5 Markets	0.33	0.30	0.35	0.41	0.27	0.14	0.31
% Exporting to 6-10 Markets	0.15	0.14	0.11	0.15	0.23	0.26	0.20
% Exporting to 11-25 Markets	0.14	0.11	0.12	0.13	0.22	0.32	0.30
% Exporting to >25 Markets	0.03	0.02	0.02	0.03	0.05	0.12	0.07

The average number of markets exported to over the five-year period was 5.9. This figure is significantly boosted by the presence of a small number of firms that export to many markets. Using the median as an alternative measure, half of the firms export to fewer than 2.8 markets with the other half exporting to more than this number of markets. The average number of destination markets per firm is higher than was found by Bernard, Jensen and Schott (2006). The firms in their analysis exported to 3.3 markets in 2000. The highly skewed nature of the distribution, meaning that most firms export to few markets while a small percentage have a much larger market coverage, is common across the Irish, French and US firms. Only 17% of the firms in this paper export to more than 10 markets and just 3% to more than 25. Eaton, Kortum and Kramarz (2004) found approximately 20% of firms exporting to more than 10 markets and reported 1.5% exporting to over 50.

Figure 1: Distribution of Firms by Market Coverage
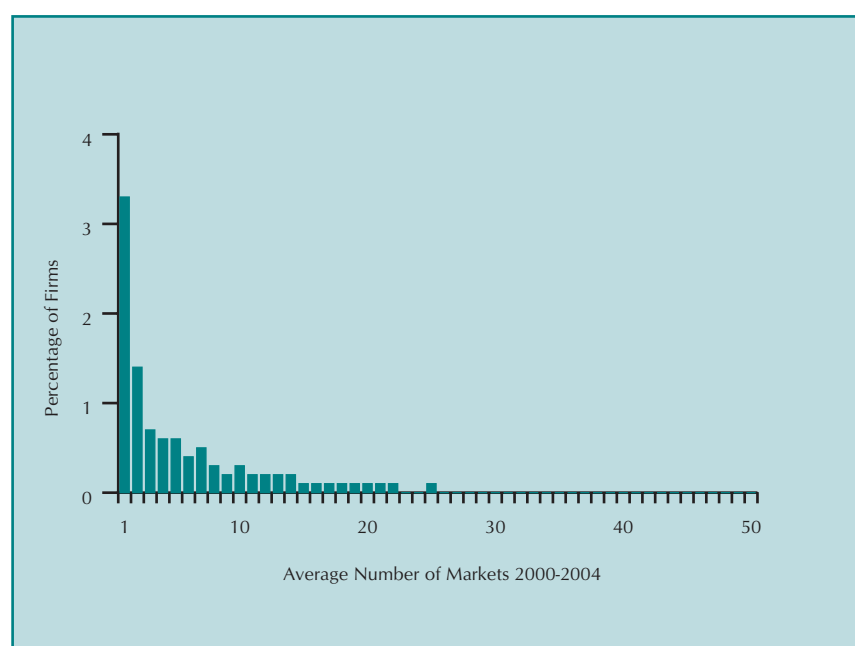
Looking at differences across size categories of firms, we find that larger firms have higher average and median numbers of destinations. Of the smallest group of firms (under 25 employees), 43% export to just one market and a further 30% to between 2 and 5 markets. As firm size increases, the proportion exporting solely to one market declines. One market accounts for 23% of the exporting firms in the 100-249 employees group and 13% of the largest group. On the other side of the distribution, 13-14% of firms with under 50 employees export to more than 10 markets, while 44% of the 250-499 group and 37% of the over-500 employee group are exporting to this many destinations.

