

Export dynamics in Small Open Economies: Indigenous Irish Manufacturing Exports, 1985-2003*

A.M. Gleeson

*Institute for International Integration Studies at Trinity College, Dublin
and Department of Economics, Trinity College, Dublin*

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Abstract

The aim of this paper is to explore how a recent methodology developed to look at export dynamics in a region in a large economy can be extended to look at export dynamics in a small open economy, where local market size means that enterprises tend to engage in exporting at an early stage in their development. Building on work by Wagner (2004) and in the context of the recent trade modelling of export heterogeneity (e.g., Melitz (2003)), this paper explores export dynamics in the Irish indigenous manufacturing sector using Davis, Haltiwanger and Schuh (1996) type decomposition techniques from the labour turnover literature. Overall export growth rates in the manufacturing sector vary widely, and we focus particularly on two years when exceptional rates of growth and decline were experienced. We conduct our analysis using a plant level panel data set constructed from the annual Irish Census of Industrial Production for the period 1985 to 2003.

KEY WORDS: Exports; decomposition, manufacturing, plant-level panel data

JEL Classification: E32, F14

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Correspondence to: AM Gleeson, *Institute for International Integration Studies at Trinity College, Dublin 2.*

Email: gleesoam@tcd.ie

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1. Introduction

The aim of this paper is to explore how a recent methodology developed to look at export dynamics in a region in a large economy can be extended to look at export dynamics in a small open economy, where local market size means that enterprises tend to engage in exporting at an early stage in their development. Building on work by Wagner (2004), this paper explores export dynamics in the Irish indigenous manufacturing sector using decomposition techniques developed in the labour-turnover literature.

These techniques are used to analyse the dynamics of enterprises engaged in the export activities and they allow us to explore a range of issues such as: to what extent is export growth due to an increase in exports of existing exporters or to entry by new exporters? Is the capacity of exporting enterprises to respond in a boom situation identical across enterprise size? How different are export dynamics across key sectoral groups? We conduct our analysis using a plant level panel data set constructed from the annual Census of Industrial Production for the period 1985 to 2003.

This paper contributes to the growing empirical literature resulting from the recent theoretical developments in international trade focusing on firm heterogeneity, for example, Melitz (2003). This contribution is made by examining exporter behaviour in a small developed open economy at a more comprehensive and disaggregated level than in previous studies. The paper also contributes to the growing empirical literature which has investigated the characteristics and destinations of Irish manufacturing exports, following Bernard and Jensen (1995), as well as the determinants of Irish export behaviour.¹ We disaggregate indigenous Irish manufacturing exporting firms into several types including entering, continuing and

¹ For example see, Roper and Love (2001); Girma, Görg and Strobl (2003); Sutherland (2003), Lawless (2004) and Ruane and Sutherland (2005).

exiting firms, in order to examine the heterogeneity that exists among exporters within and across industries and size categories.

The Irish economy is an interesting choice for this analysis. Over the period covered it has moved from being a low-growth, high-unemployment economy to being having among the highest growth rates and lowest unemployment rates within the EU. Much of this growth has been attributed to its export success, a large component of which has been in the form of manufacturing exports by multinational enterprises based in Ireland. This paper looks solely at the indigenous manufacturing enterprises, which, on average, export over one third of their output.²

The paper is organized as follows: Section 2 gives an overview of the recent theoretical and empirical literature in order to contextualise this study. Section 3 details the decomposition methodology adopted. In Section 4 the data and variables used in the analysis are described. Section 5 presents the empirical evidence on the export behaviour of Irish-owned enterprises (IOEs) for the Irish manufacturing sector as a whole and for two particular disaggregations: manufacturing by six different size classes and the OECD's four technological groups. Section 6 provides the conclusions of the research and suggestions for further research.

2. Literature Context

In recent years rich new firm level datasets have become available for a number of countries, including Ireland, the UK, US, France, Colombia and Chile. These micro-level datasets have enabled more detailed analyses of the heterogeneous nature of firms than was previously possible. Empirical evidence using these data sets has shown that firms, even those within the same sector, react very differently to macroeconomic and international stimuli (Bernard and Jensen, 1995, 1999; Roberts and Tybout, 1997; Clerides, Lach and Tybout, 1998,

² These exports account for less than 10 percent of total manufacturing exports in 2003.

Wagner, 2004). Therefore, the usual simplification of traditional and “new” trade theory based on the analysis of a representative firm, even within an industry, conceals important effects that help to explain not only the differences between exporters and non-exporters but also the heterogeneity that exists among exporting firms.

The empirical studies suggest that successful theoretical frameworks for studying firms and the decision to export should incorporate intra-industry heterogeneity. As a result of the emerging empirical evidence, innovative new models of international trade incorporating firm heterogeneity have been developed, e.g., Melitz (2003), Bernard, Redding, and Schott (2004) and Yeaple (2005), and Bernard, Eaton, Jensen, and Kortum (2003).³ These new theoretical models, primarily concerned with trade-induced resource reallocations from less efficient to more efficient firms and industries, provide solid micro foundations to underpin the recent empirical findings on firms’ export heterogeneity.

Wagner (2004) uses plant level data on manufacturing firms in the German state of Lower Saxony employing 20 or more workers, to examine the heterogeneity of exporters. Changes in export behaviour are explored over two-year intervals for the period 1995 to 2002, and the paper focuses on the export boom of 1997-1998. Total manufacturing exports, as well as four broad manufacturing sub-sectors of manufacturing, three technology classes and six size classes (measured by the average number of employees), are decomposed into contributions from firms that enter the export market (starters), continuing exporting firms with increasing, constant and decreasing export values and firms that exit the export market (stoppers). He finds a high degree of heterogeneity among German exporters even within the same sector and size category. He also finds, perhaps surprisingly to those unfamiliar with this decomposition approach, that a large number of plants experience decreasing exports during

³ BRS (2004) and Yeaple (2005) are extensions of Melitz’s approach.

an export boom.⁴ . His analysis shows that continuing firms dominate across all sectors and size classes, while starters and stoppers contribute only marginally to the overall change in net exports, although this varies across sector and size class.⁵ . The main drivers of the 1997-8 export boom were a small number of large plants (those with 500 or more employees); while accounting for just 4 per cent of all exporting firms, they contributed approximately 81 per cent of the gross increase and almost all of the net increase in exports during the boom.

