

PETER PIPER¹ PICKED A PECK OF PICKLED PEPPERS AND PACKED THEM OFF TO PORTUGAL: FIRM-LEVEL PATTERNS IN MERCHANDISE TRADE

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In this paper we examine patterns of merchandise exports over the period 1988-2005, using both product level and firm level data. The presentation is descriptive, and is intended to frame future analysis of the determinants and impact of observed trading behaviour. There are two main points of focus: the degree of concentration in export products, partners, and firms; and the dynamics of trade relationship entry and exit, where trade relationships can be defined according to the product, country or firm concerned, or a combination of the three. The main contribution is the development of a decomposition of export value growth into that coming from new entries, exits and continuing exporters and export relationships. Future work will examine the causal relationships underlying observed patterns of export market entry and exit, and the impact that these dynamics have on firm performance.

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Disclaimer

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The results of this study are based in part on tax data supplied by Inland Revenue to Statistics New Zealand under the Tax Administration Act. This tax data must be used only for statistical purposes, and no individual information is provided back to Inland Revenue for administrative or regulatory purposes. Any discussion of data limitations or weaknesses is in the context of using the data for statistical purposes, and is not related to the ability of the data to support Inland Revenue's core operational requirements. Careful consideration has been given to the privacy, security and confidentiality issues associated with using tax data in this project. In particular, in the IBULDD dataset, individuals' tax data has been aggregated to the firm-level. Furthermore, only people authorised by the Statistics Act 1975 are allowed to see data about a particular firm.

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1. Introduction

Export performance is both an indicator of, and a factor in, New Zealand's economic success. In an increasingly globalised environment, the ability to reach and supply international markets is perhaps the clearest measure of performance for New Zealand firms.

Exporting provides substantial benefits, both to the firms involved and to the economy as a whole. Exporting gives firms access to larger markets, allowing them to expand their customer base, increase their scale and raise profits. It forces firms to confront world-class competitors, exposes them to new ideas and expertise, and encourages them to stay abreast of market trends. By maintaining a strong international position, firms also protect their domestic markets from increasing import competition. For the economy as a whole, exporting brings wealth into the country, provides employment and allows us to raise overall living standards.

However, New Zealand's recent export performance has been less than stellar. While other OECD countries have been rapidly expanding their export intensity, New Zealand's exports to GDP ratio has changed little. By 2006, New Zealand's exports to GDP ratio was 27.8%, 21st of the 30 OECD countries, and well behind most other small countries.⁴ For goods exports, the measure examined here, New Zealand's export intensity was 20.2%, 20th of the 26 countries with data available, and less than half that of other small countries such as Ireland, the Netherlands and Hungary. Although comparisons between New Zealand and these countries need to take into account their proximity to large markets, and New Zealand's lower import intensity of exports (such that most of the value added in New Zealand exports is produced domestically), slow export growth has become a cause of concern to many.

Improved aggregate export performance can come from a wide range of sources. Export value can increase with little change in the composition of either products exported, firms involved or trading partners through increasing the volume of exports or through changes in the unit price of existing export products. Alternatively, export growth can involve significant innovation – new firms beginning to export, new products being introduced, new markets being targeted.⁵ At the same time, the international environment changes rapidly, and exporting is a difficult business. Not all exporters survive, and those that do may find themselves changing the focus of efforts to different countries or products.

In this paper we examine changes in the composition of New Zealand's merchandise exports over time, focusing on the dynamics of market entry and exit, and on the degree of diversification over the past 18 years. We consider a greater level of detail than has been attempted previously, considering trade patterns at the level of detailed 5 and 10 digit product classifications by destination. Two levels of analysis

⁴ Source: OECD International Trade Indicators, http://www.oecd.org/document/13/0,2340,en_2649_34235_36853069_1_1_1_1,00.html

⁵ Increases in unit price may themselves be associated with significant innovation, as these may be due to improvements in product quality or marketing, rather than exogenous changes in world prices.

are presented in parallel – a macro perspective on exports from New Zealand, and a micro perspective on the export performance of New Zealand firms. The analysis is descriptive, and is intended to frame future analysis of the determinants and impact of observed trading behaviours. In many cases, this paper replicates and extends previous New Zealand and international studies of export performance.

Future work will consider the firm-level and environmental determinants of export market entry and exit, including the impact of firm factors such as domestic or foreign ownership, productivity, innovation, and past export performance alongside environmental factors such as exchange rate levels and volatility, economic conditions in New Zealand and destination countries, and geographic distance. We will also be looking at the impact of exporting on firm performance, asking the question of whether exporting has an appreciable impact on firm-level productivity and performance.

2. The Data

Two main data sources are used in this paper, both based on data provided to Statistics New Zealand by the New Zealand Customs Service. The first is detailed data on New Zealand's aggregate merchandise exports at the product level. The second is unit-record firm data on merchandise trade, linked to simple firm characteristics from the newly compiled Longitudinal Firm Performance Dataset (LFPD).

2.1. Aggregate Data

The aggregate data was provided by Statistics New Zealand and forms the basis of their official Merchandise Trade statistics. It provides annual data on the value of New Zealand's merchandise trade, disaggregated by partner country and product type. Each line entry shows the value of exports of a specific product, to a given destination. Values are given in current New Zealand dollars. Exports are valued free on board and are classified to the country of final destination, as shown on the Customs declaration. Exports are defined as "goods which add to or subtract from the material resources in New Zealand as a result of their movement in or out of the country", with a small number of exclusions, such as currency transactions, goods consigned for modification or repair, and temporary trade goods such as the effects of New Zealand tourists going overseas.⁶

Two versions of the aggregate data are used. The first uses the SITC 5-digit product classifications, and covers the years from 1988 to 2005. The second uses the HS 10-digit product classification and covers the period 1996-2005. Although HS10 data is available at the aggregate level back to 1988, there have been numerous changes in product classifications over time, and it has not yet been possible to create a full concordance beyond 1996. Section 2.3 discusses the classification changes and their impact on the analysis in more detail. In addition, restricting the period to 1996 onwards allows for better comparison to the firm level data. The focus will be on the 10 digit product data from 1996-2005 as this allows for a fuller investigation of firm-

⁶ See Statistics New Zealand Information about Merchandise Trade Statistics for more details. <http://www.stats.govt.nz/datasets/exports-imports/overseas-merchandise-trade.htm>

level changes in export behaviour. The SITC 5-digit aggregate data is provided mainly to situate the more detailed data within a longer time period.⁷

2.2. Firm-Level Data

The firm-level data was provided through Statistics New Zealand's LFPD. The complete dataset, described in more detail in Fabling et al (2007), combines administrative and survey data over various time frames and frequencies.

For this paper, we make use of three data sources – the Longitudinal Business Frame (LBF), the Business Activity Indicator (BAI) and Customs data, for the calendar years 1996 to 2005. This time frame is chosen to maximize the available time period while maintaining a high level of comparability between the three sources and mitigating the effect of changes in product classifications and political changes in destination countries. The approach taken to political and classification changes is discussed further in Section 2.3, below.

The main focus of the paper is the Customs data on merchandise exports. This data is available over the period from 1988 to 2006, but the quality of matches between Customs clients and firms falls prior to 1998. Customs data is available on a daily basis, and has been rolled up to calendar years for comparability with the aggregate data. Alongside details of products type and trade partner the firm-level data includes information on port of loading and discharge, method of transportation, and whether trades conducted in foreign currencies are hedged.