In further comparisons of exporting firms, we find some consistent differences in the characteristics of firms selling in many markets relative to those in a small number of markets. Firms with greater market coverage tend to be larger in terms of employment and there is some evidence suggesting they are more productive. Firms selling in multiple markets have a fairly similar level of exports per market as those in only one or two markets. This result initially appears counterintuitive given that these firms with many markets are larger and export much more in total. The apparent puzzle is resolved when exports to a particular market are compared. Taking the UK as an example because it is the market most firms export to, firms with more export markets export much more to the UK than do firms with few export markets. The measurement of exports per market for firms with many markets is reduced because they also export to some small markets. This denotes a pattern of firm export growth in which firms both increase exports to their existing markets and expand their portfolio of markets into new destinations.

5.   Firm Export Dynamics

The previous section confirmed findings from the existing literature that firms tend to export to a relatively small number of foreign markets, with reliance on a single destination being the modal outcome and only a small percentage of firms exporting to more than 10 markets. This section begins to exploit the individual market information and the time dimension of the data.

5.1   Market Coverage, Entry and Exit

Table 2 documents the distribution of firms across markets and the levels of entry and exit, averaged over the time period. Unsurprisingly, given its proximity and historical links, the UK is the most common export destination for Irish exporters. The 584 firms who sell at least some of their exports to this market represent 94% of the sample. The second largest market (the US) has less than half of the number of firms exporting to it than the UK. With the exception of the US, the top ten markets for Irish firms are all located in Western Europe.

Table 2: Average Number of Exporters, Entry and Exit by Destination

	Exporters	Entry	Exit		Exporters	Entry	Exit
UK	584	30	26	Saudi Arabia	40	9	10
USA	228	30	25	Hong Kong	36	10	10
Germany	213	26	27	Hungary	38	12	9
France	210	26	22	China	39	11	7
Netherlands	183	26	22	S. Korea	31	8	8
Italy	144	21	19	Taiwan	32	7	6
Spain	136	24	20	India	35	11	9
Belgium	139	25	24	Brazil	23	5	6
Sweden	122	19	21	New Zealand	33	10	8
Denmark	110	20	17	Malaysia	31	7	6
Portugal	76	18	18	Egypt	26	7	7
Switzerland	87	19	15	Philippines	21	5	7
Japan	75	17	17	Argentina	19	4	4
Norway	74	15	16	Kuwait	23	6	6
Canada	71	15	14	Mexico	24	8	6
Austria	69	15	14	Lebanon	17	6	7
Finland	78	16	11	Nigeria	22	6	4
Poland	61	14	11	Slovak R.	14	6	6
Australia	65	16	13	Slovenia	19	6	5
South Africa	56	15	14	Jordan	17	6	6
Greece	59	12	11	Thailand	20	6	3
Russia	43	8	10	Pakistan	17	4	3
Israel	53	11	10	Chile	15	3	4
Turkey	41	11	14	Algeria	7	2	4
Czech R.	46	13	12	Morocco	8	3	3
UAE	44	11	12	Tunisia	5	3	2
Singapore	40	11	12				

The most striking feature of the data presented in Table 2 is the extent to which entry and exit exists in all markets. Although the number of exporters in each destination changes only slightly over the period, the gross flows into and out of markets strongly outweigh net changes in firm numbers. For example, over the period 2000-2004, there was an average increase of only four firms per year exporting to the UK market, a tiny figure relative to the total number of firms exporting to this destination. However, the underlying pattern is more dynamic than this relatively small net change might imply. An average of 30 exporters began selling to the UK each year and 26 exited. Indeed, as a percentage of existing exporters, the UK has one of the lowest rates of entry and exit. In general, the rates of entry and exit to and from markets tend to increase as we move from more popular to less popular destinations.

One obvious potential explanation for the simultaneous entry and exit of firms to the same markets is that the firms are operating in different sectors. We could therefore be observing the replacement of firms in declining sectors with those in expanding sectors. However, this structural change story is not supported by the data. Even when the firms are divided into sectors, the basic finding of simultaneous entry and exit remains strong. Although entry and exit to exporting markets occurs in all sectors, it is the case that certain sectors, in particular modern manufacturing and internationally traded services have higher entry rates than exit rates, showing net expansion of these

sectors. More traditional manufacturing sectors on the other hand show fairly equal entry and exit rates, while food and drink sectors have slightly higher exit rates. The dominant result in all sectors is of variation across firms within the sectors.

