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Product and Destination Mix in Export Markets*

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Abstract

Expansion into foreign markets is a major decision for a firm and it involves choices about which countries to approach and which products to export. We use a new database that covers the universe of export transactions for firms located in Portugal for the period 1996-2005 in order to examine the joint decision of where and what to export. We find that multi-product and multi-destination firms are crucial in explaining the dynamics of export over time. The exporters' portfolio is very diversified in terms of sectors and product tenure and it is frequently modified over time. We show that, while continuing firms exporting continuing products to continuing destinations are fundamental in explaining the year-to-year growth rate of aggregate exports, the contribution of gross entry and exit of both destinations and products is, in absolute value, as important as the contribution of gross entry and exit of firms. Moreover, growth dynamics of new exporters proceeds along lines that are different from those characterizing the representative incumbent firm. The destination extensive margin is almost as important as the destination intensive margin and almost one-third of the latter is due to product switching (the product extensive margin). Firms access new destinations mostly by exporting new products, i.e. products that were not previously sold anywhere else by the firm. Products already exported by the firm to other destinations are an important but not the primary way to enter new destinations.

Keywords: Multi-Product Firm, Product Scope, Market Penetration, Exporting

JEL Codes: F1, L25, D21

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1 Introduction

Expansion into foreign markets is an important decision for any firm. It can be defined as a risky decision with high potential returns. Risks arise from devoting resources to sell in markets where there more uncertainty about the market structure, the shape of the demand curve and the institutional background. Returns from expanding into foreign markets derive from higher sales and profits, benefiting also from the diversification of market specific risks and economies of scale. Overall, the decision to enter foreign markets seems as significant as the decision to create a new firm.

Expansion into foreign markets requires decisions about which countries to approach and which products to export. Firms' foreign product mix is the result of a complex combination of factors. The decision of which products to offer in each market depends on production costs, destination country specific costs, market structure and consumer's preferences and income. Before making decisions on expansion, firms can learn from other domestic firms operating in those markets or from their own experience in other markets.

The decisions related with the recomposition of the product-mix of mature exporters are also interesting to examine. In mature stages of the internationalization process firms keep facing idiosyncratic or country-market related shocks, which prompts a recomposition of the export mix. Product switching allows firms to survive to changes in the underlying market conditions and, at the macro level, it contributes to reallocate economic activity towards more efficient uses.

The main contribution of this paper is to describe the joint destination/product strategies of exporters using a new transaction-level database for Portugal for the period 1996-2005. The database covers the universe of export and import transactions for firms located in Portugal and it provides extremely detailed information on products, values, quantities and other characteristics of the transactions. We make three main contributions to the literature. First, we contribute to the recent and extremely scarce literature describing the product and destinations mix of exporters. We find that multi-product and multi-destination exporters (which do not necessarily coincide) are in the majority and account for a more than proportional share of total export. The range of products that they export is very diversified in more respects: it frequently spans multiple 2-digits sectors, the top product (and destination) in terms of firm export sales is important but not dominant even for two- or three-product exporters and, lastly, products vary in terms of tenure within the firm. The latter property is the consequence of frequent product (and destination) switching by the firm. Second, we decompose Portugal export growth rate into three margins: firms, destinations and products. The

breakdown of firms' sales growth rates along different margins is standard in the industrial organization (IO) literature. In our context, the different extensive margins in total exports reflect the foreign sales attributed to new exporters, new destinations or new products, while the different intensive margins reflect exports attributed to existing firms, existing markets or existing products. We show that while the intensive margin (sales of continuing products by continuing firms in continuing destinations) accounts for most of the year-to-year variation in export, the gross contribution of the destination and product extensive margins (for continuing exporters) are as important as the gross contribution of entering and exiting firms and that all of them are as important as the intensive margin. Moreover, we find that continuing firms enter in new markets mainly by selling new products, i.e. products that were not previously sold anywhere else by the same firm. Our third contribution is then to show that the dynamics of new exporters is quite different from the one of experienced exporters. We show that year-to-year changes in export sales for new exporters are driven both by the intensive margin (sales of continuing products in continuing destinations) and by the extensive margin (addition of new destinations and addition of new products in continuing destinations). We believe that all three contributions are informative for developing a dynamic model of multi-products firms.

Our study is related to the recent (and small) literature on multi-product firms and product switching (see Bernard et al. (2006)). Our paper differs from Bernard et al. (2006) in two respects: first, it explores jointly the destination and product dimension instead of the product dimension only and, second, it focuses on the mix of exported products instead of on the mix of produced products. Other papers exploring the product dimension for exporting firms are Arkolakis and Muendler (2007), Bernard, Jensen, Redding and Schott (2007), Iacovone and Javorcik (2008) and Schott (2004). The former paper shows that the distribution of the exporters' number of goods (the exporter scope) is robust within destinations and approximately Pareto, with most firms selling only one or two goods. In addition, it shows that the exporter scope is positively associated with average sales per good within destinations but not across destinations. The latter paper extends the analysis into the price dimension, showing that firms tend to specialize in some products. Furthermore, it should be noted that all these papers somehow link firm's entrance in foreign markets with classical IO results on firm survival (see for instance Klette and Kortum (2004) for some stylized facts). Finally, our paper follows a recent strand of research based on the analysis of extensive international trade micro data, namely by making use of transactions-level data for Portuguese exporters over the period 1995-2005. Other studies based on transaction-level data are Eaton, Eslava, Kugler and Tybout (2007) for Colombia,

Eaton, Kortum and Kramarz (2007) for France, Muûls and Pisu (2007) for Belgium, Bernard, Jensen and Schott (2007) and Mayer and Ottaviano (2007) for a sample of European firms.

The paper is organized as follows. The next section describes the database used. Section 3 provides evidence on the behaviour of multi-product and multi-destination firms, on their product and destination portfolio and on the extent of product and destination switching. Section 4 decomposes Portuguese export growth along the firm, destination and product dimensions. Section 5 describes the behaviour of cohorts of new exporters, aiming at examining their expansion strategies and the link between market attractiveness and entrance of new exporters. Section 6 concludes.