The LBF, BAI and IR4 data are used to provide information about firm characteristics, and about the population of active non-exporting firms.

From the LBF, we make use of firms' ANZSIC industry classification. The LBF covers the financial years 1999/00 to 2005/06. ANZSIC codes are attributed to the calendar year which has the greatest overlap with the financial year period recorded in the LBF. For the years outside the LBF, we use the ANZSIC from the closest available year for that firm. As such, for most firms the ANZSICs reported in 1996-1998 will be assumed to be the same as their 1999 industry.

The BAI includes data on firms' total sales, which are sourced from GST returns. This is used as a measure of firm size. Total sales are rolled up to calendar years.⁸

We also consider differences in export behaviour between domestic and foreign owned and controlled companies. Our indicator of foreign control is defined as those firms which answer yes to the question "is this company controlled or owned by non-residents?" on the IR4 company tax return. It is therefore limited to companies, with

⁷ The data distinguishes between exports and re-exports, where the latter is defined as "exported goods which were earlier imported into New Zealand and which include less than 50 percent New Zealand content by value". In this paper, re-exports are excluded from the analysis. SNZ Information about the Overseas Merchandise Trade (Exports), <http://www2.stats.govt.nz/domino/external/omni/omni.nsf/bf3c32a862ae07cd4c25656e000031c6/0a927cf5250c5ed0cc256a950072f098?OpenDocument> 1 Dec 2006.

⁸ The GST roll-up is based on data some of which has previously been apportioned to a monthly frequency by SNZ from either bi-monthly or six-monthly GST returns.

other business types (sole traders, partnerships etc) excluded as they do not complete IR4 returns.

Differences in business types across industries may affect the observed exporting rate among foreign owned firms. For example, the Agriculture, Forestry and Fishing industries have both a relatively low proportion of companies and a low proportion of (direct) exporters.⁹ By concentrating on companies we therefore exclude most Agricultural, Forestry and Fishing firms and thereby increase the proportion of the sample with observed exports.

Table 1 indicates the level of data coverage for each year, as a proportion of active firms (where activity is determined broadly to include firms which have a positive export or GST sales value, or a positive activity indicator for that year in the LBF or LFPD). Many of the observed missing variables are due to the differing time periods over which each data source is available. In the years prior to 1999, only GST and exports data is available, so both the ANZSIC and foreign control indicators are missing for all firms. This also impacts on the total observed population, as firms which do not have either GST data or exports data for these years will not be in the sample of active firms. This situation is mirrored for 2005, as very few firms have LBF data available for the 2005 calendar year.

Although the aggregate and firm level data are based on the same source, export value totals in each of the two datasets do not match exactly. There are three sources of this variance. The first two involve restrictions which we place on the firm-level data, to include only enterprises located in New Zealand. That is, exports by individuals and by overseas located firms are excluded. The third discrepancy arises due to imperfect matching of firms to Customs clients. It is uncertain how many unmatched firms there are, as it is not possible to distinguish between an unmatched firm and an individual. However, it is likely that the data used here underestimate the true value of enterprise exports for the first two years of the sample, as there is a significant proportion of total exports which are attributed to “non-enterprises” in those years.¹⁰ As such, there is some underestimation of export value by firms in the first two years of the sample. Still, it is notable that the 13,092 Customs clients which do not match to enterprise numbers account for only 1.4 percent of merchandise export value over the ten year period, with the remainder spread among 23,778 identifiable firms. Table 2 shows the percentage of total export value attributed to New Zealand located firms, overseas located firms and individuals and unmatched firms.

An additional concern which should be noted with the longitudinal data in the LFPD is that it is subject to discontinuities where there are changes in the structure or legal status of firms over time.¹¹ These problems arise because the LFPD tracks firms according to their enterprise number, which is based on legal units. This has

⁹ Although agricultural commodities are a major share of New Zealand's exports, they are often exported by processors (ie. manufacturers) or intermediaries (ie. wholesale trade firms).

¹⁰ When matching the exports data to enterprise records, Statistics New Zealand follows a two part process. Initially, records are electronically matched based on the names and addresses of the firms involved. In order to improve the match rate, there is then a second round of matching, in which high value exporters are manually matched to enterprise numbers.

¹¹ This is discussed more fully in Fabling et al (2007).

implications in the later parts of the analysis, as some firm entry and exit may in fact be spurious, due to changes in legal status rather than changes in the operational aspects of the firm. Similarly, restructuring within multi-enterprise groups may result in spurious entry and exit of export markets, as exports may appear to shift between members of the group. Future development work on the LFPD may reduce the severity of this issue, through implementing repairs to the longitudinal firm links.

2.3. Classification Changes

2.3.1. Classification of Destinations

The destinations shown in the dataset reflect a combination of geographical boundaries and political control. Two distinct destinations will be listed if they are significantly geographically separate (eg. the UK is separated from British Indian Ocean Territories, despite being part of the same political entity) and/or politically separate (eg. Vatican City State is listed separately from Italy). This gives a dataset with 224 discrete destinations for New Zealand exports over the period from 1996-2005. Non-country destinations, such as 'ships stores', 'ships bunkering' or 'passenger effects' are dropped from the analysis.

Where there have been changes in political boundaries (eg. the creation of the countries which were formerly part of Yugoslavia or the re-unification of Germany) destinations have been amalgamated to the smallest possible consistent entity, regardless of whether the political change involved a split or a unification. That is, the Former Yugoslav republics are classified as one destination (Former Yugoslavia), as are East and West Germany (Germany). This is salient only for the SITC 5-digit data, which covers a period of significant political changes in the late 1980s and early 1990s, but does not affect the 1996-2005 sample period. After these reclassifications, the SITC5 dataset shows a total of 214 distinct destinations, but there are no changes to the HS10 dataset.

The decision to treat countries which split identically with those which join together is based on the assumption that the political changes which take place are exogenous to the changing composition of trade.¹² In contrast, product classification concordances are restricted to their 1996 classifications, as changes in classifications may be directly related to trade performance, as discussed below.

2.3.2. Classification of Products

The SITC data is available to the 5 digit level. This implies a reasonable, though not high, level of differentiation. For example, 'meat of sheep' can be distinguished at the level of 'fresh or chilled' vs 'frozen', but not by cut.

¹² While it is possible that changing political boundaries may have affected trade patterns, it is very unlikely that trade patterns had an impact on the political reconfigurations of these countries. Further, one would expect that the changes in trade flows due to political changes are likely to have had a greater effect on trade within and between the countries involved and those which are geographically or politically close to them (eg. the reunification of Germany might be expected to have a significant impact on trade between Germany and Russia, but little impact on trade between New Zealand and Germany).

The HS10 data provides a much greater level of detail on products traded. At the 10-digit level, we can differentiate between, for example, baseball caps, bowlers' hats and other cloth or stitched hats; and between motorcycle helmets, bicycle helmets and fireman's helmets.

One drawback of the HS10 data is that it has gone through a number of revisions over time. Over the period from 1 January 1996 to 31 December 2005, there have been 30 separate revisions to the data, including one full revision in 2001.