5.2 Decomposition of Export Flows

We have seen that, across a wide range of destinations, one can observe significant rates of both entry to and exit from individual export markets. However, if these entries and exits primarily reflect small or marginal exporters, the contribution of these dynamics to total exports may not be quantitatively important. Indeed, calculations confirm that, for each individual market, those firms that are entering and exiting tend to be smaller than those that remain continuously in the market. To address this issue, this section provides estimates of the importance of firm entry and exit dynamics for the behaviour of total exports.

One way to decompose changes in exports is to separate the positive contributions from firms who start exporting or increase their exports from the negative contributions of firms who reduce their exports or stop exporting. This method follows a popular approach in the literature on labour markets. Davis, Haltiwanger and Schuh (1996) pioneered this form of analysis for data on job flows, emphasising the considerable size of gross flows relative to net changes in employment and the simultaneous creation and destruction of jobs at all stages of the business cycle. Their procedure has been applied to exporting firms before, by Wagner (2003) for German firms and Gleeson and Ruane (2006) using Irish data. Both of these papers evaluate the contribution of entry and exit to exporting, focusing in the German case on a sizeable export boom, and in the Irish case on two exceptional episodes — an export boom with growth of 35% and in contrast a collapse of 26% in net exports. Wagner's results show the majority of export dynamics are accounted for by increases and decreases in exports by existing exporters. Gleeson and Ruane find a somewhat greater contribution from entry and exit, and demonstrate substantial volatility particularly for the smallest firms with exit and re-entry being a more common feature than had previously been identified in the literature, although it is possible that this is due to the exceptional nature of the episodes covered.

Following this methodology to estimate the contribution of different groups of firms, the sample is divided into four groups:[2]

- Starters are firms who did not export in t-1 but export in t

- Stoppers are firms who exported in t-1 but do not export in t

2 A fifth possible category is firms with unchanged exports across two years, but there are no observations of this in the data. Additional breakdown by identifying re-starters and re-stoppers as Gleeson and Ruane (2006) do is also not feasible given the shorter time span of data available in this paper.

- Increasers are firms who increased exports between t-1 and t

- Decreasers are firms who reduced exports between t-1 and t

Each of these categories is converted into rates by summing across the firms in each group and dividing by total exports in t-1. Summing over the four groups gives the net change in exports between t-1 and t. The top panel of Table 3 reports the results of this method of decomposing exports. Confirming the findings of the existing research, the main contributions to net export change come from changes in exports by incumbent firms, with starters and stoppers featuring only marginally. For example, the 4% growth in net exports in 2000-2001 comes from increaser firms changing exports by 12% and decreasers by -8%. Starters and stoppers contribute less than 1% in all years. The survey nature of the data and its focus on exporters may explain why the entry and exit contributions are significantly smaller in these results than in Gleeson and Ruane (2006). It should also be noted that the period covered by the current data was one of relatively stagnant export performance, unlike the other papers that are examining significant boom or bust episodes.

Table 3: Contributions to Export Growth

	2000-2001	2001-2002	2002-2003	2003-2004
By Firm				
starters	0.0007	0.0034	0.0002	0.0002
stoppers	−0.0024	−0.0033	−0.0031	−0.0006
increasers	0.12	0.10	0.07	0.09
decreasers	−0.08	−0.16	−0.13	−0.04
= change	0.04	−0.05	−0.06	0.05
By Market				
starters	0.03	0.05	0.03	0.02
stoppers	−0.04	−0.05	−0.03	−0.01
increasers	0.19	0.14	0.11	0.14
decreasers	−0.14	−0.19	−0.17	−0.09
= change	0.04	−0.05	−0.06	0.05