2 Data

Our analysis of product and destination mix is made possible by the use of a new database that combines detailed and comprehensive information on trading behavior of firms. The database includes all export transactions by firms that are located in Portugal, on a monthly basis, from 1995 to 2005. A transaction record includes the firm's tax identification, an eight digit Combined Nomenclature product code, the value of the transaction, the quantity of exported goods(expressed in kilos), the destination country, the type of transport, the relevant international commercial term (FOB, CIF,...) and a variable indicating the type of transaction (transfer of ownership after payment, return of a product...).[1] The data used comes from customs returns forms in the case of extra-EU trade and from the Intrastat form in the case of intra-EU trade and it aggregates to total Portuguese exports as reported by the Statistics Portugal (Instituto Nacional de Estatística). In the analysis, we consider only transactions that are worth more than 100 euro. Still, our data covers, on average, more than 99 percent of total exports and about 75 percent of the exporters. The data is aggregated at the annual level and all values are expressed in current euro. The analysis focuses on the 1996-2005 period. The consideration of this long time span requires adjustments in some six digit product codes in order to ensure the compatibility of two versions of the product classification. Although it would be possible to work at the six digits Combined Nomenclature level, we define products at four-digit level according to the HS. This allows us to avoid other possible classification problems related to Combined

[1]The Combined Nomenclature system is comprised of the Harmonized System (HS) nomenclature with further European Community subdivisions. The Harmonized system is run by the World Customs Organisation (WCO). This classification of commodities is used by most trading nations and in international trade negotiations. The first six digits of the Combined Nomenclature system approximately coincide with the Harmonized System classification. While the Combined Nomenclature system is changed almost every year, the Harmonized System, created in 1988, was updated on January 1st 1996, January 1st 2002 and January 1st 2007. The adjustments were made at the six digit level and implied the aggregation of some categories.

Nomenclature and still allows for a set of 1241 potential products.[2] Section A.1, in the appendix, shows an example of a HS four-digits product.

As shown in Table 1, our sample includes 13,632 exporters in 1996, exporting 1,117 products to 200 countries. The average exporter in 1996 ships 4.7 products to 3.6 destinations and receives about 1.4 millions euro.[3] Table 1 shows that, at the aggregate level, the number of exporters has increased considerably (more than 50 percent) between 1996 and 2005 while both the number of products exported and the number of destinations served has been quite stable. At the firm-level, the average number of products exported by a firm has not changed while the average number of destinations reached has decreased from 3.6 to 2.8. The lack of dynamics for the total number of products exported or destinations served and for the average number of products exported by a firm suggested by Table 1 is misleading. There is a high degree of reallocation of resources across firms and within firms along the product and destination dimensions. The stability in the average number of products exported by a firm or in the total number of products exported by Portugal hides not only a considerable degree of firm entry and exit flows but also frequent and pervasive product and destination switching within firms. As shown by the high standard deviation figures in Table 1, there is a high degree of heterogeneity in terms of the number of destinations served, number of products exported and, as a consequence, of the revenue resulting from exports. Such heterogeneity and reallocation stand as the main motivations of this paper and they are analyzed in detail in the next sections.

3 Multi-product and Multi-destination Exporters

This section documents the performance of multi-product and multi-destination firms, describes their export portfolio and evaluates the extent of product and destination switching. We find that multi-product and multi-destination exporters are in the majority and they are responsible, more than proportionally, for the bulk of total export. Firms that export multiple product do not however necessarily reach multiple destinations. In terms of their portfolio, the top product and the top destination (in terms of their share in firm's export) are very important but other products and destinations are altogether relevant in explaining firm and total export. Most of the firms, including two-products firms, export products that belong to different (2-digits) sectors. Products vary in terms of their tenure within the firm. This is a consequence of the fact that firms regularly modify their product mix, adding and dropping products as well as destinations.

[2] Robustness tests were performed and all results qualitatively hold at the six-digit HS level as well.

[3] Section A.2, in the appendix, provides more information on Portuguese exports and exporters at the sectoral level.

Table 1: Summary Statistics, Selected Years

Firm-level	1996	1999	2002	2005
Number of Products				
- mean	4.7	4.6	4.9	4.6
- median	2	2	2	2
- standard deviation	11.3	10.8	12.9	12.2
Number of Destinations				
- mean	3.6	3.5	3.3	2.8
- median	1	1	1	1
- standard deviation	5.2	5.3	5.4	4.9
Export (Million Euro)				
- mean	1.4	1.5	1.6	1.4
- median	0.1	0.0	0.0	0.0
- standard deviation	18.0	17.4	19.5	17.8
Aggregate-level				
Number of Firms	13632	15054	17199	21127
Number of Products	1117	1118	1126	1143
Number of Destinations	200	201	207	202
Export (Million Euro)	18876	22984.2	27345.1	29619.9

3.1 The Importance of Multi-product and Multi-destination Exporters

Most of the firms export multiple products and multi-product exporters are responsible for 91 percent of total exports. Similarly, a large fraction of firms export to multiple destinations and those are responsible for 94 percent of total exports. Table 2 reports the joint distribution of exporters over the number of products and the number of destinations while Table 3 reports the joint distribution of exports over the same two variables. The last rows of Table 2 and 3 (the marginal distributions along the product dimension) show that almost half of the firms export only one product but they are responsible for less than 10 percent of total export. Multi-product firms represent the majority of the exporters: within this group, firms exporting between 4 and 50 products represent about one third of the exporters and account for two thirds of total exports. A small percentage of firms, about 9 percent, export more than 11 products but this accounts for about 40 percent total exports. In terms of destinations, the situation is similar: the last columns of Tables 2 and 3 (the marginal distributions along the destination dimension) show that more than half of the firms export to one destination and are very small, accounting for only 6 percent of total exports. Firms exporting to a number of countries between 4 and 50, on the contrary, are responsible for more than three fourths of total exports. The joint distribution shows that multi-product exporters are not always multi-destination and viceversa. For example, among firms that ship 4 to 10 products, one out of three is reaching one destination only while 20 percent of the firms that sell to a number of countries between 4 and 10 export one

Table 2: Joint Distribution of Firms over Number of Products and Countries, average 1996-2005

	Products						
Destinations	1	2	3	4-10	11-50	51+	Total
1	36.0	8.3	3.5	6.0	2.4	0.4	56.6
2	3.9	3.6	1.7	3.1	1.2	0.2	13.7
3	1.8	1.3	1.0	2.1	0.7	0.1	7.0
4-10	3.1	3.0	2.1	5.6	1.9	0.2	15.9
11-50	0.5	0.8	0.8	2.9	1.6	0.1	6.7
51+	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Total	45.3	17.0	9.1	19.7	7.9	1.0	100.0

Table 3: Joint Distribution of Exports Over Number of Products and Countries, average 1996-2005

	Products						
Destinations	1	2	3	4-10	11-50	51+	Total
1	2.4	1.0	0.5	1.3	1.1	0.2	6.5
2	1.1	0.7	0.5	1.6	1.0	0.1	5.0
3	0.8	0.7	0.5	1.4	0.6	0.1	4.1
4-10	2.5	3.9	2.3	9.3	5.0	0.3	23.3
11-50	2.0	3.2	3.3	16.3	26.5	4.7	56.0
51+	0.0	0.1	0.2	2.1	1.9	1.0	5.3
Total	8.9	9.7	9.2	31.8	35.2	5.4	100.0

product only. This said, firms that sell multiple products to multiple countries are very important: the subset of firms selling from 4 to 50 products to 4 to 50 countries account for two thirds of total exports. Bernard et al. (2006) obtain similar results while describing U.S. firms in terms of products (they use a more detailed product classification, do not consider export markets and ignore the destination dimension): 59 percent of U.S. firms is single-product and this set of firms accounts for 9 percent of total output. They also find that the average multi-product firm produces 4 goods.