These revisions often include the introduction of classifications for new technologies or varieties. However, the introduction of a new category to the HS classification system does not necessarily correspond with the introduction of a new product to New Zealand's trade flows. For example, until October 2005, fresh pears were distinguished only with respect to whether they were European or nashi pears. Since that date, the 'Pears' category is distinguished by variety – Belle de Jumet, Beurre Bosc, Doyenne du Comice, Taylor's Gold, plus separate categories for 'green pears', 'red pears' and 'pears, not elsewhere specified'. Other products have been reclassified into wider groupings, or simply into different combinations. Until April 1998, dairy spreads were distinguished according to fat content, but are now listed as a single category. Wools have always been distinguished according to thickness (microns), but the relevant gradations have changed over time.

Classification changes may also reflect changes in recognition of salient points in terms of product characteristics - for example from July 1997, the classification distinguishes between digital audio tape and audio tape other than digital, whereas previously these were both listed as 'Media, unrecorded; magnetic tapes, prepared, (of a width not exceeding 4mm), for sound or similar recording of other phenomena (excluding products of chapter 37), audio tape'.

Changes to the classification system also reflect changes in New Zealand's tariff system. For example in May 2003, we began to distinguish between synthetic and hog bristle paint brushes, while in July 2005 we dropped a distinction based purely on the tariff schedule – between 'Pens; felt tipped and other porous-tipped pens and markers' and 'Pens; felt tipped and other porous-tipped pens and markers; alternative rate'.

In summary, there are three main reasons for classification revisions:

- changes in the tariff rates and conditions for a given product
- changes in the perceived nature or importance of the goods eg. consolidation of several varieties into a single good, due to falling relevance of the differences
- the development/recognition of new goods

This creates substantial difficulties for comparing product composition over time. In the basic trade data, many apparently new products are actually products which have been traded previously but have been reclassified. We therefore need to create a consistent concordance of all products over time. As changes in classifications are often endogenous (eg they occur because a new good has been introduced) we do this by attributing all product codes back to their HS1996 code.

Although this approach is suitable for product groups which have split over time, it cannot be used on products which have merged. For example, a 1996 category “Apples” which later splits into “Red Delicious” and “Granny Smith” could be rolled back to its original 1996 group, but if a pair of categories “electric toothbrushes with revolving heads” and “electric toothbrushes without revolving heads” had merged to “electric toothbrushes”, they could not be tracked to a unique 1996 code. Products whose classifications have merged over time are therefore excluded from the analysis of product dynamics, with a small number of exceptions.

In examining the materiality of merged classifications, we find that around 6.3 percent of total export value between 1996 and 2005 is in products which are subject to mergers. This value ranges from 4.5 to 9.3 percent in any given year. Much of the value in merged products is associated with a small number of products. Over half the value of merged products is accounted for by just 10 HS10 codes. A further 15 percent is accounted for by the next 10 codes.

In order to capture this value, we therefore apply a manual adjustment for the top 20 HS10 products. This involves creating a small number of codes which merge several groupings into a single HS1996 code. These adjustments affect 3 groups of products – simple leather products, wool, and newsprint/paperboard. In the case of wool, for example, the HS10 classification changes over time related to the fineness of the wool. In 1996, classes of wool were grouped according to three fineness categories – less than 28 microns in diameter, 29 to 34 microns, and 35 microns and over. On the first of July 1999, these classifications changed to four classes, less than 24.5 microns, 24.5 to 31.4 microns, 31.4 to 35.4 microns, and greater than 35.4 microns. As it is impossible to distinguish what value of each grade of wool is attributable to the other categories we therefore group all grades together, while maintaining the distinction between, for example, whether or not wool has been degreased or carbonized. Given these adjustments, our revised dataset allows us to use 98.6 percent of total export value over the 10 years of the sample in the aggregate data, with a maximum of 1.8 percent of value excluded due to mergers in any one year. In the micro data, around 7.5 percent of total export value is affected by merged codes. After the manual corrections are applied, this falls to 1.3 percent. Products are differentiable into 10,090 distinct products, plus the aggregated code for those products which have been merged. In the analysis below, merged codes are included in aggregate export statistics but are excluded from analysis at the product level.

In contrast, the SITC 5 data was last updated in 1987/88, and shows a total of 3,030 products exported or re-exported from New Zealand over the 18 years to 2005. While this allows for a consistent set of definitions, any products which did not exist in 1988 will be subsumed in categories “not elsewhere specified”. As a rough guide to the extent to which new products are encompassed in these ‘other’ codes, the value in product codes labeled ‘not elsewhere specified’ trebled over the 18 years in question, while the ‘specified’ product codes doubled. As such, the problem of identifying truly new goods in New Zealand’s trade flows is hidden, rather than actually solved.

3. Introductory Statistics

New Zealand's aggregate merchandise export value grew at an average of 4.9 percent per annum over the period from 1988-2005. The aggregate value peaked in 2001, and had not recovered by 2005, leaving the compound aggregate growth rate at 4.3 percent per year for the last ten years, despite strong growth between 1999 and 2001 (Figure 1).¹³

Figure 2 shows the changes in product composition over time, using the SITC 1-digit classification of product groups. Notable changes include increases in the shares of Machinery and Transport Equipment, and Food and Live Animals, and a fall in the share of Crude Materials.

The past 18 years have also seen some changes in the relative importance of our export destinations. Notable examples are the fall in the relative importance of our exports to Japan and an increase in those to China. Six countries have remained among the top ten export destinations throughout the period – Australia, Germany, Japan, South Korea, the UK and the US. A further eight countries moved into and out of the top ten destinations over this time. Figure 3 shows the shares of each of these 14 countries in total exports between 1988 and 2005. In any given year, these countries account for 75 to 80 percent of total export value.

Despite relative stability at the one digit product level, we would expect to see much greater changes at more disaggregated levels. Similarly, while the top countries cover over three quarters of all New Zealand's exports, we would expect to see differences in the types of products going to each country, and also to see significant entry and exit of more peripheral countries. The rest of this paper will address some of the implications of taking a more detailed perspective on trade flows, looking at changes in products traded and trade partners, as well as the distribution of exporting across firms within the New Zealand economy.

¹³ The HS 10 figures include merged products.

4. Export Concentration and Diversification

A number of publications have commented on the degree of diversification in the product and destination mix of New Zealand exports. This stems at least in part from concerns over the heavy reliance on the primary sector. Various commentators have suggested that economic growth may be hindered by a reliance on primary products – the so called ‘Curse of Natural Resources’.¹⁴

Lederman and Maloney (2003) find that while there is little evidence for a negative effect on growth associated with an abundance of natural resources, there is some evidence for a negative effect from export concentration. Heavy reliance on any one export creates a vulnerability to changes in demand for that good, and may raise issues of political economy which can be harmful to growth (for example, through lobbying by interest groups).

At the same time, geographic concentration of our export destinations (and import sources) leaves us vulnerable in the case of rapid changes in the political or economic situations in our key trade partners.

Conversely, increasing concentration may be a sign of reallocation of resources towards the sectors in which New Zealand has a competitive advantage. This can have a positive effect on growth both through a level effect, as resources move to more efficient uses, and a growth effect, through dynamic feedback loops and learning-by-doing.