Cumulative Impact, by Market				
	2000-2001	2000-2002	2000-2003	2000-2004
starters	0.03	0.07	0.06	0.07
stoppers	−0.04	−0.09	−0.10	−0.10
increasers	0.19	0.20	0.21	0.24
decreasers	−0.14	−0.19	−0.25	−0.24
= change	0.04	−0.01	−0.08	−0.03

Moving beyond the contribution of firms who start exporting activity or quit it altogether, the figures in Table 2 raise the question of how important are the patterns of entry and exit of firms to individual markets for aggregate exports. This question can be addressed by applying the Davis-Haltiwanger decomposition to each individual market. In other words, net

export growth can also be separated into increases and decreases in exports across individual markets, and within these markets one can calculate the importance of entry, exit, increasers and decreasers. To be concrete, this exercise involves dividing firms into four groups, this time summing over changes in their exports to individual markets:

- Starters are firms who did not export to the specific market n in t-1 but export to that market in t

- Stoppers are firms who exported to market n in t-1 but do not export there in t

- Increasers are firms who increased exports to market n between t-1 and t

- Decreasers are firms who reduced exports to market n between t-1 and t

As above, these are converted into rates. The four groups again combine to give the net change in exports, this time the contributions being from markets rather than from firms. While entry and exit to exporting was only a tiny proportion of export changes, the contribution of changes in market coverage are substantially larger. The middle panel of Table 3 shows firms entering a new market generate gross exports of between 2-5% of the total. The bulk of gross export flows still comes from incumbent firms in any market increasing or decreasing exports. However, the relative magnitudes of starters and increasers or of stoppers and decreasers are much closer together than when we considered firm entry and exit solely to exporting activity. The dynamics of firm entry and exit across markets is a sizeable factor in considering export flows.

The contributions of starters and stoppers to exporting in different destinations may still be under-estimated by the decomposition above. Comparing measurements of export sales of incumbent firms and firms switching markets has two potential drawbacks. The first is a matter of accountancy; incumbent firms are reporting exports for an entire year, whereas it is highly improbable that this is true of firms changing their markets. Unless all firms entering a new market do so on the first day of the accounting period, we are not comparing like with like. A second potential issue relates to sunk costs in exporting. If, as has often been suggested, a sunk cost is encountered on becoming an exporter and this is borne completely within the first exporting period it is fairly reasonable to assume that firms take some time to establish their exporting activity.

This question can be addressed by applying the decomposition of changes in exports by market to longer time periods. The final panel of Table 3 reports these results. Focusing on the final column, contributions to net export growth (or rather decline in

this instance) between 2000 and 2004 are calculated. Firms who were exporting to a market in 2004 where they had not been present in 2000 added 7%, while firms who stopped exporting to a market they had exported to in 2000 contributed -10%. Increasers and decreasers essentially cancel one another out with gross changes of 24% each. Taking this approach the relative contributions of firms changing markets becomes even more evident.

6. Patterns Underlying Entry and Exit

It is well known that exporting status is very persistent: In any particular period, very few exporting firms will cease exporting altogether and only a small proportion of non-exporting will start to export. However, the Enterprise Ireland data show that this persistence is much less of a feature in the portfolio of destinations a firm exports to than it is in the export status of firms.

Table 4 shows the percentage of firms of different size groups who increase or decrease their number of markets from year to year. The rates at which firms change market coverage is extremely high, especially in larger firms. On average, 28% of firms increase their market coverage and 25% exit some markets. The proportion of firms entering markets does not have any apparent relationship with firm size. In contrast, the proportion exiting markets increases fairly steadily with firm size — the three smallest size groups have exit rates of 20-25%, while in the group of largest firms we see 40% reducing their number of markets.