3.2 Product and Destination Portfolio

We proceed by describing the product and destination portfolio in terms of shares of firm's exports, diversification across sectors and tenure within the firm.

Table 4 reports the sales share of the top five products and destinations by firm type. The top panel of the Table shows that, although the main product exported by a firm is important, in terms of the firm's total export, a sizeable share of firm's export comes from the remaining products. For example, three-product firms get one fourth of their export sales from two of their products, with the least selling one still accounting for 6 percent of total revenues. The bottom panel of Table 4 shows that the same holds in terms of destinations. Bernard et al. (2006) also find similar within-firm product

Table 4: Top 5 Products and Destinations Shares, by firm type, average 1996-2005

	Firm's product scope					
Product rank	1	2	3	4-10	11-50	51+
1	100	82.5	76.0	65.9	49.6	25.1
2		17.5	18.1	18.8	17.4	12.0
3			5.9	8.1	9.3	7.8
4				4.0	5.9	5.8
5				2.4	4.1	4.7
	Firm's product scope					
Destination rank	1	2	3	4-10	11-50	51+
1	100	82.4	74.9	62.3	43.2	24.8
2		17.6	19.2	20.7	19.2	13.8
3			5.9	9.4	11.3	9.8
4				4.4	7.3	7.7
5				2.6	5.1	6.3

Table 5: Distribution of firms according to the number of 2-digit sectors their products belong to, by firm type, average 1996-2005

	Firm's product scope (4-digits)					
Sectors (2-digits)	1	2	3	4-10	11-50	51+
1	100	49.1	27.7	9.9	0.1	0.0
2		50.9	42.1	22.0	2.3	0.0
3			30.2	24.4	3.8	0.0
4				20.7	5.9	0.0
5+				23.0	87.9	100.0

output shares.

Table 5 shows that the product mix of multi-product firms is quite diversified in terms of two-digits sectors. For each firm type, we report the fraction of firms whose product portfolio is concentrated in one sector, two sectors, three sectors and so on. About half of the two-product exporters ship goods belonging to two different sectors. Almost two thirds of three-product exporters have a product portfolio that includes more than one sector and 30 percent ship three goods belonging to three different sectors. Multi-product firms export products which can be very different.

Table 6 shows that the product portfolio is also diversified in terms of tenure. We consider exporters in the last year of the sample period and, for each firm type, we rank the products in terms of the tenure within the firm, that is the number of years since the product was first exported by the firm. By construction, since we consider only firms that export every year from 1996 to 2005, the maximum product tenure is ten years. The difference between the oldest and the newest product is, on average, 4 years in two-product firms and 6 years in three-product firms. This suggest a high degree of product switching within firms. We study this in the next section.

Table 6: Average Years of Tenure, products ordered by tenure, by firm type, 2005

	Firm's product scope					
Product rank	1	2	3	4-10	11-50	51+
1	9.4	9.5	9.4	9.7	9.7	9.7
2		5.4	6.6	8.1	9.0	9.4
3			3.4	6.2	8.3	9.1
4				4.4	7.7	8.9
5				3.7	7.1	8.7
6				3.1	6.4	8.5
7				2.4	5.9	8.3
8				1.9	5.3	8.2
9				1.7	4.7	8.0
10				1.4	4.2	7.9

3.3 Frequency of Product and Destination Switching

Having seen the importance of multi-product and multi-destination firms and the characteristics of their portfolio, we now ask how frequently exporters change products and destinations over time. We consider firms that export every year in the period 1996 to 2005 and we consider two subperiods: (1) 1996-2000 and (2) 2001-2005. In each subperiod we classify firms in four categories: (1) None - the firm does not change its mix of products (2) Drop - the firm only drops products (3) Add - the firm only adds products (4) Both - the firm both adds and drops products. We compute the average percent of firms in each category (across the two subperiods). The same calculations are performed in terms of destination switch as well. The results are shown in Table 7. The results indicate that product and destination switching are very frequent among all types of firms. Among single-product firms, 38 per cent add products within five years and 45 per cent add or drop products. Among multi-product firms, the percentage of firms that switch products goes from a minimum of 80 to a maximum of 100. Similarly, among single-destination firms, 40 percent of the firms add destinations within five years and one out of two firms add or drop destinations. Among multi-destination firms, the percentage of firms that switch destination goes from a minimum of 86 to a maximum of 100. Bernard et al. (2006), looking at U.S firms production decisions, find that most firms switch products, that product switching is more frequent in multi-product firms compared to single-product firms and in large firms compared to small firms. These results are consistent with the behaviour of Portuguese firms in export markets. Gorg et al. (2007) also find that many firms add as well as drop products from the export mix in any given year and they study what determines the survival of products in the export mix. They find that characteristics of the products as well as characteristics of the firm matter.

Table 7: Product Switching by Portuguese Exporters, five years spell, average 1996-2005

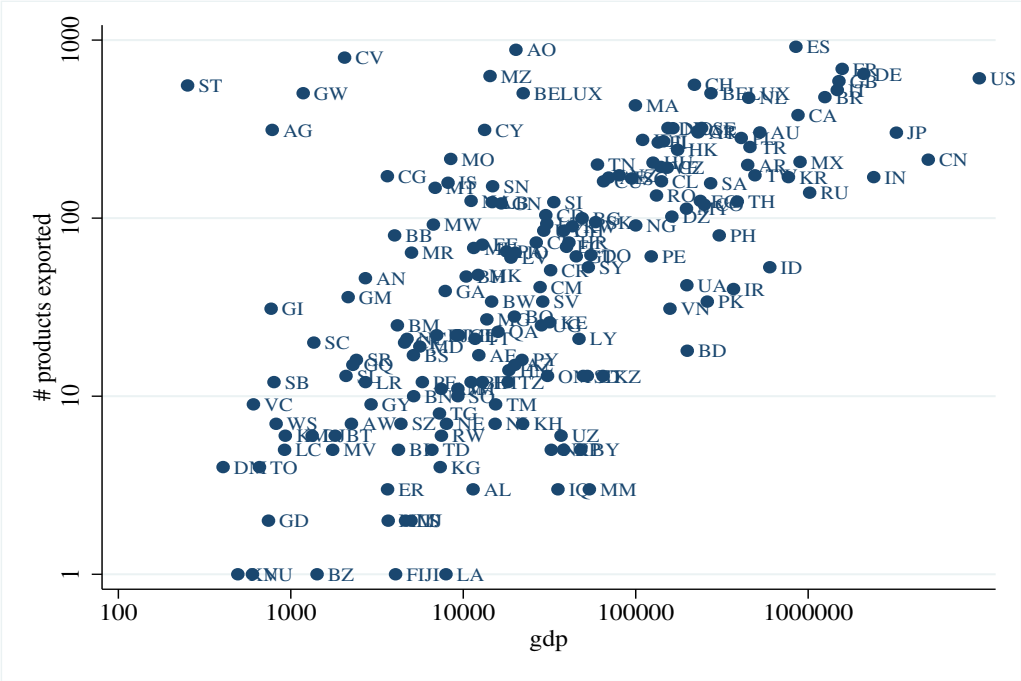
		Multi-product				
Year	**Single-product**	2	3	4-10	11-50	51+
None	55.3	19.5	6.2	1.4	0.1	0.0
Drop product(s) only	na	26.8	29.3	20.6	5.7	0.6
Add product(s) only	38.0	24.8	13.4	6.1	0.4	0.0
Add and drop product(s)	6.7	28.9	51.2	72.0	93.8	99.4
		Multi-destination				
Year	**Single-destination**	2	3	4-10	11-50	51+
None	48.3	13.6	5.7	1.3	0.0	0.0
Drop product(s) only	na	22.5	22.3	18.7	5.8	4.8
Add product(s) only	41.1	24.9	18.8	7.7	1.7	0.0
Add and drop product(s)	10.6	39.0	53.2	72.4	92.5	95.2