The decomposition methodology employed by Wagner is useful for revealing the degree of heterogeneity that exists amongst exporters within any chosen sector/sub-sector. We extend Wagner's approach to examine the export dynamics of a small open economy where firms engage in export activities at an early stage of their development.⁶ . Since firms start to export early, they are more likely to enter and exit export markets (i.e., become "export switchers"). To take account of this, we extend the categories of exporter types to include re-starters as well as re-stoppers. The following section describes our methodology in detail.

3. Decomposition Methodology

The decomposition methodology, built on Wagner (2004),⁷ decomposes the net change in total exports into its micro level dynamic components by examining the export growth rates of six types of exporting firms: starters, re-starters, continuing exporters with increased export values and those with decreased export values, re-stoppers and stoppers, in order to analyse the contribution of each type of exporter to net export growth. Exporting firms that

⁴ About one third of all firms, regardless of group, experienced a decline in export values during the export boom period.

⁵ Export starters and stoppers exist in all but the largest size category (500 or more employees)

⁶ Exporting at an early stage may not be so important for firms where the domestic market is large and scale efficiencies are already achievable within that market, such as Germany; however it is particularly important for small economies where the limited size of the domestic market prevents firms from expanding and achieving minimum efficient scale

⁷ This method is an adaptation of the approach widely used in the job turnover literature (for example see Davis, Haltiwanger and Schuh (DHS), 1996).

exit and re-enter at a later date are generally known in the literature as switchers⁸ and are a common feature in the data for Irish manufacturing firms. In this paper switchers are accounted for by the use of the two categories re-starters and re-stoppers. Re-starters are switcher firms that have exported previously, exited and then re-entered the export market in a later year; as they have some prior exporting experience, it is important to distinguish between them on re-entry from true starters.⁹ Similarly, re-stoppers are switcher firms that have exited the export market on at least one previous occasion. The distinction between starters and re-starters is particularly important as the latter have distinct advantages in re-entering export markets over starters in that they have already incurred some of the sunk costs of entering export markets and have gained valuable experience of foreign markets from previous international transactions.¹⁰

Manufacturing firms are compared over two year intervals for the period 1985-2003. There are many firms which did not export at all; since this study is about enterprises which export at some point, these non-exporters do not enter the analysis. Using the period 1995-1996 as an example, each of the remaining, exporting, firms in this two year period belongs to one of the following six categories:

- (i) Starters are firms that did not export in 1995 or at any previous date but did in 1996.
- (ii) Re-starters are switcher firms that re-enter the export in 1996 but did not export in 1995.

⁸ Bernard and Jensen (1995 and 2004).

⁹ Re-starters and re-stoppers have to be identified separately in the data and classified as such throughout. The effect of this is that, if following entry, they subsequently exit and re-enter, they are classified from this first exit as switchers, i.e. as re-starters and/or re-stoppers as appropriate. Obviously firms which exit exporting once in the timeframe we have could ultimately re-enter and hence could be latent re-stoppers unless they die. In other words, all stoppers are potentially re-entrants unless they cease production.

¹⁰ The difference between re-starters and starters will be greater the more recent the period in which the firm previously exported.

- (iii) *Increasers* are continuing establishments that experienced an increase in export values between 1995 and 1996.
- (iv) *Decreasers* are continuing establishments that experienced a decrease in export values between 1995 and 1996.
- (v) *Re-stoppers* are switcher firms that re-exit the export market in 1996 having exported in 1995, and ceased exporting in some previous year.
- (vi) *Stoppers* are firms that did report exports in 1995 but not in 1996, or in any subsequent year.

$$Net\Delta TotalExports = \sum(i) + \sum(ii) + \sum(iii) + (-\sum(iv) - \sum(v) - \sum(vi)) \quad (1)$$

The percentage change in total exports is calculated to show the relative contribution of each of these types of firms to the change in total exports in a given two-year period.

The notation adopted is similar to that used by DHS (1996). Subscripts: e denotes the establishment or plant; s denotes the sector or size class and t denotes the time period. Capital letters E and S refer to a set of establishments or sectors, respectively. Generally upper case letters refer to levels: exports (X), export creation (C), export destruction (D); lower case letters refer to rates: for example, c is the export creation rate, defined as the size weighted sum of export growth rates among the subset of plants with expanding exports. The Greek symbol delta, Δ , refers to the first difference operator, e.g. $\Delta X_t = X_t - X_{t-1}$.

3.1 Gross Export Creation, Destruction and Reallocation

Gross export creation is the sum of all exports at expanding exporters and newly exporting or re-exporting plants. Thus gross export creation in sector s at time t is

$$C_{st} = \sum_{e \in S^+} \Delta X_{est} \quad (2)$$

Gross export destruction is the sum of all exports of contracting exporters, export stoppers, and export re-stoppers. Thus gross export destruction in sector s at time t is

$$D_{st} = \sum_{e \in S^-} |\Delta X_{est}|, \quad (3)$$

where the superscripts $+$ and $-$ indicate the subset of plants in the sector that expand and contract, respectively.

Export creation and destruction can be expressed as rates by dividing by a measure of sector size. Plant export growth is size-weighted following the methodology in Wagner (2004), which expresses the plant-level growth, g_{est} , as the change in exports of the plant between period t and $t-1$ relative to the total value of sectoral exports in $t-1$.¹¹ The plant-level exports growth rate, g_{est} , is

$$g_{est} = \frac{\Delta X_{est}}{X_{st-1}}. \quad (4)$$

The sectoral rates of gross export creation and gross export destruction are size-weighted sums of plant-level growth rates:

$$c_{st} = \sum_{e \in S^+} g_{est} \quad (5)$$

and

$$d_{st} = - \sum_{e \in S^-} g_{est}. \quad (6)$$

3.2 Net Export Creation

The net change in total exports between years in any two year period is the sum of the positive gross changes by the establishments with increased exports and export starters/re-

¹¹ This differs from the method of DHS (1996) who measure plant level employment growth rate as a simple average of employment in period's t and $t-1$. The conventional growth rate measure, g , which divides exports by lagged exports is monotonically related to the DHS growth measure, g' , as follows: $g \equiv \frac{2g'}{(2-g')}$.

See Appendix 1 for an example using the DHS methodology on total indigenous manufacturing exports.

starters and the negative gross changes of the establishments with decreased exports and export stoppers/re-stoppers.