Table 4: Changes in Market Coverage and Firm Size (Average 2000-2004)

	% Entering Markets	% Exiting Markets
All firms	0.28	0.25
< 25	0.29	0.24
25-49	0.26	0.20
50-99	0.30	0.25
100-249	0.26	0.28
250-499	0.31	0.37
500+	0.26	0.40

Table 5 is a summary of transition probabilities, characterised as changes in market coverage by number of existing markets. The probabilities are calculated as averages of actual movements for the five years of sample data. The extent of the change in number of markets becomes larger further up the distribution of market coverage the firm is situated. Firms exporting to a small number of markets tend to change their coverage by adding or subtracting one more market. However, as coverage of existing markets becomes larger, we are more likely to find positive transition probabilities relating to two or three markets. Changing

coverage by more than plus or minus four markets remains highly unusual, even amongst firms exporting to more than 25 markets, so these are not reported.

The ''No Change'' line shows that levels of persistence are high for firms exporting to few markets but decline as market coverage in the previous year (*t-1*) increases. These probabilities indicate that once a firm exports to more than three markets, it is more likely to change its market coverage from one year to the next than it is to stay exporting to the same number of markets. This is related to the fact documented in Table 2 that rates of entry and exit are higher for less popular markets. Another pattern related to increasing market coverage is that the probability of exiting markets begins to overtake the probability of entry, whereas entry is more likely than exit for smaller firms.

Table 5: Market Transition Rates

	0	1	2	3	4	5	6-10	11-25	>25
Year t									
+4	0.00	0.00	0.01	0.01	0.02	0.01	0.03	0.05	0.04
+3	0.01	0.00	0.02	0.03	0.03	0.04	0.03	0.05	0.09
+2	0.01	0.02	0.04	0.09	0.04	0.10	0.08	0.10	0.13
+1	0.15	0.08	0.14	0.13	0.16	0.18	0.16	0.11	0.09
No Change	0.83	0.81	0.56	0.46	0.38	0.33	0.28	0.17	0.27
−1	0.00	0.08	0.17	0.21	0.22	0.20	0.14	0.14	0.12
−2	0.00	0.00	0.04	0.06	0.08	0.05	0.12	0.07	0.09
−3	0.00	0.00	0.00	0.00	0.02	0.02	0.05	0.08	0.02
−4	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.06	0.06
Total Entry	0.17	0.11	0.22	0.27	0.29	0.37	0.36	0.38	0.35
Total Exit	0.00	0.08	0.22	0.27	0.33	0.30	0.36	0.45	0.38

Although there does not appear to be any existing model of exporting which predicts these patterns, they do fit with some reasonable assumptions about firm exporting. With regard to exit rates, if firms face both firm-specific productivity shocks and market specific shocks (as in Eaton, Kortum and Kramarz, 2005), then firms exporting to many markets would have a higher probability of experiencing a negative exit-inducing shock in at least one of their destinations. Increased entry rates on the other hand could be linked to firm productivity through a process of learning by exporting or alternatively nested in a reduction of sunk costs as exporting experience increases.

7. Market Characteristics

The preceding analysis has not involved any information on the identity of markets. Knowing precisely where the firms export to, and not simply the number of markets, allows for aspects of the geographic patterns of trade to be examined in more detail. This section does this by examining the prediction that there exists a ''hierarchy'' in export markets, as proposed by Eaton, Kortum,

and Kramarz (2005). According to this hypothesis, countries can be strictly ranked according to the factors that act as barriers to trade (geographic distance, trade barriers, language and cultural differences). Thus, those firms that export to one market will enter the most popular market, and if they add a market, it will be the second most popular market.

Section 7.1 reports some evidence that broadly supports the idea of a ranking of markets by comparing the country portfolios of firms with different levels of market coverage. There is, however, considerable heterogeneity amongst the firms, particularly in terms of which of the less popular markets they export to. Section 7.2 tests the hierarchy idea using a slightly different approach, asking if firms expanding their market coverage only enter less popular markets than those they already sell to and vice versa for firms exiting markets. Again, there is evidence to support this hypothesis, but exceptions can and do exist.