Figure 1 shows a clear linear positive relationship between the number of products exported by Portugal against the size of the destination country, measured as GDP in 2000 PPP. Both variables are in logs. The few countries in the top-left corner of the plot are particular in the sense that they all are Portugal ex-colonies. A simple OLS regression indicates that the fitted line has a slope of .55, indicating that the number of products exported rises less than proportionally with country size.

4 Firms, Products, Destinations and Aggregate Growth

In this section we study the impact of firms' product and destination switching on Portuguese total exports. First we consider the firm dimension. We track the number of continuing, exiting and entering firm (extensive margin) and their average export (intensive margin). Moreover we confirm Eaton, Eslava, Kugler and Tybout (2007) findings about the huge number of single-year exporters and their small export sales. Then we decompose the growth rate of Portugal export into the contribution of firms, destinations and products. We find that year-to-year changes are explained mainly by the intensive margin, namely by the contribution of continuing firms selling continuing products in continuing destinations. However we also find that the gross contributions of the destination and product extensive margins (for continuing firms) are as important as the gross contribution of entering and exiting firms and that all of them are as important as the intensive margin. Finally we find that the contribution of continuing firms in added destinations is mainly due to the introduction of products that the firm was not priory exporting anywhere else.

Figure 1: Country-level - Product scope and destination market size, logs (GDP 2000, PPP)



4.1 The Firm Margin

Table 8 decomposes the total number of exporters in each year into those continuing, exiting, entering or just staying one year. Here we follow Eaton, Eslava, Kugler and Tybout (2007) in defining firm categories. Entrants in year t are those firms that did not export in $t-1$, export in t and will export in $t+1$ as well; exiters in year t are those firms that exported in $t-1$, export in t but will not export in $t+1$; continuing firms in year t are those firms that exported in $t-1$, export in t and will export in $t+1$ as well; finally, single-year exporters in year t are those firms that did not export in $t-1$, export in t but will not export in $t+1$. The top panel of Table 8 reports the number of firms falling in each category over time and the bottom panel reports average exports per firm for each category. Results show that about half of the firms are continuing exporters, single year firms represent about 20 percent of the total and entering exporters are slightly more numerous than exiting ones. The share of continuing firms in total exports is overwhelming, representing more than 95 per cent. In contrast, single year firms represent less than one per cent of total exports. Thus the gap between exports per firm in each group is very wide. Entering and exiting firms, just like in the IO literature, are on average smaller, in terms of sales per firm, than incumbents. Eaton, Eslava, Kugler and Tybout (2007) also find that single-year Colombian exporters are numerous but count little in terms of exports. They discuss several explanations for these facts.

Table 8: Continuing, Entering, Exiting and Single-Year Exporters 1997-2004

	Number of firms			
Year	Continuing	Exiting	Entering	Single-Year
1997	8187	1438	2075	2601
1998	8471	1791	1925	3001
1999	8683	1713	1924	2734
2000	8729	1878	2279	3355
2001	8992	2016	2137	3435
2002	9213	1916	2292	3778
2003	9430	2075	2410	5473
2004	9664	2176	2942	5907
	Export per firm (thous. euro)			
Year	Continuing	Exiting	Entering	Single-Year
1997	2445	149	279	23
1998	2535	142	215	21
1999	2540	134	326	26
2000	2809	425	415	19
2001	2863	180	319	23
2002	2841	208	312	15
2003	2864	150	263	10
2004	2893	237	313	21

4.2 Decomposing Export Growth: Firms, Destinations and Products

Having looked at total export and the firm extensive and intensive margins we now go more in detail and decompose Portugal's total export growth in the contribution of three distinct decisions: the decision to entry/stay/exit in export markets, the decision of where to export and the decision of what to export. First we decompose total export growth in the contribution of "entering", "exiting" and "continuing" exporters, that is, in the extensive and intensive margin at the aggregate level along the firm dimension.

$$\Delta Y_t = \sum_{j \in N} \Delta Y_{jt} + \sum_{j \in X} \Delta Y_{jt} + \sum_{j \in C} \Delta Y_{jt}, \tag{1}$$

where ΔY_t is the change in Portugal exports from year $t-1$ to year t, N is the set of entering exporters, X is the set of exiting exporters and C is the set of continuing exporters. The next step is to break down the change in export shipped by continuing exporters into "added destinations" (AD), "dropped destinations" (DD) and "continuing destinations" (CD), that is, in the extensive and intensive margin at the firm level along the destination dimension.

$$\sum_{j \in C} \Delta Y_{jt} = \sum_{z \in AD} \Delta Y_{zjt} + \sum_{z \in DD} \Delta Y_{zjt} + \sum_{z \in CD} \Delta Y_{zjt}, \tag{2}$$

Next, we consider the product that firms choose to export in "continuing" and "added" destinations. First we distinguish among "added" (AP), "dropped" (DP) and "continuing" (CP) products exported by firms in "continuing destinations", that is, the

extensive and intensive margin at the firm level along the product dimension.

$$\sum_{z \in CD} \Delta Y_{zjt} = \sum_{v \in AP} \Delta Y_{vzjt} + \sum_{v \in DP} \Delta Y_{vzjt} + \sum_{v \in CP} \Delta Y_{vzjt}, \tag{3}$$

Finally, we split the export change associated to new destinations into products already sold by the firm somewhere, i.e. old products (OP), and products that were not sold by the firm anywhere, i.e. new products (NP). We consider this as an interaction between the extensive margin along the destination dimension and the product margin.

$$\sum_{z \in AD} \Delta Y_{zjt} = \sum_{v \in OP} \Delta Y_{vzjt} + \sum_{v \in NP} \Delta Y_{vzjt}. \tag{4}$$