Existing studies of New Zealand’s export composition suggest that there has been substantial diversification, and imply that this has been largely positive for the economy. Easton (1997, 2004) suggests that between 1965 and 1980 New Zealand’s rate of product and export market diversification was faster than in any other OECD country. However, this analysis used only 2 digit industries, rather than specific products, and is hence significantly influenced by New Zealand’s high level of concentration in agriculture at the beginning of this period.

Grimes (2006) shows that diversification in merchandise exports (also measured at the 2 digit level) has helped to reduce the volatility of New Zealand’s terms of trade. Lower volatility is in turn associated with faster economic growth, although Grimes finds that New Zealand’s diversification away from meat and dairy products (as a share of exports) since 1972 had the proximate effect of reducing the level of the terms of trade, relative to the early 1970s.

Black et al (2003) note that while there was relatively little change in the broad structure of exports (2-digit level) over the 1990s, significant changes have occurred at a more disaggregated level. Compositional changes have been particularly strong

¹⁴ See, for example, Corden W.M., Neary J.P. (1982). "Booming Sector and De-industrialisation in a Small Open Economy." *The Economic Journal* 92 (December): 829-831; Sachs, Jeffrey D. and Andrew M. Warner. "The Big Push, Natural Resource Booms And Growth," *Journal of Development Economics*, 1999, v59(1,Jun), 43-76

within the categories involving less transformation, suggesting that structural change is continuing within New Zealand's primary based industries. Ballingall and Briggs (2005) show significant diversification in both products and destinations between 1964 and 2003. This is at an SITC 1 digit level.

In this section, we document the degree of diversification of NZ export products and destinations at the SITC 5 and HS10 levels. Several measures of diversification are possible, but for brevity we focus only on the standard Herfindahl Index:

$H = \sum_{i=1}^n (s_i^2)$, in which s_i is the share of product (country) i and n is the total number of products (destinations).¹⁵ This gives an index ranging from $1/n$ to 1, with smaller numbers indicating greater diversification. Merged products are excluded from the HS10 results on products and relationships, but included in the country level results.

4.1. Product and Destination Concentration

Figure 4 shows the Herfindahl index for the diversification of products over the 18 years to 2005. Both the HS10 and SITC5 product classifications are shown. The greater diversification for the HS10 products reflects the greater number of product groups over which products are split in the more detailed data. While there was significant diversification between 1988 and 1995, this had effectively tailed off by the mid 1990s, and the period from 1999 to 2001 saw increasing concentration in export value. This appears to be caused by a rise in the value of dairy exports, which make up a significant proportion of New Zealand's aggregate export value throughout the period.

There has also been some diversification in the geographic destination of New Zealand exports, although this has been quite uneven over time (Figure 5). The overall diversification in both products and markets implies a similar diversification at the level of product-partner relationships, particularly over the years from 1988 to 1996 (Figure 6).

4.2. Firm Level Concentration

At the level of the firm, it is well recognized that New Zealand's exports are concentrated among a small proportion of firms. This is even more obvious when the focus is on merchandise exports, thereby excluding service exports which are received onshore, such as tourism and international education, and 'weightless' exports such as financial and business services and licenses which do not involve the transport of physical materials over New Zealand's customs border.

In any given year between 1996 and 2005 no more than 2.1 percent of firms in New Zealand show up as having any 'traditional' exports, in the sense of goods flowing across the border. This is not however surprising, as many firms are in industries which show little opportunity or need to export. For example, most service industries,

¹⁵ Preliminary work using the SITC5 product classifications also considered alternative measures such as Gini coefficients, coefficient of variation and standard deviation of logs. These are available for comparison on request.

many local retailers, and branches of larger international enterprise groups are unlikely to show significant merchandise exports. In the analysis that follows we therefore focus on three industries which have significant merchandise export potential – agriculture, forestry and fisheries (AFF), manufacturing (MANU), and wholesale trade (WST). Together, these three industries account for over 85 percent of goods export value in nine of the ten years covered (Table 3).¹⁶

The outlier year is 2002, in which nearly 25 percent of value is attributed to enterprises outside of the three main groups. This is due to a spike in the share of value attributed to firms whose listed industry groups are Property and Business Services, and Finance and Insurance. Potential explanations for this spike revolve around lags between firms changing their main activities, and this being reflected in their reported ANZSIC codes, and changing roles of enterprises within multi-enterprise groups which have not been immediately captured in the allocation of export value.

We therefore allocate firms to their modal industry – the ANZSIC which is most commonly associated with that enterprise. The main effect this has on the data is through shifting some value away from Finance and Insurance and Property and Business Services, and into the three main exporting industries.

The last ten years have seen a substantial increase in exporters, both in absolute number and as a proportion of active firms in each industry. Within the period 1999 to 2004¹⁷, the percentage of firms exporting increased by around 22% in Manufacturing, and 30% in Agriculture, Forestry and Fishing, and Wholesale Trade (Table 4).

Differences in export proportions across industries are determined by market structure, as well as the degree of trade in specific goods. For example, while goods produced by the Agriculture, Forestry and Fishing industries are highly traded, this trade is often handled by either intermediaries (whose main activity would commonly be listed as wholesale trade) or processing companies (which would be listed as manufacturers).

¹⁶ Note that those firms which have missing ANZSIC codes in every year are counted among the “other” category.

¹⁷ This period is chosen to avoid difference in data coverage over time.

However, export value remains highly concentrated, with the top quartile of exporters contributing over 98 percent of export value, and the top 10 percent of firms accounting for around 94 percent (Table 5). There has been a slight increase in the share of the top quartile over time, but no obvious trends at the very top of the distribution.

As would be expected, the probability of exporting and the share of export value are much greater among larger firms. There also seems to be a greater degree of export activity among firms which are foreign owned or controlled. Looking at those firms with available data on GST sales value shows that exports are most common, and are highly concentrated, amongst large firms (Table 6).¹⁸

Information on foreign ownership and control is only available for between 22 and 35 percent of firms in any given year, for the years 1996 to 2005 (the years covered by the LBF), as it is sourced from IR4s. Overall, foreign controlled companies have both a greater probability of exporting, and a higher average value of exports per firm among those firms which do export, such that they account for a disproportionate amount of export value relative to their number (Table 7). However, it is notable that foreign controlled companies are also substantially larger than New Zealand firms on average so their higher exporting may be associated with this larger size, as much as the ownership factor.¹⁹ Future work on the determinants and impacts of exporting on firm size, ownership and performance will look in detail at the causality of these relationships.

¹⁸ In any given year up to 12 percent of firms which have some indication of activity do not have data available on total GST sales (Table 1).

¹⁹ Fabling et al (2007) find that the performance of foreign controlled exporters does not differ from that of foreign controlled non-exporters, and that foreign controlled companies outperform domestic companies. Among domestic companies, exporters are more productive than non-exporters.

5. Dynamics of Entry and Exit

Section 4 showed while New Zealand's aggregate exports have diversified substantially over the past 18 years, both in terms of the share of products exported and the countries traded with, this diversification has slowed since 1995. At the same time, over the past 10 years we have seen a mild degree of increased concentration in the upper quartile, with large exporters making up a greater proportion of total value over time.

Changes in the degree of concentration can occur through:

- (1) New products being exported, new trading partners, or new firms entering export markets, or, conversely, the exit of existing products, markets or firms;
- (2) Shifts in the relative shares of existing firms, products and destinations, such that those products/firms which were dominant at the start of the period lose their dominance and the overall spread of value becomes more even, or vice versa.