7.1 A Hierarchy of Markets?

Eaton, Kortum and Kramarz (2005) suggest a simple mechanism that leads to a hierarchy of firms. They suggest a model in which firms differ only by their productivity levels, and thus have different levels of unit costs. If trade barriers are identical for all firms, then these cost differentials will determine which export markets can be profitably entered. Specifically, each market will have a cost threshold. If it is efficient enough to enter the k-th market, then by definition it is efficient enough to be exporting to all markets with a higher cost threshold than k's.

Figure 2: Market Participation and Firm Market Coverage
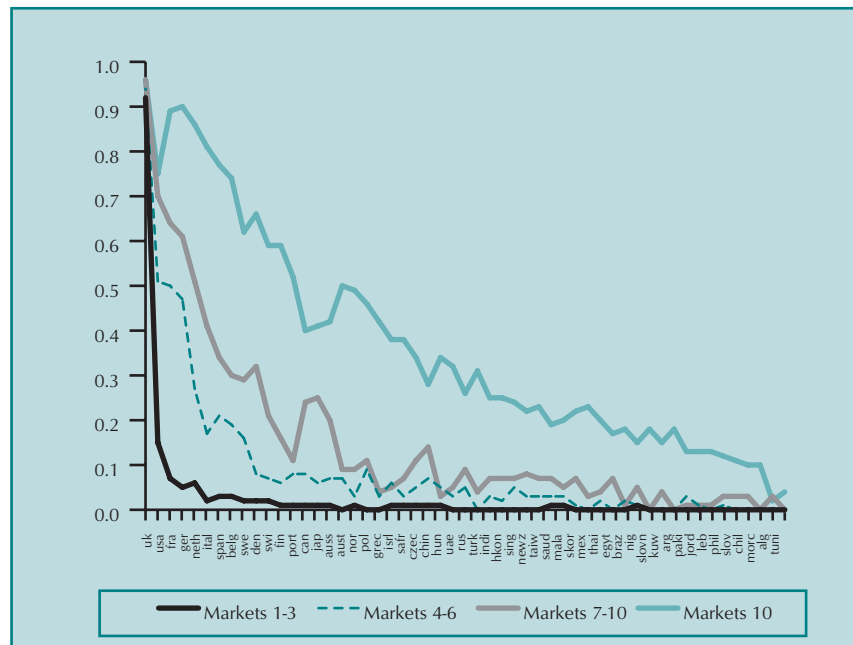
Eaton, Kortum and Kramarz point to ''substantial deviations'' from such a hierarchy in their French data and similarly no rigid ordering of destinations is observed amongst the Irish firms.

There is, however, some weaker evidence to support the general idea of a sequence of export markets. With the Enterprise Ireland dataset, this can be seen by dividing the firms into four groups according to the number of markets they export to: 1-3 markets, 4-6 markets, 7-10 markets and 11 or more. Markets are ranked by the number of firms exporting to them. For each group of firms, the percentage exporting to each market is graphed in Figure 2. Almost all firms export to the top market (the UK). The second most highly ranked market is exported to by 15% of firms in the 1-3 markets group, 51% of firms in 4-6 markets and 75% of firms who export to more than 10. Moving left down the ranking of markets, there is no crossing of the lines representing the different firm groups — this can tentatively be interpreted as evidence that firms only export to less popular markets if they also have an export presence in the more popular destinations.

These results suggest that a hierarchy of markets may exist, but is not necessarily the same for all firms. One potential explanation for deviations from a strict hierarchy is that preferences for products may not be identical in all markets. Another is that trade barriers across countries may not be the same across all sectors. Finally, it should be kept in mind that the popularity ranking of the markets in our dataset may not reflect the true distribution of barriers to trade. There are a large number of markets with very similar numbers of exporters, so their relative positions may be determined by the presence of just one additional firm.