Substituting we can write the change in Portuguese exports as:

$$\Delta Y_t = \sum_{j \in N} \Delta Y_{jt} + \sum_{j \in X} \Delta Y_{jt} + \left[\sum_{v \in OP} \Delta Y_{vzjt} + \sum_{v \in NP} \Delta Y_{vzjt} \right] + \sum_{z \in DD} \Delta Y_{zjt} + \left[\sum_{v \in AP} \Delta Y_{vzjt} + \sum_{v \in DP} \Delta Y_{vzjt} + \sum_{v \in CP} \Delta Y_{vzjt} \right] \tag{5}$$

We compute the percent change in total export by dividing each term in equation 5 by $(Y_t + Y_{t-1})/2$, i.e. the average between exports in t and $t-1$.[4]

Results from this breakdown are presented in Table 9. The Table shows that the yearly change in total nominal exports are mainly driven by the change in exports of continuing firms. For example, this was the main force underlying the slowdown in nominal export growth in the 2000-2002 period and in the 2004-2005 period. This latter period is also characterized by a lower contribution of net entry, mostly because of a higher than usual impact of exiting firms. Over the whole period, from 1997 to 2005, average nominal aggregate export growth was 4.4 percent. One fifth of this average growth rate is accounted for by the extensive margin along the firm dimension. Eaton, Eslava, Kugler and Tybout (2007), using Colombian data for the 1997-2005 period, find that continuing firms drive most of the year to year fluctuations in aggregate export. This is due to the fact that entering and exiting firms are, like we showed in Table 8, much smaller than incumbent firms. However, they also find that net entry over the course of the sample period accounts for one quarter of the cumulative total export expansion, while gross entry explains about half of total growth. This is due to the fact that surviving new exporters are typically able to rapidly expand. This occurs in our data as well and we are going to focus on this aspect in section 5. When we consider the next level of disaggregation, destinations, we see that the intensive margin, that is

[4] As Eaton, Eslava, Kugler and Tybout (2007) explain, computing growth as the change between two dates divided by the average level in the two dates rather than the change divided by the level in the earlier date has at least two advantages: (i) x percent growth followed by -x percent growth returns us to the same level and (ii) values close to zero in the first year have a less extreme effect on the growth rate.

Table 9: Decomposition of Portugal Total Export Growth Rate, Extensive and Intensive Margins, 1997-2005

		Extensive Margin			**Intensive Margin**
	Aggregate Growth	Net	Entering Firms	Exiting Firms	Cont Firms
1997-1998	6.2	0.9	2.2	-1.3	5.3
1998-1999	3.4	1.7	3.1	-1.4	1.7
1999-2000	13.6	2.9	4.1	-1.2	10.7
2000-2001	2.0	-0.3	2.9	-3.2	2.4
2001-2002	1.8	1.3	2.9	-1.6	0.5
2002-2003	2.4	0.9	2.5	-1.6	1.6
2003-2004	5.2	2.3	3.6	-1.3	2.9
2004-2005	0.4	0.8	3.0	-2.2	-0.5
Average	4.4	1.3	3.1	-1.8	3.1
		Extensive Margin			**Intensive Margin**
	Cont Firms	Net	Added Dest	Dropped Dest	Cont Dest
1997-1998	5.3	0.8	3.9	-3.1	4.5
1998-1999	1.7	0.0	2.9	-2.9	1.8
1999-2000	10.7	0.0	2.9	-2.9	10.7
2000-2001	2.4	-1.5	2.7	-4.2	3.9
2001-2002	0.5	0.2	3.0	-2.8	0.3
2002-2003	1.6	0.9	3.3	-2.4	0.7
2003-2004	2.9	0.9	3.1	-2.2	2.0
2004-2005	-0.5	-1.2	2.8	-4.0	0.8
Average	3.1	0.0	3.1	-3.1	3.1
		Extensive Margin			**Intensive Margin**
	Cont Dest	Net	Added Prod	Dropped Prod	Cont Prod
1997-1998	4.5	-0.1	3.2	-3.3	4.6
1998-1999	1.8	0.2	2.9	-2.7	1.6
1999-2000	10.7	0.8	3.7	-2.9	10.0
2000-2001	3.9	0.6	3.0	-2.4	3.4
2001-2002	0.3	-0.4	2.8	-3.2	0.7
2002-2003	0.7	0.4	3.6	-3.2	0.3
2003-2004	2.0	1.1	3.9	-2.8	1.0
2004-2005	0.8	-0.7	2.4	-3.1	1.4
Average	3.1	0.2	3.2	-3.0	2.9

export growth in continuing destinations, accounts for almost all of the intensive margin along the firm dimension. However, the gross contribution of added destinations and dropped destinations among continuing firms is quite high. Therefore, there is a high level of reallocation of economic resources associated with destination switching. The decomposition at the product level also offers some interesting patterns. The net contribution of added and dropped products at continuing firms is usually small but the level of churning is very high. Bernard et al. (2006), looking at growth of real U.S. output during the 1972-1997 period, also finds that U.S. firms, selling on the domestic market, alter their productive capacity far more than reflected by their net contribution to total growth. The role of continuing products in continuing firms is crucial in explaining changes in Portugal's export growth. Finally, in Table 10 we show that continuing exporters tend to ship new products to newly added destination markets.

A product is defined as new, within the firm, if it was not exported, the year before, by the firm in any continuing or dropping destination. A priori we were expecting firms to enter new destinations with old, that is tested, products, but this does not seem to be the rule. An additional step in the decomposition (which we do not show in the Table for space reasons) shows that most of the products added by continuing firms at continuing destinations are also new products. Therefore our conjecture is that the role of new products is important and that firms tend to introduce them both in continuing and in new markets. This is an interaction between the extensive margin along the destination dimension and the product margin.

Table 10: Interaction Between Destination and Product Margins

	Continuing Firms Added Destinations	New Products	Old Products
1997-1998	3.9	3.3	0.5
1998-1999	2.9	2.4	0.5
1999-2000	2.9	2.4	0.5
2000-2001	2.7	2.3	0.4
2001-2002	3.0	2.5	0.5
2002-2003	3.3	2.5	0.8
2003-2004	3.1	2.6	0.5
2004-2005	2.8	2.4	0.3
Average	3.1	2.6	0.5

5 Dynamics of new exporters

In this section we focus on the role and entering strategies of new exporters. Assessing on which dimension new exporters adjust their export mix is informative about the relative importance of the different sources of uncertainty faced when entering foreign markets. We find that most of the firms start exporting selling one product in one market, are relatively little in terms of export sales and stop exporting after one year. Surviving exporters grow fast and expand especially along the product dimension. We decompose new exporters' growth along the destination and product margins and we find a dynamic which is different from the one of experienced exporters: year-to-year changes in export sales are driven both by the intensive margin (sales of continuing products in continuing destinations) and by the extensive margin (addition of new destinations and addition of new products in continuing destinations).