Gross export creation and gross export destruction in a sector are related to net change in total exports as follows:

$$net_{st} = c_{st} + d_{st} = \left(\frac{\Delta X_{st}}{X_{st-1}} \right). \quad (7)$$

Net export creation is also equal to the size-weighted sum of plant growth rates,

$$net_{st} = \sum_{e \in S} g_{est}. \quad (8)$$

4. Data

The statistical analysis in this paper uses data from an unbalanced panel of local production units constructed from cross-section data collected as part of the Census of Industrial Production (CIP), which is conducted annually by the Irish Central Statistics Office (CSO). It covers all manufacturing enterprises with three or more employees, and response to the survey is required under Statute.¹² The data set covers the years 1985 to 2003 inclusive and enterprises are categorised at a sectoral level using the 4-digit NACE Rev. 1 nomenclature.¹³ The Irish survey specifically asks about enterprise exports thus allowing a detailed examination of plant- level exporting behaviour.

Although the CIP covers all local units with three or more employees it should be noted that some firms were absent from the Census for various spells in the period 1985 to 2003. This usually occurs because a firm either became too small (less than three employees) to respond to the Census, or because it was re-classified out of the manufacturing sector into another sector such as services or construction. This non-response by some firms has created gaps in the data set with missing years of between 1 and 18 years being evident for these firms. In

¹² The data are strictly confidential and are for use inside the CSO only.

¹³ The panel is build from the annual data using individual enterprise codes, CBR numbers, which permit identification of each enterprise across the period while retain their anonymity.

order to overcome this discontinuity of information, which would undermine the analysis in the light of the high incidence of export switching behaviour of Irish manufacturing firms¹⁴, enterprises with any discontinuous years have been excluded from this analysis.¹⁵

The measurement of plant-level export changes, ΔX_{est} , takes place in three stages. The first involves matching the plant-level data by CBR number across all time periods. Once the plant-level data are longitudinally linked by CBR, it is necessary to determine whether the observed ΔX_{est} is valid, i.e., there are no missing observations. The second stage involves separating plants into groups defined by current period export behaviour. This is done by separating plants into continuing exporters ($TE_{t-1}>0$ and $TE_t>0$), export starters ($TE_{t-1}=0$ and $TE_t>0$) or export stoppers ($TE_{t-1}>0$ and $TE_t=0$) where TE denotes total exports, as well as into the switcher categories of re-starter ($TE_{t-1}=0$, $TE_t>0$ and $TE_{t-k}>0$) and re-stopper ($TE_{t-1}>0$, $TE_t=0$, and $TE_{t-j}>0$, $TE_{t-j+1}=0$). The third stage involves calculating export changes separately for each group of relevant enterprises (total manufacturing, size category, sectoral group). The last two steps are repeated for each two-year time period.

In the CIP a firm's exports are reported as a measure of export intensity, that is, the percentage of the firm's turnover that is exported. In order to calculate the value of exports, in euros¹⁶, for each firm the percentage of exports is multiplied by total turnover. However, it should be noted that gross output is used as a proxy for total turnover in the period 1985 to 1990 inclusive, as data on turnover are not available for that period.¹⁷ Using this information we calculate the establishment export values each year, this was deflated using the CSO's Producer Price Index, with 2000 as the base year.

¹⁴ See table 5.1.1 for the shares of switching firms in total exporters by year.

¹⁵ These omitted firms account for 8.3 per cent of all firms; 3.3 per cent of total turnover; 3.2 per cent of gross output; 4.0 per cent of total employment and 6.8 per cent of total exports over the entire period. Some 53.3 per cent of the omitted firms are exporters.

¹⁶ All values for the period 1985 to 2001 have been converted to Euros at the European Central Bank conversion rate of IE£1 = €1.26974.

¹⁷ Turnover is the sales of the firm in a given year whereas gross output is the cost of the products manufactured in the year. Unlike gross output, turnover includes the value of stock at the beginning of the period and excludes unsold inventory at the end of the period.

The decomposition analysis is carried out for manufacturing as a whole and then for the two sets of disaggregations. To explore difference in exporting behaviour by firm size, we use the standard six all-inclusive and mutually exclusive average employment size categories: (i) less than 20, (ii) 20-49, (iii) 50-99, (iv) 100-249, (v) 250-499 and (vi) 500 or more employees. To examine differences in exporting behaviour by sector, we use the OECD's classification which aggregates firms at the 3- and 4-digit levels into 4 technological classes: high tech (HT), medium high tech (MH), medium low tech (ML) and low tech (LT). The results of the various decompositions based on the methodology and exporting firm types are presented in the next section.

5. Results

This section reports the results of the data analysis as outlined in Sections 3 and 4. Section 5.1 contains the general results for the exporting activities of indigenous manufacturing as a whole. Section 5.2 reports the results for different employment size categories while Section 5.3 presents results by sector.

5.1 General Results

This section reports the overall findings on exporting activities of the indigenous manufacturing sector, based on the decomposition of exporters by type, along with their individual contributions to changes in net exports for each two-year period between 1985 and 2003. Table 5.1.1 shows the engagement in export trade of enterprises in the Irish manufacturing sector over the period. The number and proportion of exporting firms varies widely - from a low of 1,394 and 42 per cent of all firms in 1986 to a high of 2,280 firms in 2000 and the highest proportion of exporting firms in 1994 (60 per cent), with the average proportion for the period at 51 per cent. With more than fifty per cent of firms typically exporting in any one year, the volatility in export behaviour is reflected in the very high

percentage of export-switcher firms in each year, i.e., the sum of re-starters and re-stoppers, ranging from a low of 33 to a high of 44 per cent. This suggests high levels of churning as firms enter/re-enter and exit/re-exit export markets.

Table 5.1.1 also reports the total exports, in millions of euro (at constant 2000 prices), as well as the share of turnover exported for each year. Total exports vary year-to-year and averaged 34 per cent of turnover over the period. Exports were strongly trended upwards until 2001, after which they declined in real terms and as a share of turnover exported.¹⁸

Table 5.1.1

Year	No. of Exporting Firms	Percentage of Firms that Export	Percentage of Exporting Firms that Switch Export Status	Total Exports (m)	Percentage of Turnover Exported
1985	1,449	43.40	39.48	2,826	26.20
1986	1,394	42.29	39.70	3,183	29.44
1987	1,517	45.05	38.05	3,511	32.50
1988	1,543	46.02	39.86	4,176	37.32
1989	1,747	52.54	42.07	4,295	36.36
1990	1,941	58.98	44.01	4,347	34.52
1991	1,917	58.21	43.52	4,316	34.56
1992	1,838	56.69	44.09	4,073	33.09
1993	1,928	58.73	43.83	4,362	35.45
1994	2,005	60.16	44.44	4,482	35.28
1995	1,906	57.38	44.09	4,759	36.06
1996	1,530	46.06	43.35	4,512	32.68
1997	1,620	46.89	42.08	4,781	33.43
1998	1,685	48.32	44.11	4,845	32.12
1999	1,753	48.43	39.53	4,758	30.32
2000	2,280	58.55	35.17	6,407	31.12
2001	1,871	49.37	36.23	7,846	36.01
2002	1,914	47.46	33.83	5,792	35.74
2003	1,794	44.96	32.59	5,874	35.36
Mean	1,770	51.03	40.59	4,692	33.56