7.2   Entry and Exit in the Hierarchy

An alternative method for testing a hierarchy in destinations is to examine entry and exit by market popularity. To do this, the markets are ranked 1 to 53, with 1 being the most popular market (UK) and 53 being the least popular (Tunisia). This ordering allows us to identify the lowest ranked market for each firm. If the theoretical prediction of hierarchy is at all accurate, then we would expect that a firm entering an additional market would enter a less popular market than those it already serves. Likewise, exiting firms should be moving out of their least popular markets first. This is a fairly weak test in that it does not require firms exporting to the k-th most popular market to next move to the $k+1$-th as the strict hierarchy would suggest. It therefore allows for particular markets to be skipped over by firms (for whatever reason), so long as the general pattern is of movement from exporting to highly ranked markets first followed by movement into less popular destinations (or vice versa for exitors).

Figure 3 plots changes in market coverage against changes in the rank of the least popular previous market. Although some exceptions do exist, the vast majority of observations fit with the conjecture that firms increasing market coverage are moving into

lower ranked markets (upper-right quadrant) and those reducing market coverage are exiting their lowest ranked markets (lower-left quadrant).

Figure 3: Entry, Exit and Market Popularity
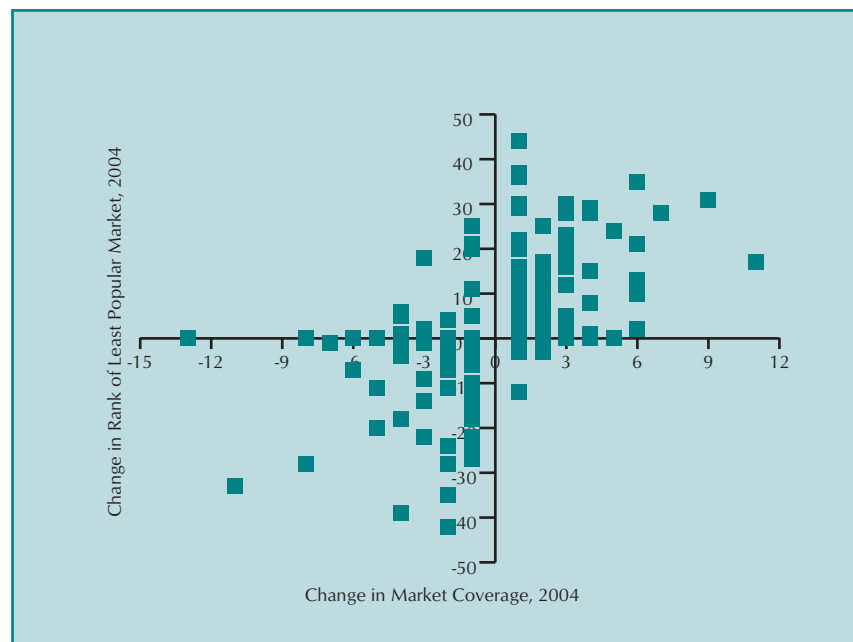
8.   Policy Implications

Understanding the processes by which firms become exporters and expand internationally is an important prerequisite for developing appropriate policies to encourage exporting activity. This is of particular importance for a small open economy such as Ireland. The patterns documented here have a number of potential implications in relation to export-promoting policies.

The first implication relates to the relevance of sunk costs for exporting. According to a popular view, there are significant sunk costs related to learning about foreign markets and setting up export operations. These costs have been assumed to represent a major barrier to participating in trade. In addition, the reluctance to re-incur these sunk costs are assumed to explain why firms rarely exit exporting altogether. This point of view suggests that measures to reduce these sunk costs and help firms to become exporters for the first time should be a major focus of policy. However, our data suggest a more complex picture than suggested by the sunk costs theory.