5.1 New exporters: size, products and destinations

Table 11 shows the joint distribution of new exporters in terms of number of products and destinations. Most of the new exporters, 87 percent, start exporting in one destination only. Moreover, conditional on entering in one destination, they start exporting by shipping only one product in almost two thirds of the cases. Table 12 shows the percentage of new exports accounted for by firms with different number of products serving different number of destinations. Even though most of the new exporters, 62 percent, enter one destination with one product only, they are responsible for only 11 percent of new exports. Table 13 shows that many of the new exporters exit foreign markets after one year only. The drop rate is very high after the first year and it reduces thereafter. We know already that many firms are single-year exporters and that they are very small. This explains the high dropout rate after the first year and in particular the increase in export per firm between the first and second year. However, sales per firm keep increasing in the subsequent years indicating that surviving exporters grow very fast. Eaton, Eslava, Kugler and Tybout (2007) also find a very low survival rate (about one third) among first-year exporters and a high growth rate for surviving firms. Table 14 shows what happens to one-product/one-destination firms after the first year, conditional on surviving. Most of the firms, about 82 percent, keep exporting to one destination only but 12 percent expand to a second destination and 6 percent to three destinations or more. On the product side there is more dynamics: 18 percent of the firms start exporting two products and another 15 percent start exporting 3 or more products.

Table 11: Joint Distribution of New Exporters over Number of Products and Number of Countries Served, entrants in 1999

	Products					
Destinations	1	2	3	4-10	11+	Total
1	62.3	11.1	4.9	6.9	1.7	86.9
2	2.5	3.0	1.0	1.1	0.4	8.0
3	0.7	0.4	0.4	0.7	0.1	2.0
4-10	0.8	0.5	0.4	0.8	0.1	2.6
11+	0.0	0.1	0.1	0.2	0.1	0.5
Total	66.3	15.1	6.8	9.4	2.4	100.0

In order to study more in detail the dynamics of new exporters we use a decomposition similar to the one of section 4. Unlike before, we consider only the cohort of firms that enter export markets in 1999 and keep exporting until 2005 and breakdown their yearly nominal export growth into the destination and product dimensions. Results are shown in Table 15. We already know, from Table 13 that this set of firms start exporting

relatively little, usually in one destination and with one product, but then grow very fast over time. Table 15 shows some more information on how these firms grow. Unlike what we saw in the aggregate decomposition, the extensive margin along the destination dimension is almost as important as the intensive margin. Yearly changes in exports at the firm level are driven both by the change in exports at continuing destination and by destination switching. The dynamics of new exporters is therefore different from the one of the average exporting firm. Table 16 shows that, similarly to what we showed for the aggregate decomposition, new exporters tend to ship new products to newly added destinations.

Table 12: Joint Distribution of New Exports over Number of Products and Number of Countries Served, entrants in 1999

	Products					
Destinations	1	2	3	4-10	11+	Total
1	11.2	2.5	2.8	6.1	1.2	23.8
2	2.6	2.2	1.8	2.0	1.3	9.9
3	1.6	0.5	0.5	1.5	0.2	4.3
4	3.2	25.7	1.1	17.2	0.7	47.9
11+	0.1	1.2	2.3	3.3	7.1	14.0
Total	18.7	32.1	8.5	30.1	10.5	100.0

Table 13: Firms by Initial Export Year Cohorts 1997-2005

	Number of firms								
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
1997	4,676								
1998	2,075	4,293							
1999	1,332	1,597	3,782						
2000	992	1,039	1,494	4,308					
2001	807	766	927	1,637	4,251				
2002	668	613	666	1,022	1,517	4,552			
2003	575	511	549	789	970	1,562	6,242		
2004	495	442	452	627	715	1,026	1,629	7,060	
2005	446	380	391	512	577	777	971	2,141	6,505
	Export per firm (thousand euros)								
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
1997	137								
1998	532	92							
1999	1042	407	159						
2000	1591	802	688	220					
2001	1908	1225	985	672	153				
2002	2332	1432	1393	1237	472	149			
2003	2907	1645	2074	1242	695	676	97		
2004	3449	1870	2009	1398	869	1057	470	133	
2005	4724	2046	1949	1559	971	1297	705	572	120

Table 14: Transition Matrix over Number of Destinations Served and Products Offered, new exporters in 1999 that entered one destination with one product, conditional on surviving, 1999 to 2000

	Destinations 2000				
Products 2000	1	2	3	4+	Tot.
1	62.6	3.4	1.2	0.3	67.6
2	11.1	4.8	1.1	0.8	17.6
3+	8.7	3.4	0.6	2.1	14.8
Total	82.4	11.7	2.9	3.1	100.0

Table 15: Decomposition of Export Growth Rate for a Cohort of New Exporters, Extensive and Intensive Margins 1999-2005

		Extensive Margin			**Intensive Margin**
	Firm's Growth	Net	Added Dest	Dropped Dest	Cont Dest
1999-2000	48.8	16.6	26.0	-9.4	32.3
2000-2001	15.9	5.9	15.0	-9.1	10.1
2001-2002	11.4	3.8	13.2	-9.4	7.6
2002-2003	10.3	4.3	12.2	-7.9	6.1
2003-2004	-5.5	3.1	12.0	-8.9	-8.7
2004-2005	-11.8	-3.9	11.3	-15.2	-7.9
Average	11.5	5.0	15.0	-10.0	6.6
		Extensive Margin			**Intensive Margin**
	Cont Dest	Net	Added Prod	Dropped Prod	Cont Prod
1999-2000	32.3	11.1	22.3	-11.2	21.0
2000-2001	10.1	0.7	13.8	-14.5	10.8
2001-2002	7.6	2.5	14.2	-11.7	5.1
2002-2003	6.1	2.6	14.2	-11.6	3.5
2003-2004	-8.7	-4.8	10.9	-15.7	-4.0
2004-2005	-7.9	-0.9	12.2	-13.1	-7.0
Average	6.6	1.9	14.6	-13.0	4.9

Table 16: New Exporters,Interaction between Destination and Product Margins

	Added Destinations	New Products	Old Products
1999-2000	26.0	14.6	11.4
2000-2001	15.0	9.1	5.9
2001-2002	13.2	7.3	5.9
2002-2003	12.2	8.1	4.2
2003-2004	12.0	7.2	4.9
2004-2005	11.3	5.9	5.4
Average	15.0	8.7	6.3

5.2 The country-product choices of new exporters

One interesting question in this line of research relates with the costs that firms face when exporting a new product to a new country. There is admittedly uncertainty relatively to these costs, thus it it natural that new exporters try to learn a priori from the experience of other domestic firms operating there. A partial test to this argument is to plot the number of firms entering each foreign market ranked by its popularity measured as the number of domestic firms already operating there. Figure 2 shows this relation (in logs) and captures a positive relation. There are obviously many variables that can affect this relation. For example, a common language, participation in trade agreements and geographical location make some destinations popular for old and new exporters. Nevertheless, this is not incompatible with the basic argument because the relation holds even when such countries are excluded. Figure 3 follows the same approach but the horizontal axis ranks markets, defined as product-country pairs, and not just destination countries. The relation between the number of new entrants and the popularity of the market remains positive.