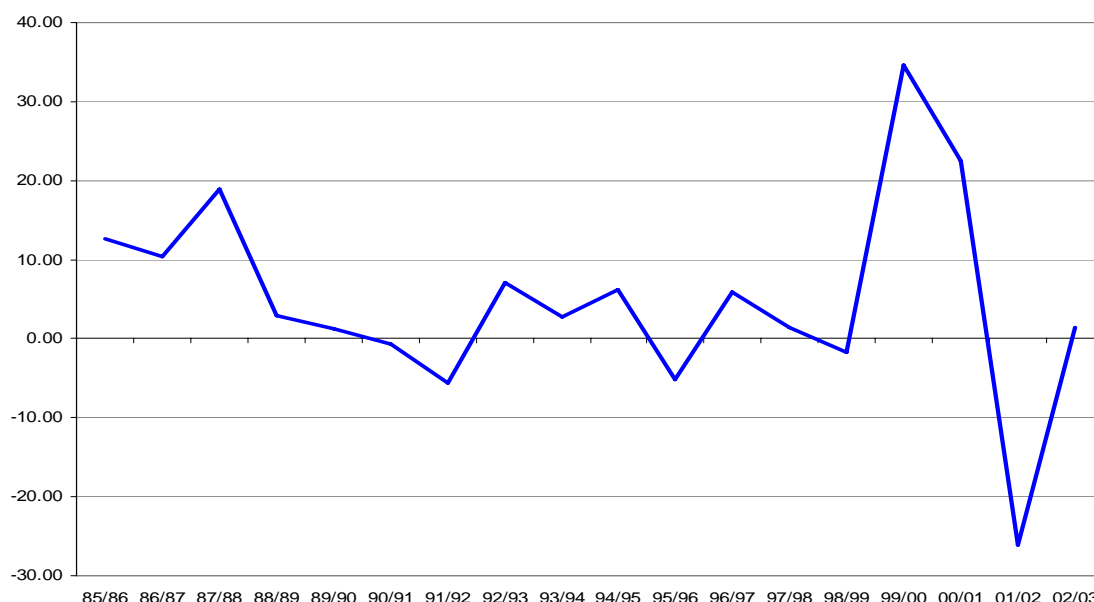
Source: Own estimates from CSO data.

A decomposition of the dynamics underlying the aggregate export statistics, in terms of starters, re-starters, increasers, decreasees, re-stoppers and stoppers, was conducted for each

¹⁸ The correlation between the share of firms that are exporters and the share of turnover exports is 0.38, indicating a positive but not strong relationship. In effect, in years where there is a large increase in exporter numbers, there was also an increase in export intensity but on a more modest scale.

of the eighteen two-year intervals between 1985 and 2003.¹⁹ Chart 5.1 shows considerable volatility in net export growth rates over the period, with the greatest volatility in the 1999-2002 period. In this paper, we explore export dynamics in two key intervals – an export boom year (1999-2000), which saw net exports increase by almost 35 per cent, and an export slump year (2001-2), in which net exports declined by over 26 per cent.²⁰

Chart 5.1 Net Export Growth, 1985-2003.



Not surprisingly, the export boom of 1999-2000 saw exceptionally high levels and shares of export starters and re-starters, 649 firms (24.1 per cent) and 297 firms (11.0 per cent) respectively, compared to average shares of 12.8 per cent for starters and 6.2 per cent for re-starters over the entire period.²¹ While more than seven hundred continuing exporters also expanded exports that year, over six hundred continuing exporters had reduced exports and

¹⁹ These results are reported in Appendices 2, 3 and 4.

²⁰ The results for the whole period, which are reported in Appendix 2, illustrate the same patterns of heterogeneity that are evident in the boom and slump years.

²¹ See Appendix 2.

over four hundred exporters exited the market. In other words, almost thirty per cent of exporter firms experienced decreased exports during the 1999-2000 export boom, this compares with a value of 44 per cent for Wagner in the relatively smaller (20 per cent net export growth) German export boom period of 1997-1998.

The heterogeneity in exporting is equally evident in the export slump in 2001-2. Unsurprisingly there was a dramatic increase in the number of continuing exporters who experienced a decline in exports – almost one thousand enterprises or almost two thirds of all continuing exporters. Furthermore over three hundred and fifty firms exited the export market – some 15 percent of firms. However, even in the year of dramatic net export decline, one third of all continuing exporters enjoyed increased exports and almost four hundred firms started to export, over two thirds of whom were exporting for the first time.²²

Table 5.1.2 Types of Exporters in Irish Manufacturing, 1999/2000, 2001/2001

		1999/2000	2001/2002
Total		2698	2267
Starters	No.	649	275
	Share	24.05	12.13
Restarters	No.	296	121
	Share	10.97	5.34
Increasers	No.	966	522
	Share	35.80	23.03
Decreasers	No.	369	996
	Share	13.68	43.93
Restoppers	No.	151	96
	Share	5.60	4.23
Stoppers	No.	267	257
	Share	9.90	11.34

Source: Own estimates from CIP, 1985-2003.

²² No firms reported constant exports over the period which is unsurprising since nominal export values were deflated into real export values, measured in constant 2000 euro prices, using a broad export deflator. However, as shall be seen later, many of the continuing firms did experience constant export intensities, measured by total exports as a percentage of total turnover.

Two results emerge clearly from Tables 5.1.1 and 5.1.2. Firstly, indigenous Irish manufacturing firms exhibit high but volatile rates of participation in exporting. Secondly, a large amount of export destruction occurs in export boom periods and correspondingly, a large amount of export creation during export slumps.

Table 5.1.3 reports the value of total exports for both years in each interval together with the net rate of change in exports, as well as the decomposition of this net change into the gross rates of export creation and destruction for each type of indigenous exporter. The scale of change in these two intervals can be set in context by reference to the averages for the whole period reported in Appendix 3.²³

Table 5.1.3 Irish Manufacturing Export Dynamics, 1999/2000, 2001/2002

		1999/2000	2001/2002
Total Exports(m) Yr 1		4758	7846
Total Exports(m) Yr 2		6407	5792
Rate of Change		34.66	-26.18
Starters	Contribution	6.09	2.30
Restarters	Contribution	6.73	0.81
Increasers	Contribution	35.56	8.70
Decreasers	Contribution	-3.52	-31.19
Restoppers	Contribution	-2.26	-0.90
Stoppers	Contribution	-7.94	-5.90

Source: Own estimates from CIP, 1985-2003.