Rather than overcoming a major hurdle, firms that enter exporting activity for the first time tend to do so in a very gradual fashion, usually only entering a single market. Some of these firms tend to move on to add markets and to expand sales within their existing markets. However, the transition probabilities reported in Table 5 show that this is a relatively slow and gradual process. Moreover, those firms that export to many markets tend to be larger and more productive, and are at little risk of exiting

exporting altogether. Thus, our data provide an alternative explanation for why entry to and exit from exporting is rarely observed. Most firms involved in exporting are sufficiently established in enough export markets that they are very unlikely to exit from exporting altogether. Indeed, in our data, it turned out that only those firms involved in one or two markets reported exiting from exporting activity. This suggests a picture of firms gradually establishing their exporting activity over time, with the initial entry into exporting being less important than suggested by the sunk costs theory.

The second implication for policy relates to the significant amount of heterogeneity observed among the exporting firms. Calculations show that even when firms are grouped together with those with similar characteristics — for example, firms exporting to two markets in 2000 — their subsequent exporting performance over the period 2000-2004 varied widely. Another example of the importance of heterogeneity is the high observed rates of simultaneous entry and exit to individual destinations. Even in strongly expanding markets, one sees significant rates of firm exit from exporting as well as the expected entries, with the reverse holding in contracting markets. These finding suggest that any policy approach to promoting exports must be flexible. In particular, these results probably caution against trying to identify and focus resources on any individual market or type of firm as attempting to ''spot winners'' in the face of such widespread heterogeneity is a difficult prospect.

More generally, our results point to there being unpredictable factors relating to demand and the competitive environment in individual export markets that are difficult to provide information on in advance. As such, exit of firms will likely continue to be a common feature and should be expected even under the most successful export promotion policies.

A final implication relates to the role played by policies to assist exporters to operate in specific individual export markets. The literature on sunk costs has often stressed that learning about individual foreign markets and setting up export operations may represent significant barriers to export participation. To the extent that our data show changes in firms' portfolio of export markets to be quite common, the importance of sunk costs of this type may be less important than previously thought.

One particularly interesting pattern documented in our data is that rates of entry and exit to and from markets are significantly higher in the less popular markets than in the more popular ones. This could be interpreted as weak evidence that firms find it more difficult to assess their prospects of success in advance in markets that are less familiar to the firm and on which information on market conditions may not be as widely available. The more information on the market the firm can access in advance, the

better it can make decisions on entry. This suggests that policy may have a more important role to play in helping to facilitate export growth to less popular destinations.

9. Conclusions

To date, economic research on firm exports has focused almost exclusively on if a firm exports and how much. How firms evolve once they have become exporters has been difficult to analyse, as data on exports to individual markets at the firm level is rarely available. The Enterprise Ireland survey fills this gap for indigenous Irish firms, with detailed information on firm exports to over fifty destinations.

Two sets of findings from this paper are worth emphasising. The first relates to the dynamics of export markets. When examined at the level of individual markets, the exporting process exhibits far more dynamics than is evident when one only observes exporting status. Furthermore, these dynamics make a quantitatively important contribution to net export growth. Although firms rarely become exporters or cease exporting entirely, they frequently enter and exit individual markets. Indeed, frequent changes of market coverage by firms and simultaneous entry and exit of firms are observed in all markets.

The second set of findings relates to the evolution of export market portfolios at the firm level. Once they have become exporters, growing firms expand their market coverage very gradually, typically entering one or perhaps two new markets. At the same time as increasing their market coverage, growing exporters are typically increasing their sales to their existing export markets. The reverse is also true; exporters with a large number of export markets are rarely, if ever, at risk of exiting exporting entirely. They may, however, slowly reduce the number of markets they export to. As more years of the Enterprise Ireland dataset become available, it will be possible to conduct more detailed research on the evolution of exporting patterns at the firm level.

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