Figure 2: Rank of destination countries and choice of new exporters

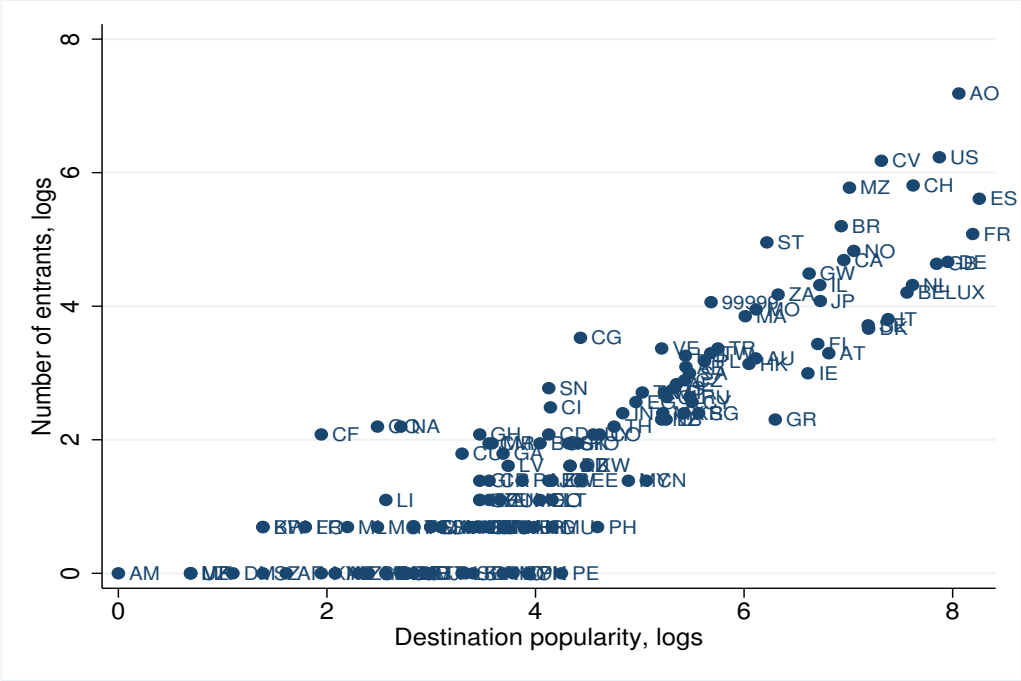
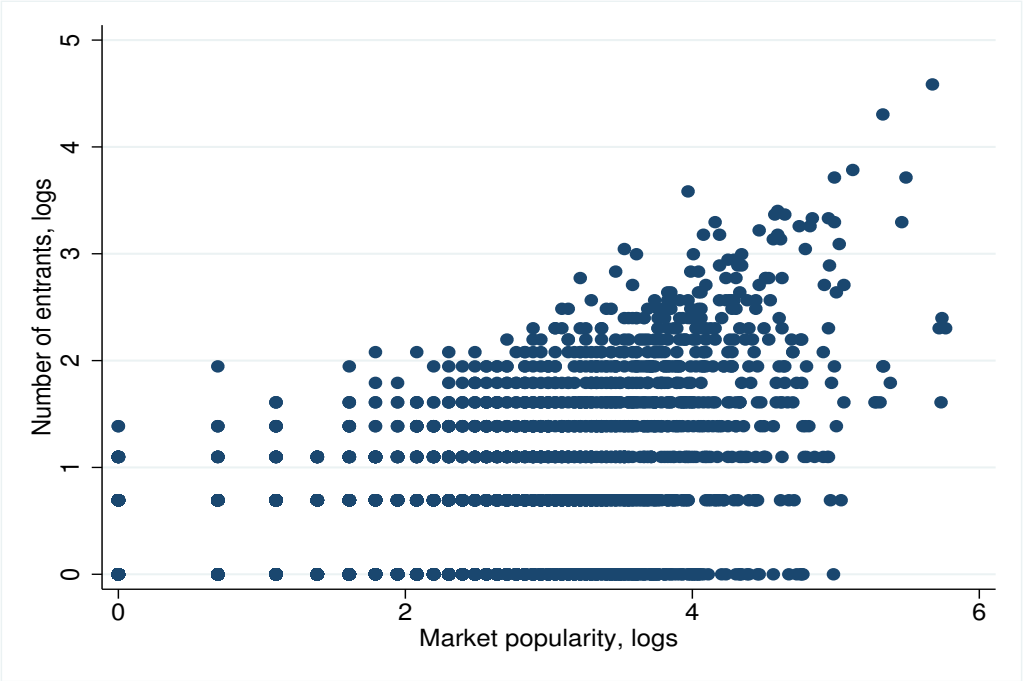


Figure 3: Rank of destination markets and choice of new exporters



6 Conclusions

We use a new transaction level trade database for the period 1996-2005 to describe the joint product and destination decisions of Portuguese exporters. Some of the facts shown are in line with and consolidate the still scarce literature on this subject but some other are novel to the literature. Our main contribution is the analysis of the joint product and destination dimensions. We show that multi-product and multi-destination firms are crucial in explaining the level and growth rates of Portuguese exports. In particular firms that export four or more products and operate in four or more destinations are responsible for over two thirds of total exports.

The exporters' portfolio is very diversified in terms of sectors and product tenure. Even when exporters are small in terms of product scope and ship only two products abroad, 50 percent of the times they export products that belong to two different Harmonized System 2-digits sectors. The average year difference between the oldest and most recent product within this type of firms is more than 4 years out of a potential maximum of 10 years. The product and destination portfolio changes frequently over time. Product and destination switching is widespread, even among single or two-products firms.

We breakdown the aggregate export growth along three margins: firms, destinations and products. We show that while continuing firms exporting continuing products to continuing destinations are fundamental in explaining year to year changes in export growth, the contribution of gross entry and exit of both destinations and products is,

in absolute value, as important as the gross entry and exit of firms.

We show that growth dynamics of new exporters proceeds along lines that are different from those characterizing the representative incumbent firm. New exporters tend to enter one destination with one product and then grow both along the destination and (especially) product dimensions. The destination extensive margin is almost as important as the destination intensive margin and almost one third of the destination intensive margin is due to product switching (the product extensive margin). We then look at the interaction between product and destination margin and show that growth in new destinations is achieved mostly through the introduction of new (to the firm) products. Products already exported by the firm to other destinations are an important but not the primary way to enter new destinations.