Despite the importance of churning in terms of entering and exiting export markets, the activities of continuing exporters dominate the net change in total exports in both boom and slump years, where their contribution to growth and decline respectively exceeds the net change for the sector overall. These findings are broadly in line with those of Wagner

²³ The average net growth in exports was 4.9 per cent for the entire 19 years period, with average positive contributions from export starters, re-starters and increasers of 6.3, 1.7 and 15.9 per cent respectively, and averages negative contributions from decreaseers, re-stoppers and stoppers of 11.2, 2.0 and 5.7 per cent respectively

(2004), who also finds that continuing exporters dominate, however, he finds that entry and exit contribute only marginally (approximately 0.7 per cent each) to the overall change in net exports. Substantially more churning is evident in the Irish case with entry/re-entry and exit/re-exits accounting for 12.8 and 10.2 per cent respectively, in the boom period.

Finally in this section, we look at changes in exports in terms of export intensity, which measures the proportion of turnover that is exported by a firm over time. The export intensity of continuing exporters allows us to examine whether growth/decline in exports is associated with growth/decline in total turnover, in which case export intensity may rise, be unchanged or fall.²⁴ Table 5.1.4 shows that in the 1999-2000 boom, almost 44 percent of continuing firms were experiencing reduced export intensity, i.e., a falling proportion of their outputs being exported. Since we know that these firms' exports were expanding in real terms, the lower export intensity must reflect greater domestic markets sales and may reflect the buoyancy and higher profitability of the Irish market at that time. In the 2001-2002 slump, despite the high decline in net exports, over 47 percent of continuing exporters were experiencing an increase in export intensity. Taking these two period together points to the heterogeneity of exporter experiences during these contrasting periods, and what is hidden when focussing solely on net exports.²⁵

²⁴ For example, if turnover increases while the amount of exports remains constant then export intensity will decline; conversely, if the amount of exports declines but by less than the decline in turnover, export intensity will increase.

²⁵ On average some 38.5 per cent of continuing exporters experience increased export intensity over the period, while the shares of continuing exporters experiencing no change or a negative change in export intensity are 25.6 and 35.9 per cent respectively.

Table 5.1.4 Export Intensities of Continuing Exporters, 1999/2000, 2001/2002

		1999/2000	2001/2002
Total		1335	1518
Increasing	No.	495	723
	Share	37.08	47.63
Constant	No.	256	281
	Share	19.18	18.51
Decreasing	No.	584	514
	Share	43.75	33.86

Source: Own estimates from CIP, 1985-2003.

In the next section we first explore evidence for the effects of export market participation on the scale of production (proxied by average employment size) and then look at the issue of structural change through export-induced reallocations at sectoral level.²⁶

5.2 Average Size

It can be argued that exporting activities enables firms to reach minimum efficient scale; this is especially relevant for firms in a small economy where the small size of the market may prohibit or at least inhibit the achievement of economies of scale unless the firm can expand sales into outside markets. Plant size can be used as a proxy for the scale of production with larger enterprises generally able to achieve lower costs and hence greater export potential. A decomposition analysis by average plant size, measured using the simple average of numbers employed over the two-year intervals, is presented in this sub-section.

Table 5.2.1 shows the percentage of exporters by average size class as well as each class's share of the total number of exporting firms for 1985 and 2003.²⁷ Firms in all size categories, even the smallest, export. Not surprisingly, there tend to be lowest exporter

²⁶ The empirical analysis by size classification and sectoral group was conducted for all eighteen two-year periods between 1985 and 2003. The results file is available from the corresponding author on request.

²⁷ Care should be taken when looking at the largest size classes, due to the small number of firms within these classes.

proportions in the smallest size categories, and as the domestic market has grown, the share of exporters in the smallest size category has declined. In all other size categories, the share of exporters has increased very substantially between 1985 and 2003.²⁸ The largest average size class accounts for less than 0.5 per cent of total exporters in 1985 and 2003, a result which contrasts with Wagner (2004), who finds that in the German economy the largest firms account for 4 per cent of total exporting firms.

Table 5.2.1

Average Size	Percentage of Exporting Firms by Average Size Class		Percentage of Total Exporters		Percentage of Turnover Exported by Average Size Class		Percentage of Total Exports	
	1985	2003	1985	2003	1985	2003	1985	2003
Less than 20 employees	40.81	36.64	62.80	55.13	10.38	20.26	4.78	7.89
20 – 49 employees	40.32	54.91	18.84	24.92	15.98	27.70	10.97	14.74
50 – 99 employees	59.22	68.12	10.42	10.48	30.69	36.12	18.79	16.95
100 – 249 employees	69.34	82.93	6.56	7.58	34.38	42.54	38.92	35.88
250 – 499 employees	52.00	90.00	0.90	1.51	30.13	50.23	16.63	18.53
500 or more employees	46.67	100.0	0.48	0.39	25.45	28.24	9.91	6.00
Average/Total	43.40	44.96	100	100	26.20	35.36	100	100

Source: Own estimates from CIP, 1985-2003.

Table 5.2.2 shows the numbers and share of exporting firms in each size class for 1999-2000 and 2001-2. The largest share of exporting firms in the smallest average size class occurs among starters (33.5 per cent) in 1999-2000, while for the following five average size classes it is increasing continuers that account for the greatest shares. This result is not surprising as exporting is seen as a means to achieving scale, especially in a small economy, so firms would enter the export market at a much earlier stage of development. As might be expected,

²⁸ The small increase in the average share over the period reflects the dominance in terms of numbers of firms in the smallest category.

in 2001/2002 continuing decreaseers comprise the largest shares of exporting firms across all size classes. The two largest size classes have no export starters, re-starters, re-stoppers or stoppers in these two periods of dramatic boom and slump; this is in line with Wagner's (2004) findings for German (Lower Saxony) exporters.²⁹ Table 5.2.3 shows the contributions of export creation and destruction to net export changes in each of the two focus periods. During the export boom, the 250-499 size category experienced the largest export growth. As might be expected, in the smallest size category export starters and re-starters make the largest contribution (45.7 per cent) to the net export growth of 37.1 per cent, which results from export creation/export destruction rates of 77.7 and 40.6 per cent respectively; the contribution of increasers dominates in all other size classes. .