In this section we examine the dynamics of export market entry and exit, through a decomposition of the sources of export growth. Section 5.1 deals with summary statistics which indicate the overall level of entry and exit at product, firm and relationship level. Section 5.2 decomposes aggregate export growth into shares from new products, new destinations and new firms. Section 5.3 looks at the duration of observed trade relationships.

5.1. *Export Dynamics*

In this section we present some simple statistics which illustrate the degree of volatility in exports at the 10-digit product level and the firm level over the years 1996 to 2005. Overall, we find that, while there are a significant number of products and firms that exported continuously over the period, there is also a large group that export for relatively short periods.

5.1.1. **Product Level Analysis**

In any given year, between 64 and 72 percent of the 10,090 observed products have a positive export value. Just over 40 percent are consistently exported in every year throughout the ten year period (though not necessarily by the same firm).²⁰ The rest experience at least one year in which they are not exported. Over 10 percent of products exported are in only one year. Figure 7 shows the distribution of products according to the number of years in which they are exported.

²⁰ In comparison, just over half of the SITC5 products are exported in every year between 1988 and 2005.

Figure 8 shows the number of products exported per year, divided according to whether it is the first year in which they are observed, they have been observed in previous years but not in the year immediately before, or if they have been exported in both the current year and the year immediately previous. Clearly, this decomposition is affected by the length of past history available. For example, all products show up as “new” in 1996. In any given year after the first three there are considerably more “previous” products than there are “new” products.

This points to a significant degree of volatility in the exports of some products. Among the products that were not consistently exported throughout the ten years, most experienced multiple spells of exporting (Table 8). That is, they were exported for one or more years, followed by a year or more gap, then another spell of exporting. Many of these spells were very short – almost half lasted only a single year. This is discussed further in Section 5.3 below.

5.1.2. Firm Level Analysis

Patterns at the firm level are quite similar, with around 16 percent of firms which ever export exporting in every year, 38 percent exporting in only one year, and the rest being fairly evenly spread between two and nine years. Just under 40 percent of intermittent exporters experienced more than one export spell.

The degree of intermittency in firm-level export patterns is outlined in Table 9. Overall, around three-quarters of exporting firms experience only a single spell of exporting over the ten year period. However, for 38 percent of these firms, this is because they export in only a single year. Only 22 percent of firms export in eight or more of the ten years.

5.2. *Entry and Exit*

As noted above, changes in the value and concentration of exports over time can come from a number of sources. It may be that export growth occurs through increasing volumes or through increases in the unit value of goods sold offshore. Alternatively, growth in exports may be driven by the introduction of new products, links to new markets, or the entry of new firms.

In this section, we decompose changes in export value over time according to four sources: new entries, exits, ongoing relationships and intermittent exports. We do this across a range of strata, considering entry and exit at the level of 5 and 10 digit products, product-market relationships, firm entry and exit of exporting, and changes in firm level product and market relationships.

The reader should note that the results at the firm level should be treated with a certain amount of caution. Enterprises which have changed their legal status over time lead to some overstatement of the numbers of and value attributed to entering and exiting firms.

5.2.1. SITC 5-Digit Product Analysis

Initially, we follow the methodology used by Evenett and Venables (2002) in their paper on market entry by developing countries. Evenett and Venables suggest that much of the growth in total exports for the 23 developing economies that they look at comes from the introduction of new products and from the 'geographical spread of trade'. That is, from exporting existing products to new markets. They also suggest that there is very little exit of products. In this section we replicate the results of Evenett and Venables for New Zealand, and extend these by looking at a more disaggregated product classification and by considering entry and exit at the firm level.

Following Evenett and Venables and using the SITC5 data from 1988-2005, products are defined according to their export performance in the first and last four years of observation, and classified into 4 status groups:

- Continuing - the product was exported at some point between 1988 and 1991 and between 2001-2005.
- Exit - the good was exported between 1988 and 1991 but not in 2001-2005
- Entry - the good was exported between 2001 and 2005 but not in 1988-1991.
- Intermittent - the good was not exported in either period (but was exported at some stage in between)

Values refer to the average value over the four year periods. As such, the measured growth in exports refers to the difference between annual average exports in the last four and first four years of the sample. This smoothes some of the variability in export values from year to year.

The use of a four year period at either end also mitigates somewhat the problems of left- and right- censoring. That is, we reduce the probability of mis-identifying goods as entries if they were not exported in 1988 but had been exported previously. However, the reader should keep in mind that many products which are labelled as 'entries' may in fact have been exported in previous years, and those defined as 'exits' may yet be exported again in 2006 and future years. The data shows a considerable amount of intermittent exporting, such that a four year gap need not imply permanent or long-term exit.²¹

Our preferred analysis differs from that of Evenett and Venables in two main ways. Firstly, we do not include a threshold for significance.²² Evenett and Venables impose a threshold for 'economic significance' in export values, with exports which fall below this threshold being counted as not exported. As such, a product which is

²¹ If we take a four year period in the middle of the data (1995-1998) and consider the probability that a product which is not exported over this time is exported in the preceding or following 7 years, we find that around 60% of the products which would be classified as entries if the data started in 1995 would actually be re-entries, having been exported in the preceding 7 years. Similarly, around 80% of those which would be classified as exits if the data ended in 1998 would also be mis-classified, in that they re-enter the data in the following 7 years. Comparable figures for the product by destination relationships are 45% and 73%. Increasing the period to 5 or 6 years does not seem to have appreciable effects on the degree of mis-classification.

²² Note, however, that there is an implicit threshold in the data, as exporters are not required to fill in a Customs form for export consignments valued under NZ\$1000.

exported in low values at the start of the period and increases over time would be counted as an entry in their analysis but as a continuing product in ours. Secondly, our main results are presented using SITC 5-digit product classifications, while Evenett and Venables use SITC 3-digit groupings.²³

Around 87.5 percent of all products were exported both in the early period and the later period, and are therefore classified as continuing products under the definitions above. Around 5.6 percent are classified as entries, while 4.7 percent count as exits. 67 products were exported intermittently – that is, they were not exported in either the early or later periods, although they were exported at some point in the full sample period (Table 10).

We can also consider the total contribution that each status group made to export value growth over this period, by calculating the sum of export growth associated with each status group. This shows that almost all the increase in export value in New Zealand came from increases in the value of existing products, rather than from new entries. Of the total increase in export value of \$13.4bn, \$13.6bn came from increased exports of existing products, while only \$13.3m came from new products. The difference of -\$140m comes from the exit of products which were exported in the early period but no longer exported in 2002-2005.

What were the new products?

There are some differences in the pattern of dynamics according to SITC groups (Table 11). Product groups which seemed to be ‘punching above their weight’ in terms of new product entries included *Food and Live Animals* (14 percent of new entries, 11 percent of total products), *Crude Materials, inedible* (18 percent of entries and 8 percent of all products), and *Chemicals and related products not elsewhere specified* (20 percent of new products and 16 percent of the total). In contrast, *Manufactured Goods Classified Chiefly by Material* and *Machinery and Transport Equipment* saw a lower proportion of new goods (16 and 17 percent respectively) relative to their share of the total (27 and 21 percent).