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A Appendix: Database

A.1 Product Definition

The following is an example of a four-digits HS product. Out of 21 possible Chapters, consider Chapter XVIII entitled "optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof". This includes three headings,

"90 optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof",
"91 clocks and watches and parts thereof" and
"92 musical instruments; parts and accessories of such articles".

The third heading, number 92, further divides into

"9201 Pianos, including automatic pianos; harpsichords and other keyboard stringed instruments"
"9202 Other string musical instruments (for example, guitars, violins, harps)"
"9203 Keyboard pipe organs; harmoniums and similar keyboard instruments with free metal reeds"
"9204 Accordions and similar instruments; mouth organs"
"9205 Other wind musical instruments (for example, clarinets, trumpets, bagpipes)"
"9206 Percussion musical instruments (for example, drums, xylophones, cymbals, castanets, maracas)"
"9207 Musical instruments, the sound of which is produced, or must be amplified, electrically (for example, organs, guitars, accordions)"
"9208 Musical boxes, fairground organs, mechanical street organs, mechanical singing birds, musical saws and other musical instruments not falling within any other heading of this chapter; decoy calls of all kinds; whistles, call horns and other mouth-blown sound signalling instruments"
"9209 Parts (for example, mechanisms for musical boxes) and accessories (for example, cards, discs and rolls for mechanical instruments) of musical instruments; metronomes, tuning forks and pitch pipes of all kinds"

which is the disaggregation level which corresponds to our definition of products.

A.2 Summary Statistics, by Sector

Here we provide some background on the sectoral structure of Portuguese exports and exporters. Table 17 shows the percentage of country exports accounted for by each sector for each year in the sample period. Similarly, Table 18 shows the percentage of exporters belonging to each sector.

Table 17: Summary Statistics, by sector

	Total Export (percent)			
1-Digit Sector	1996	1999	2000	2005
Animal products	1.5	1.5	1.6	1.7
Vegetable products	0.8	0.8	1.2	1.3
Animal or vegetable fats and oils	0.7	0.4	0.5	0.6
Prepared food, beverages, tobacco	4.3	4.3	4.5	4.9
Mineral products	3.4	0.2.5	2.5	5.6
Chemical products	3.4	3.6	4.2	5.3
Plastics and rubber	2.5	3.2	3.9	5.3
Leather and travel goods	0.4	0.3	0.4	0.3
Wood, cork products	4.6	4.8	4.8	4.5
Paper products	4.7	4.6	4.8	4.7
Textiles	22.8	20.7	18.0	13.1
Footwear	7.9	7.0	5.9	4.2
Plaster, cement, ceramic, glass	3.9	3.7	3.5	3.7
Jewellery	0.4	0.4	0.3	0.2
Base metals	3.9	4.9	5.5	7.6
Machinery, electrical equipment	16.2	19.1	19.7	18.6
Vehicles, aircraft, vessels	15.6	15.4	15.0	14.3
Optic., music., measur., med. instr.	1.0	0.8	1.0	0.7
Arms and ammunition	0.2	0.2	0.1	0.1
Miscellaneous manufactured articles	1.7	1.8	2.3	2.9
Works of art and antiques	0.0	0.0	0.0	0.0
Other	0.1	0.1	0.3	0.3

Note: Abbreviated Titles of the Chapters of the HS 1996 Description and Coding System

Table 18: Summary Statistics - Continued

	Nb Exporters (percent)			
1-Digit Sector	1996	1999	2002	2005
Animal products	2.5	2.1	2.0	2.1
Vegetable products	2.4	2.3	2.0	1.8
Animal or vegetable fats and oils	0.6	0.6	0.5	0.4
Prepared food, beverages, tobacco	5.1	4.8	4.5	4.2
Mineral products	1.2	1.0	1.0	1.1
Chemical products	3.9	4.1	3.8	3.3
Plastics and rubber	3.8	4.0	4.2	3.9
Leather and travel goods	1.0	0.9	1.0	0.8
Wood, cork products	4.8	4.4	4.0	3.4
Paper products	3.7	3.8	3.8	3.3
Textiles	19.8	18.2	16.4	12.2
Footwear	6.4	5.3	4.6	3.4
Plaster, cement, ceramic, glass	8.0	7.6	7.3	5.7
Jewellery	0.7	0.7	0.8	0.5
Base metals	5.9	6.5	6.4	6.2
Machinery, electrical equipment	16.0	18.5	17.5	16.1
Vehicles, aircraft, vessels	3.9	4.8	9.1	22.2
Optic., music., measur., med. instr.	2.3	2.5	2.7	2.3
Arms and ammunition	0.1	0.1	0.1	0.1
Miscellaneous manufactured articles	6.4	6.6	7.2	6.3
Works of art and antiques	0.2	0.2	0.3	0.2
Other	1.1	0.8	0.6	0.5

Note: Abbreviated Titles of the Chapters of the HS 1996 Description and Coding System

A.3 Transition Matrices

Tables 19 and 20 represent one-year transition matrices for firms over number of products and number of destinations.

Table 19: One-Year Transition Matrix over Number of Products Offered, average 1996-2005

	products year $t+1$									
products year t	0	1-5	6-10	11-25	26-50	51-100	101-200	201-500	501-1000	1001+
0	85.2	13.9	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0
1-5	38.7	56.2	4.1	0.9	0.1	0.0	0.0	0.0	0.0	0.0
6-10	11.2	32.7	41.0	13.9	0.9	0.1	0.0	0.0	0.0	0.0
11-25	8.1	10.9	21.5	50.7	7.9	0.9	0.0	0.0	0.0	0.0
26-50	5.5	4.6	4.3	26.1	47.1	12.0	0.4	0.0	0.0	0.0
51-100	2.1	1.2	0.7	6.1	23.1	58.1	8.6	0.0	0.0	0.0
101-200	0.9	0.0	0.3	2.2	3.5	20.1	68.9	4.1	0.0	0.0
201-500	0.0	0.0	0.0	0.0	0.0	0.0	32.1	67.9	0.0	0.0
501-1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
1001+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Table 20: One-Year Transition Matrix over Number of Destinations Offered, average 1996-2005

	destinations year $t+1$						
destinations year t	0	1-5	6-10	11-25	26-50	51-100	101-200
0	85.2	14.7	0.1	0.0	0.0	0.0	0.0
1-5	38.6	58.6	2.6	0.2	0.0	0.0	0.0
6-10	2.9	26.5	58.2	12.3	0.1	0.0	0.0
11-25	1.5	2.5	16.6	75.4	4.1	0.0	0.0
26-50	1.3	1.6	0.5	17.4	76.7	2.5	0.0
51-100	0.8	0.8	0.0	0.8	17.2	79.1	1.5
101-200	0.0	0.0	0.0	0.0	0.0	22.2	77.8

A.4 Robustness

We performed a number of robustness checks. Results hold (i) when we adopt a six-digits HS product definition, (ii) when we drop single-year exporters, (iii) when we exclude some firms that enter or exit the market with many products.

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