In the 2001/2002 export slump, the largest size category experienced the greatest decline in net exports (>49 per cent), almost entirely due to the declining exports of continuing exporters.³⁰ While all size classes experienced a decline in net exports, dominated by the activities of export decreaseers, there was also significant export creation (34.6 per cent) in the smallest size category.

These decomposition results by class size differ from Wagner, who finds that the smallest size class experienced a negative change in net exports in the German export boom³¹, and that the largest firms, amounting to just 4 per cent of all exporters, account for almost all (98 per cent) of the net increase in total exports. In the case of the Irish economy, the smallest size class contributes over 13 per cent to the net increase in total exports in the boom, while the largest firms, representing less than 0.5 per cent of exporters, account for only 9 per cent of the net increase in total exports.

²⁹ Since larger firms have relatively higher survival rates, they would not be as likely to exit.

³⁰ As noted above, larger firms are less likely to close in a slump.

³¹ However, he cautions on attaching too much importance to the results for this class as "the contributions of very small firms (less than 20 employees) to total exports can be expected to be negligible." (p.498)

Again, we see a high level of heterogeneity between exporting firms even within the same average size categories. In the following section we examine the contributions to net exports of the various types of exporting enterprises by decomposing at a sectoral level.

Table 5.2.2 Types of Exporters by Average Plant Size, 1999-00 and 2001-02

Average Size		1999-2000						2001-2002					
		<20	20-49	50-99	100-249	250-499	500+	<20	20-49	50-99	100-249	250-499	500+
Total		1730	597	191	149	22	9	1349	528	210	145	26	9
Starters	No.	580	64	3	2	0	0	225	41	7	2	0	0
	Share	33.53	10.72	1.57	1.34	0.00	0.00	16.68	7.77	3.33	1.38	0.00	0.00
Restarters	No.	228	56	8	2	2	0	85	29	4	3	0	0
	Share	13.18	9.38	4.19	1.34	9.09	0.00	6.30	5.49	1.90	2.07	0.00	0.00
Increasers	No.	380	324	124	114	16	8	304	106	63	46	2	1
	Share	21.97	54.27	64.92	76.51	72.73	88.89	22.54	20.08	30.00	31.72	7.69	11.11
Decreasers	No.	216	88	36	24	4	1	445	300	126	93	24	8
	Share	12.49	14.74	18.85	16.11	18.18	11.11	32.99	56.82	60.00	64.14	92.31	88.89
Restoppers	No.	96	38	12	5	0	0	62	28	5	1	0	0
	Share	5.55	6.37	6.28	3.36	0.00	0.00	4.60	5.30	2.38	0.69	0.00	0.00
Stoppers	No.	230	27	8	2	0	0	228	24	5	0	0	0
	Share	13.29	4.52	4.19	1.34	0.00	0.00	16.90	4.55	2.38	0.00	0.00	0.00

Source: Own estimates from CIP, 1985-2003.

Table 5.2.3 Export Dynamics for Average Plant Size, 1999-00 and 2001-02

Average Size		1999-2000						2001-2002					
		<20	20-49	50-99	100-249	250-499	500+	<20	20-49	50-99	100-249	250-499	500+
Yr 1 (m)		283	632	828	1850	627	572	596	1220	1230	2400	1330	792
Yr 2 (m)		388	920	919	2430	1020	724	486	944	1100	2060	803	404
Change		37.11	45.69	11.02	31.30	63.46	26.66	18.54	22.42	10.54	14.36	39.44	49.03
Starters	Contribution	33.83	11.49	1.55	5.54	0.00	0.00	12.37	6.18	1.39	0.57	0.00	0.00
Restarters	Contribution	11.90	5.74	0.39	0.06	39.03	0.00	3.19	1.95	0.75	0.31	0.00	0.00
Increasers	Contribution	31.92	43.56	29.46	32.76	27.52	26.85	19.00	9.39	15.03	9.53	0.79	0.09
Decreasers	Contribution	11.13	-4.13	-3.32	-2.91	-3.08	-0.19	29.20	27.73	23.20	24.75	40.23	49.12
Restoppers	Contribution	-5.60	-2.06	-7.99	-0.59	0.00	0.00	-3.12	-3.20	-0.94	-0.01	0.00	0.00
Stoppers	Contribution	23.83	-8.92	-9.06	-3.55	0.00	0.00	20.78	-9.00	-3.58	0.00	0.00	0.00

Source: Own estimates from CIP, 1985-2003.

5.3 Sectoral Characteristics

In this sub-section total manufacturing is disaggregated by sector using the OECD's technological groupings in order to examine the evidence for exporter heterogeneity at sectoral level.

Table 5.3.1 reports the share of firms that engage in the export market by OECD technological grouping, as well as the percentage that each group contributes to the overall number of exporters in 1985 and 2003. Over 70 per cent of high tech firms are active in the export market in both years, while for the corresponding export-market participation rates for other technological groups range from 36 to 55 per cent. Despite the large share of exporting firms in the high tech sector, this sector accounts for just 3.2 per cent of all exporting firms in 2003, while the low tech sector accounted for 48.6 per cent.³² The shares of medium high and medium low tech sectors in total exporting firms remained unchanged at around 16 and 31 percent, respectively, over the period.

Table 5.3.1 also presents the share of turnover exported by each technological group along with each group's share of total manufacturing exports for the two years. Again, it can be seen that the high tech sector exports the largest share of its turnover, up to 64.4 per cent in 2003; this accounts for a very small, albeit an increasing share of total exports up from 1.2 in 1985 to 7.4 per cent in 2003. The medium high tech sector finished the period exporting just over 45.6 per cent of its turnover, a substantial increase of 76.5 per cent over the period, while its share of total exports almost doubled. The medium low tech sector exported an increasing share of its turnover over the period, which increased by just over 37 per cent and its share of total exports increased similarly. The low tech sector experienced an increase its share of turnover—exported - up from 28 per cent to 36.5 per cent, but it experienced a decline

³² High tech exporter firms increased their share of the total between 1985 and 2003, when they grew by more than 30 per cent growth, at the expense of low tech firms which accounted for 49.5 in 1985.

of 19 per cent in its share of total exports (from 83.6 per cent to 67.7 per cent) over the period.

Table 5.3.1

OECD Classification	Percentage of Exporting Firms by Average Size Class		Percentage of Total Exporters		Percentage of Turnover Exported by Average Size Class		Percentage of Total Exports	
	1985	2003	1985	2003	1985	2003	1985	2003
High-Tech	73.47	71.60	2.48	3.23	48.10	64.38	1.21	7.36
Medium High-Tech	48.48	54.58	16.49	16.95	25.84	45.61	7.61	14.52
Medium Low-Tech	42.62	36.68	31.47	31.16	14.17	19.43	7.56	10.41
Low-Tech	41.57	47.76	49.55	48.66	28.00	36.51	83.62	67.71
Average	43.40	44.96	100	100	26.20	33.56	100	100

Source: Own estimates from CIP, 1985-2003.