In *Crude Materials*, this seems to be associated with a high degree of churn, as this group also made up a high proportion of exits (20.1%). Conversely, churn in *Machinery and Transport Equipment* seems to be low, with both entries and exit shares being low relative to the number of total products. Other groups saw a greater overall change in the number of export products. *Food and Live Animals* have seen an increase in the total share of products exported, while *Manufactured Goods by Material* have seen a fall in their share of export products.

The high concentration of value in continuing products contrasts sharply with the results of Evenett and Venables, who find that new products are a significant source of export growth in most countries in their sample. To confirm whether this is a function of differences in the methodology employed, or differences in actual export experiences of the sample countries (the Evenett and Venables sample was

²³ We exclude those products in the SITC 1-digit Group 9 *Commodities and Transactions Not Elsewhere Classified* as this group includes only a very small number of product classifications and is a catch-all group for products which cannot be classified. The exclusion has no material impact on the results.

concentrated on developing countries) we repeated our analysis to match the methodology as closely as possible, through the use of 3 digit SITC classifications, the introduction of a \$50,000 threshold for significant export value, and the deflation of trade values to 1995 US dollars.²⁴ One significant difference remains – the observation period in Evenett and Venables’s data was from 1970-1997, while our data is available from 1988-2005.

The low levels of new entry do not appear to be driven by differing methodologies. Rather, from the very start of the period under observation, New Zealand has had significant exports in a wider range of products than most of the countries considered by Evenett and Venables. At the start of the period, New Zealand exported 234 discrete products at the 3 digit level. In contrast, only 3 of the countries studied by Evenett and Venables exported more than 200 products at the beginning of the observation period. Those countries (Brazil, China, and Malaysia) also show little or no growth from new products. Countries with extremely high shares of growth from new products (eg Bolivia and Ghana) had very low numbers of product line exports at the beginning of the period (41 and 43 products respectively).

This is related to both the country selection imposed by Evenett and Venables, whose focus was on developing countries, and the time period covered by the data. The NZ data covers the period from 1988 to 2005, while the international data is from 1970 to 1997. Given the longer time period available to Evenett and Venables, there is greater scope for change in the composition of merchandise exports.

5.2.2. Product by Destination Analysis

While there was little evidence of growth from new products, or from exporting to completely new countries,²⁵ we now turn to an analysis of products by destinations.

Here, we decompose those products which were exported both at the start and the end of the period according to whether they were always exported to the same countries, began being exported to new countries, or exited from any countries they had previously been exported to.

The breakdown of product-destination relationships is expressed in Figure 9. The top two tiers of the diagram refer to the preceding analysis. The top tier shows the total value and growth of all 2976 products exported over the 18 year period. The second tier shows the number of products in each status group, the total value and the amount contributed to export value growth over the observation period. The lowest

²⁴ For each year, implicit price deflators for the 1st of July are used. These are rebased to 1995. For the purposes of comparison we first convert to US dollars using annual average exchange rates (monthly exchange rates available from www.rbnz.govt.nz) then deflate according to the US GDP implicit price deflator (<http://research.stlouisfed.org/fred2/series/GDPDEF?&cid=21>). Evenett and Venables also compare their results across a range of minimum thresholds, from zero to \$500,000 USD. The higher threshold used implies greater changes in product composition, with the value growth associated with entries rising from 1.7 percent with no threshold to 17.7 percent with a threshold of \$500,000. Similarly, the loss in exit value associated with product exits increased from zero to .3 percent.

²⁵ The results at the country level are not reported, as preliminary work showed only a single new destination over the 18 year observation period.

tier decomposes the changes in export value of products which were exported both at the beginning and end of the period according to the dynamics regarding the destinations they are exported to.

Only a small minority of the 557,042 potential product-destination pairings (2603 products by 214 destinations) are ever observed. That is, most countries never received most goods from New Zealand. Although tier two showed that there were very few new products exported, among ongoing exports the number of new relationships exceeds the number of continuing relationships, implying a significant amount of geographic spread of product exports.

Averaging across product lines, the average product was exported to 12.21 destinations in 1988-1991 (Table 12). By 2002-2005, the mean number of export destinations for a given product had risen to 18.2. On average there were 9.65 new markets per product.

5.2.3. HS 10-digit Product Level Summary

Turning to the shorter time period, and more detailed product classifications available for the HS10 aggregate and firm-level data, we focus on this final decomposition of export growth. Changing the number of years of data and the level of disaggregation forces us to reconsider our definitions of new, exiting, ongoing and intermittent exports.

Due to the shorter time period available, we reduce the number of years at the start and end of the period on which we base our definitions. Also, in order to cope with the higher degree of intermittency of exporting at highly disaggregated levels, we explore three alternative definitions for a product to be classified as an entry or exit.

Our first option is to use the same definitions as above, but reduce the time period considered at the start and end to three years rather than four, due to the shorter total length of time available.

A second option is to reduce the time period to three years and tighten the requirements for a product/firm to be recognised as an entry or exit, in order to separate out those exports which are intermittent. We therefore define:

- Entry: a firm (product/country) is defined as an entry if it does not export (is not exported/is not exported to) in any of the first three years, but is exported in at least two of the last three years.
- Exit: exported in at least two of the first three years but not exported at all in the last three years.
- Continuing: exported in at least two of the first and last three years
- Intermittent: everything else – those products which are not exported consistently at the start or the end of the period, or both.

A final, and even more restrictive option, would be to require that in order to be classed as a consistent export at either the start or end of the period, a product (or firm, or country) must have been present in each of the first or last three years.

While the choice between these definitions, is fairly subjective, this will be the case with any classification of this type. In future, we hope to do some robustness tests of different definitions of entry and exit. For the moment, our preferred option is to take the intermediate option.

Table 13 summarises the impact of the different definitions by noting the number of products, total export value over the ten year period, and average export value and growth which would fall into each product type depending on the definition applied. In all cases, the merged product category is excluded.

Regardless of the definition used, the bulk of export value and growth is attributed to continuing products. However, changing the definitions makes a significant difference to the numbers of products and the value in each of the other categories. In particular, placing a more stringent restriction at either end raises the number products designated as “intermittent”. This increases the overall value associated with these products but lowers their share of growth.

Using the intermediate definition above, we briefly cover the distribution of value at the aggregate level over the past ten years. Rather than repeating the full analysis presented above, we simply reproduce Figure 9, showing the relative contributions of different types of product under the second definition above (Figure 10). Growth is determined as the difference in average export values over the first and last three years. Overall, the HS10 data support the conclusion above – that the vast bulk of export value, and the growth therein comes from increasing value of our existing exports. The increase in value attributable to new products only just outweighs that lost from exiting products. Compared to the more detailed product categories suggest a greater impact of intermittent products. This is due, at least in part, to the more stringent requirements for entries and exits.

The 10-digit data also shows a lower share of growth attributable to geographic spread among existing products, with the value gained from new entries being substantially counterbalanced by destruction of export value due to exit of some markets.

Although the number of products exiting exceeds the number of new products, the share of growth is greater for entries. This is in part explained by the use of current New Zealand dollars rather than constant, leading to over emphasis of the value of later years relative to earlier ones.

5.2.4. Firm Level Analysis

Turning to the firm level, we restrict the sample to those firms which export in at least one year over the ten year period in order to focus on the degree of entry and exit. Anywhere between 37 and 60 percent of the firms which are ever identified as exporters have zero export value in any given year (Table 14).