Table 5.3.2 presents the numbers and shares of exporter types by the OECD technological groupings for the previously highlighted 1999-2000 and 2001-2 intervals. Perhaps the most striking feature of this table is the high degree of churning that exists in the boom interval, particularly in the high tech sector, which has the lowest share of gross export creating firms (66.3 per cent) and the highest share of gross export destroyers (33.8 per cent).³³ While there is a great deal of heterogeneity in terms of contributing types exists across the four sectoral groups, increasers generally dominate the export pattern during the boom.³⁴

The high tech group fared worse than other sectors during the export slump of 2001-2002, experiencing a lower share of export creators and a higher share of export destroyers. Again, continuing firms dominate the patterns, with increasers and decreasers shares of exporting firms accounting for 22.6 and 47.3 per cent on average, respectively, during these years.

³³ These compare with averages of 70 per cent for gross export-creating firms and 29 percent for gross export destroyers in the other three groups.

³⁴ The exception is the medium low tech group, where export starters contribute 29.9 per cent to gross export creation while increasers portion is slightly lower at 28.3 per cent

Progressing to the dynamic decomposition of exporters by OECD group, Table 5.3.3 shows that the high tech group experienced very large net export growth (82 per cent) in the 1999-2000 interval, almost 83 per cent of which was due to continuing firms with increasing export values. Despite the large net export growth evident in this group, there was gross export destruction amounting to 15.4 per cent for the interval. The low tech group had the smallest growth rate for net exports, 28.6 per cent, with an increasers' share of 29.3 per cent. This group experienced the highest share of export market exits (12.6 per cent) for the period. Looking at the 2001-2002 interval the picture is very different; the high tech group experienced the largest decline in net export growth (53.1 per cent) during these years followed by the low tech group (26.4 per cent).

In each period the largest share of the growth/decline in net exports was due to the share of continuing exporters with increasing/decreasing export values over the period. Once more, heterogeneity is evident among exporters even within the same technology group. Also, there is some evidence of restructuring away from low tech toward medium and high tech activities in the export market over the period 1985 to 2003. However, comparing our results with those of Wagner (2004), we see substantially higher levels of churning across all technology groups than those reported for Germany. Also, while the share of high-tech exports in total manufacturing exports is much higher 11.8 per cent compared with 3.6 per cent for Germany, the results for the other technology groups is less favourable; medium- and low-tech exports account for 32.1 and 55.8 per cent respectively in contrast to Germany's 87.9 and 8.5 per cent for medium- and low-tech sectoral groups.

Table 5.3.2 Types of Exporters by OECD Groupings, 1999-00 and 2001-02

		1999-2000				2001-2002			
		HT	MHT	MLT	LT	HT	MHT	MLT	LT
Total		80	460	912	1246	66	379	766	1056
Starters	No.	15	80	273	281	6	32	124	113
	Share	18.75	17.39	29.93	22.55	9.09	8.44	16.17	10.71
Restarters	No.	3	51	118	124	0	24	47	50
	Share	3.75	11.09	12.94	9.95	0.00	6.33	6.13	4.74
Increasers	No.	35	192	258	481	15	76	184	247
	Share	43.75	41.74	28.29	38.60	22.73	20.05	23.99	23.41
Decreasers	No.	10	85	121	153	37	191	276	492
	Share	12.50	18.48	13.27	12.28	56.06	50.40	35.98	46.64
Restoppers	No.	0	20	60	71	1	16	42	37
	Share	0.00	4.35	6.58	5.70	1.52	4.22	5.48	3.51
Stoppers	No.	17	32	82	136	7	40	94	116
	Share	21.25	6.96	8.99	10.91	10.61	10.55	12.26	11.00

Source: Own estimates from CIP, 1985-2003.

Table 5.3.3 Export Dynamics of OECD Grouping, 1999-00 and 2001-02

		1999-2000				2001-2002			
		HT	MHT	MLT	LT	HT	MHT	MLT	LT
Total Exports (m) Yr 1		239	649	678	3200	605	1010	884	5340
Total Exports (m) Yr 2		435	957	899	4120	283	823	754	3930
Rate of Change		81.72	47.53	32.68	28.59	-53.12	-18.61	-14.71	-26.38
Starters	Contribution	13.60	3.89	4.14	6.37	2.59	3.12	4.06	1.82
Restarters	Contribution	0.60	2.75	4.26	8.49	0.00	2.26	2.54	0.33
Increasers	Contribution	82.88	48.03	34.64	29.32	1.91	6.38	12.34	9.30
Decreasers	Contribution	-5.66	-4.43	-4.18	-3.02	-42.61	-26.24	-23.63	-32.00
Restoppers	Contribution	0.00	-1.74	-2.48	-2.48	-1.46	-0.54	-4.18	-0.36
Stoppers	Contribution	-9.70	-0.97	-3.71	-10.09	-13.55	-3.60	-5.84	-5.48

Source: Own estimates from CIP, 1985-2003.

6. Conclusions

This analysis provides evidence on the heterogeneous nature of exporting enterprises, even within size class and sector, from the perspective of a small open economy, and highlights the relevance of the recent trade models which incorporate firm heterogeneity.

In small open economies the limits of the domestic market force firms to enter the export market at an early stage of their development in an attempt to gain scale efficiencies through access to a larger market. This results in greater numbers of small firms engaging in exporting activities and the prevalence of a higher degree of churning than would be expected in a larger economy, as seen for Germany in Wagner (2004).

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Appendix 1 Davis, Haltiwanger and Schuh (1996) Decomposition Method on Irish Manufacturing Export Dynamics, 1985-2003

	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
Total Exports(m) Yr 1	2826	3183	3511	4176	4295	4347	4316	4073	4362	4482	4759	4512	4781	4845	4758	6407	7846	5792
Total Exports(m) Yr 2	3183	3511	4176	4295	4347	4316	4073	4362	4482	4759	4512	4781	4845	4758	6407	7846	5792	5874
Rate of Change	11.88	9.82	17.30	2.80	1.20	-0.71	-5.79	6.86	2.70	6.01	-5.34	5.80	1.34	-1.82	29.54	20.20	-30.12	1.40
Starters Share	17.21	13.42	14.00	5.21	2.48	5.47	6.94	1.78	6.06	1.58	2.72	3.80	3.37	3.32	5.19	6.53	2.64	6.51
Restarters Share	0.00	2.09	0.63	0.65	1.44	1.49	1.04	0.82	1.61	0.51	1.96	1.71	0.99	0.96	5.73	5.40	0.93	0.73
Increasesers Share	16.13	13.94	18.12	12.07	11.81	16.97	11.81	14.26	11.62	13.40	13.63	13.60	14.09	12.38	30.31	24.00	10.01	16.92
Decreasers Share	-10.54	-9.39	-9.50	-10.98	-10.78	-14.04	-13.82	-7.25	-8.38	-5.09	-10.79	-9.54	-11.59	-8.08	-3.00	-11.80	-35.88	-11.20
Restoppers Share	-2.84	-1.16	-1.07	-2.17	-1.02	-2.42	-1.49	-0.82	-0.40	-2.10	-2.24	-0.85	-1.79	-5.23	-1.92	-1.03	-1.04	-0.78
Stoppers Share	-8.08	-9.09	-4.88	-1.98	-2.73	-8.18	-10.27	-1.93	-7.81	-2.30	-10.62	-2.92	-3.73	-5.18	-6.77	-2.91	-6.78	-10.78

Source: Own estimates from CIP, 1985-2003.

Appendix 2 Types of Exporters in Irish Manufacturing, 1985-2003

		85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
Total		1796	1850	1919	2042	2261	2500	2232	2295	2286	2243	2196	1894	2002	2102	2698	2520	2267	2252
Starters	No.	347	371	302	335	310	407	187	289	228	146	176	211	185	285	649	95	275	232
	Share	19.32	20.05	15.74	16.41	13.71	16.28	8.38	12.59	9.97	6.51	8.01	11.14	9.24	13.56	24.05	3.77	12.13	10.30
Restarters	No.	0	85	100	164	204	152	128	168	130	92	114	153	197	132	296	145	121	106
	Share	0	4.59	5.21	8.03	9.02	6.08	5.73	7.32	5.69	4.10	5.19	8.08	9.84	6.28	10.97	5.75	5.34	4.71
Increasers	No.	550	686	650	754	774	643	833	869	1006	897	769	721	679	726	966	831	522	693
	Share	30.62	37.08	33.87	36.92	34.23	25.72	37.32	37.86	44.01	39.99	35.02	38.07	33.92	34.54	35.80	32.98	23.03	30.77
Decreasers	No.	497	375	491	494	653	715	690	602	641	771	471	535	624	610	369	800	996	763
	Share	27.67	20.27	25.59	24.19	28.88	28.60	30.91	26.23	28.04	34.37	21.45	28.25	31.17	29.02	13.68	31.75	43.93	33.88
Restoppers	No.	241	139	191	162	164	261	191	160	126	164	344	125	163	169	151	228	96	87
	Share	13.42	7.51	9.95	7.93	7.25	10.44	8.56	6.97	5.51	7.31	15.66	6.60	8.14	8.04	5.60	9.05	4.23	3.86
Stoppers	No.	161	194	185	133	156	322	203	207	155	173	322	149	154	180	267	421	257	371
	Share	8.96	10.49	9.64	6.51	6.90	12.88	9.09	9.02	6.78	7.71	14.66	7.87	7.69	8.56	9.90	16.71	11.34	16.47

Source: Own estimates from CIP, 1985-2003.

Appendix 3 Irish Manufacturing Export Dynamics, 1985-2003

	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
Total Exports(m) Yr 1	2826	3183	3511	4176	4295	4347	4316	4073	4362	4482	4759	4512	4781	4845	4758	6407	7846	5792
Total Exports(m) Yr 2	3183	3511	4176	4295	4347	4316	4073	4362	4482	4759	4512	4781	4845	4758	6407	7846	5792	5874
Rate of Change	12.63	10.33	18.94	2.84	1.21	-0.70	-5.63	7.10	2.73	6.19	-5.20	5.97	1.35	-1.80	34.66	22.47	-26.18	1.41
Starters Share	18.29	14.11	15.32	5.29	2.50	5.45	6.74	1.84	6.14	1.63	2.65	3.91	3.39	3.29	6.09	7.26	2.30	6.55
Restarters Share	0.00	2.20	0.69	0.66	1.45	1.48	1.02	0.85	1.63	0.52	1.91	1.76	1.00	0.96	6.73	6.01	0.81	0.74
Increasesers Share	17.14	14.66	19.84	12.24	11.88	16.91	11.48	14.77	11.78	13.82	13.28	14.00	14.18	12.27	35.56	26.70	8.70	17.04
Decreasers Share	-11.20	-9.87	-10.40	-11.14	-10.84	-13.99	-13.43	-7.51	-8.50	-5.25	-10.51	-9.83	-11.67	-8.01	-3.52	-13.12	-31.19	-11.28
Restoppers Share	-3.01	-1.21	-1.17	-2.20	-1.02	-2.41	-1.45	-0.85	-0.41	-2.16	-2.18	-0.87	-1.80	-5.18	-2.26	-1.15	-0.90	-0.79
Stoppers Share	-8.59	-9.56	-5.35	-2.01	-2.75	-8.15	-9.98	-2.00	-7.92	-2.37	-10.34	-3.01	-3.75	-5.13	-7.94	-3.24	-5.90	-10.85

Source: Own estimates from CIP, 1985-2003.

Appendix 4 Export Intensities of Continuing Exporters, 1985-2003

	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
Total	1047	1061	1141	1248	1427	1358	1523	1471	1647	1668	1240	1256	1303	1336	1335	1631	1518	1456
Increasing No.	296	512	414	416	456	517	652	637	643	619	494	507	461	513	495	738	723	450
Share	28.27	48.26	36.28	33.33	31.96	38.07	42.81	43.30	39.04	37.11	39.84	40.37	35.38	38.40	37.08	45.25	47.63	30.91
Constant No.	409	340	393	398	349	277	367	416	412	389	310	302	281	271	256	368	281	374
Share	39.06	32.05	34.44	31.89	24.46	20.40	24.10	28.28	25.02	23.32	25.00	24.04	21.57	20.28	19.18	22.56	18.51	25.69
Decreasing No.	342	209	334	434	622	564	504	418	592	660	436	447	561	552	584	525	514	632
Share	32.66	19.70	29.27	34.78	43.59	41.53	33.09	28.42	35.94	39.57	35.16	35.59	43.05	41.32	43.75	32.19	33.86	43.41

Source: Own estimates from CIP, 1985-2003.