The number of firms which export has grown significantly each year until 2005. Figure 11 distinguishes the number of firms exporting per year according to whether they are new to exporting, had exported in the previous year, or had exported

previously but not in the most recent year. While at the product level many 'new' products had in fact been exported in previous years (Figure 8), the firm level data suggests that growth in numbers has come mainly from the entry of a substantial number of new firms each year.

There is a wide dispersion in the number of trading partners that each firm exports to, and the number of products which they export (Table 15 and Table 16). Across the ten year period, the median number of countries exported to and the median number of products exported were two and three respectively, but some firms exported to more than 28 countries and had a product range of up to 100 products in some years.

As would be expected, larger value exporters tend to export both more products in any given year, and to more countries. This is particularly evident in the number of products exported, with the average number of products exported per year for those firms in the top quartile of export value being more than ten times that of firms in the bottom quartile (Table 17).

Among those exporters who export continuously over the ten year period, there is a tendency for them to expand the number of products they export, and the number of destinations they export to (Table 18 and Table 19).

Decomposition of Export Growth

Returning to the decomposition of export growth at the firm level, Table 20 shows the number of firms classified as entries, exits, continuing or intermittent according to the definitions set out in Section 5.2.3 above. Again, our preferred specification is to require a firm to export in at least 2 of the three years in question.

Error! Reference source not found. presents a decomposition of export growth at the firm level. The first level mimics that shown in Figure 10 above, but considers the degree of entry and exit of exporting at the firm level. We also note the number of new, exiting and intermittent firms whose change in export status is also accompanied by firm birth or death. That is, for export entrants we note the percentage of that group of firms which was 'born' between 1996 and 2005, for exits the percentage that ceased, and for intermittent exporters, the proportion which either started or ceased over this time period. As noted above in Section 2.2, some of these births and deaths may be spurious, as they reflect both the actual start or ceasing of a firm, but also changes in enterprise numbers due to restructuring.

The consideration of export dynamics within continuing firms is complicated by the large number of potential ways to define relationships at the firm level. We therefore focus on those relationships that can be recognised as being new, ongoing, or ending, and disregard the various types of 'intermittent' relationship. Table 21 presents a quick view of the relationship breakdown within continuing firms for a subset of relationship types. This is an area which will be covered in more depth in future analytical work, looking at the determinants of market and product entry and exit at the firm level, including the impact of exchange rates, geographical factors, firm characteristics and the economic environment on export dynamics. In the meantime, it is worth noting that the vast majority of new relationships come from the

introduction at firm level of new products into established relationships with existing partners, while the majority of relationships ended due to changes in the firms product range, rather than the end of relationships with partners.

5.3. *Duration of Trade*

While the discussion above considers the importance of new products and new destinations in generating export growth, a second aspect of export dynamics is associated with the end of export relationships. The evidence in Section 5.2 showed that while a large number of products were exported continuously over the period from 1988 to 2005, there were also a large number of products which were exported for only a short time or were exported intermittently. In this section we consider the duration of trading spells at the level of the product by country relationships, firm exporting spells, and firm-country-product export relationships. A spell is defined as a continuous period of exports over one or more years.

A better understanding of the factors that determine success in export markets have significant implications for government policy on international connections and export development assistance. New market entry is associated with a variety of fixed (sunk) costs, in the form of investments in market information and marketing, developing networks and distribution chains etc. If they are specific to both the product and the country concerned, these sunk costs may be incurred each time a new relationship is begun. Past trade relationships may reduce the cost of new entries, by giving firms better information about the markets they are going into, or the ability to build off existing networks. Alternatively, if past export experiences have been unsuccessful, there may be reputational barriers that raise the cost of re-entry or the initial entry costs to new firms. In either case, the impact of past experience is likely to decline as the gap between exporting spells increases, as networks and market knowledge deteriorate.

It has been suggested that the costs of market entry are much higher for New Zealand firms, due to the size of our market and the distance to other major markets.²⁶ This also translates, particularly in non-traditional industries, to a lack of reputation in offshore markets. These difficulties may prevent firms from entering export markets, but may also impact upon the success of firms which do enter.

The level of sunk costs is likely to differ across industries, products and destinations. For example, it may be lower in products where New Zealand already has an established reputation for quality, or in products which are relatively undifferentiated and may require less marketing. Equally, some differentiated products may have low sunk costs if their main means of exporting is through internet-based orders. This suggests that intermittent or one-off exporting is not problematic for some firms, as they have low costs of entry and exit. However, for other firms and industries, the costs of export market entry may impact on their ability to begin exporting, their ability to maintain exports over the medium term, and the benefits of consistent market presence over intermittent spells of exporting.

²⁶ See, for example, Simmons (2002)

In future work we will focus more closely on the firm and environmental determinants of both entry and exit of export markets. At this stage we simply provide some background descriptive information on the length of exporting relationships at various levels.

To our knowledge, the only published studies of the duration of trade relationships to date are those of Besedes and Prusa (2006a,b). Besedes and Prusa (2006a) show that trade relationships are very unstable when viewed at the disaggregated 7 digit Tariff Schedule level. They discuss this in terms of the duration of US trading relationships, where a trade relationship is defined as a period in which there is consistently non-zero trade in a given product with a given country over one or more years. They also find that there is a significant amount of duration dependence in export relationships. That is, while the median duration of trade relationships with the United States is only around two to four years, those relationships that survive the first few years have a very low probability of failure and tend to survive for a long time.

In other work (Besedes and Prusa 2006b), the authors show that there are significant differences in the average duration of trade relationships depending on the level of product differentiation. Using the classification developed in Rauch (1999), they find that in their data, differentiated products had a median survival time of five years, while homogenous products and reference priced goods had a median duration of only two years.²⁷ They suggest that this is because homogenous goods are more highly affected by changes in tariffs and trade costs than differentiated goods.

Alternatively, higher costs of market entry might deter all but the most successful differentiated product firms from beginning to export, while those that enter are more likely to stay in markets once they have begun to export, knowing that if they leave and wish to return they will again have to incur significant entry costs.

Here we examine patterns of trade duration using New Zealand data at the firm and product level, considering difference in duration according to simple product, market and firm characteristics. The results are purely descriptive, but throw up a number of areas for further investigation.

In their analysis of trade relationships involving exports to the US, Besedes and Prusa assume that multiple spells within the same product can be treated as independent of each other, showing that this assumption has little impact on their results.

The main effect of treating multiple spells as independent and equally important is to place greater weight on those relationships which experience multiple spells, and less weight on those which experience only a single spell. For example, a relationship which experiences a single, 18 year spell of trade will be counted towards the average trade duration only once, while relationships experiencing multiple short trading periods will be counted several times. Equally weighting all

²⁷ Rauch (1999) defined those goods which are traded on an organized exchange as homogenous, those which are not sold on exchanges but for which there is a benchmark international price as reference priced, and all other goods as differentiated.

spells will therefore produce a lower estimated trade duration than weighting according to relationships.

Throughout our analysis we present two alternative specifications side-by-side, one in which each *spell* receives equal weight (the unweighted results) and one in which each *relationship* receives equal weight. The latter is achieved by weighting each observed spell by the inverse of the number of spells observed for the relationship. We also provide some indicative comparisons across various treatments of multiple spell relationships.

The different specifications have different impacts according to the level of disaggregation and the length of the observation period. Table 22 sets out the distribution of numbers of spells observed within relationships at different levels of analysis. This suggests that treating multiple spells as independent will have a greater impact on results for SITC 5-digit products than for that of HS 10-Digit products, for which we have a shorter observation period.

Additionally, we note that there are various ways in which we might wish to treat censored spells – that is, spells which are observed in the first and last years of the sample period. For these spells we cannot determine whether they continue prior to, or after, the observed period. In the current paper we consider mean durations of observed spell lengths, and some simple methods of allowing for censoring by the use of survival analysis techniques. A more formal treatment of censored spells will follow in future.

5.3.1. SITC 5-Digit Relationships

As noted above, there are various ways in which we can account for multiple spell relationships. We could continue to treat all spells as independent and equally important. We could consider only relationships which experience only a single spell. We could consider only the first spell of each relationship. We could consider sub-groups of relationships, where the sub-group is defined by the number of discrete export spells experienced by that relationship. Finally, we could weight analysis according to the number of spells experienced, with greater weight placed on those relationships which experience only a single spell.

Considering these options, we first present summary statistics of observable spell durations for the SITC 5-Digit data in Table 23 (that is, not accounting for censoring at the start or end of the sample period). By definition, all spells last longer than 0 years. No spells last longer than 18 years, as this is the period of observation.

At the product level, we see that the mean spell length is reasonably long, at 8 years, but that this is mainly driven by products which are exported continuously throughout the 18 year period. The median spell length is only 4 years. As expected, reducing the sample to a single spell for each relationship shows up as having higher proportions of short spells, and lower proportions of longer spells. Interestingly, the distribution of first spells differs from that of final spells, with final spells being considerably longer overall. This difference is understated in the reported results, as these include single spell relationships. Removing these would suggest an even larger difference in the average spell length between first and last spells among repeated spell exports.

At the level of product-destination relationships we see a very different picture (Table 24). Regardless of the choice of how multiple spells are treated, the median observed spell length is very low. Again, median spell lengths are somewhat longer for the last than first spells.

Allowing For Censored Relationships

The figures above are based on observed spell lengths. As such, a five year spell ending in 2001 is treated equivalently to one ending in 2005. In reality, we would expect that many spells which are observed in the first or last year of the sample period actually extend longer than we have record of them. In particular, it seems likely that the majority of relationships which are consistent over the entire 18 year period will extend beyond those 18 years, in one or both directions.

Survival analysis techniques allow us to control for this type of censoring. Survival analysis is used to calculate expected durations, based on the observable data while allowing for spells that are not observed to finish. Spells which are censored are treated as surviving for 'at least x years'.

Here we consider some simple descriptions of spell durations, both for the sample as a whole and comparing across a number of simple distinctions. We report two common measures of duration – the survival function and the estimated hazard function. The survival function plots the share of all observed spells which survive at each duration. The hazard function plots the estimated probability of failure at each duration, conditional on a spell having lasted a certain length of time.

Figure 13 below plots the survivor function across a number of comparisons across all spells, showing both unweighted and weighted estimates.²⁸ Perhaps the most striking feature is the drop which occurs in the first year – over half of all observed spells fail after a single year.

The survival rate is noticeably higher using the weighted analysis. In the unweighted analysis, the results place greater emphasis on relationships with multiple, short spells, and less on those with a single, longer spell. Plotting the hazard rates for the weighted and unweighted spells shows that the weighted results does indeed have a noticeable effect in spreading the survival function in the SITC5 data. When equal weights are placed on relationships, rather than spells, the impact of multiple, short spells within relationships is significantly reduced.

The hazard function estimates suggest that the probability of export relationship failure is high in the first few years, but drops rapidly in the following five years (Figure 14).

We also consider differences in the duration of export spells according to the characteristics of the products or destinations involved. Figure 15 and Figure 16 compare the impact of some simple distinctions on observed relationship durations.

²⁸ Weights are defined as the inverse of the number of spells observed in that relationship.

We first consider descriptive statistics comparing the duration of exporting spells between high-income and lower-income destination countries. To consider this question we plot survival functions separately for OECD and non-OECD destinations.²⁹ The results suggest that export relationships tend to last longer when they are with OECD countries (Figure 15). This may reflect a combination of factors, including the higher income of the destinations and hence their greater demand for imports, and closer political and historical relationships than with many other potential destinations.

For an initial indication of the relationship between trade duration and trade value we compare the survival rates of trade relationships based on the value of exports in the first year. We cannot be sure whether export spells which are observed in 1988 are actually in their first year or whether they are part of a long-standing trade relationship. Therefore, these relationships (including the 30 percent of relationships which are observed to trade in each of the 18 years of observation) are excluded from this analysis. For this initial, bilateral comparison, we compare the survival rate across quartiles of export value. As anticipated, durations are longer where the value of trade is higher (Figure 16).

5.3.2. HS 10-Digit product analysis

Results at the 10 digit level are quite similar. Here we present only the summary statistics at the simple product and relationship level, with their associated survival functions (Table 25 and Figure 17). The results tell a similar story to those of the SITC 5-Digit products above. Lower mean durations are most likely due to the shorter sample period.

The relationship data again shows somewhat shorter durations than the product data (Table 26 and

Figure 18). Somewhat unexpectedly, however, we see a lower proportion of relationships failing in the first year using the HS 10-digit classifications than we did using the SITC 5-digit classifications. This implies that durations tend to be longer among products in which New Zealand exports a range of products within the wider 5-digit groups, hence placing more weight on longer duration spells.

Comparing across product and destination characteristics paints a similar picture to that reported above, with longer durations in relationships with OECD countries and for high value products.³⁰ For HS10 products we also compare survival rates across broad product groups. Figure 19 shows high survival rates in agricultural products, with the lowest survival rates among manufactured goods. This presents a somewhat different picture to that found by Besedes and Prusa (2006b), with longer durations among those product groups which tend to be less easily differentiated.

²⁹ OECD membership is determined according to current members at the time of writing. We exclude destinations which are politically linked to but geographically separated from the main member countries (eg. the Canary Islands, British Indian Ocean Territories).

³⁰ These graphs are not shown.

5.3.3. Firm Level Analysis

Interestingly, comparing the product results to the firm results suggests that the mean spell length for firms is in fact longer than that for product-market relationships (Table 27). This implies that many firms maintain exporting while changing the mix of products and countries with which they trade, as discussed above in Section 5.2.4.

Again, the probability of failure is highest within the first few years, then drops rapidly (Figure 20). However, the proportion of firms failing after a single year is lower than the proportion of product-market relationships.

The failure rate differs somewhat by industry, with manufacturers tending to have significantly higher survival rates than either wholesale trade or agriculture, forestry and fishing enterprises (Figure 21). The duration of trade is also very closely linked to the value of trade, with the largest differences in survival functions being between 'large' exporters (those in the top quartile of export value in the first year of the spell) and smaller ones (Figure 22). These differences are more substantial than those shown at the product-market relationship level (Figure 16).

There is also a slight difference according to ownership, with foreign owned companies having somewhat longer-lived export spells (Figure 23). As noted above, however, this may be due to the higher export value of these firms.

Turning to export relationships at the firm level, we see that these are even shorter, with the mean export relationship lasting only 1.6 years (Table 28). This reinforces the conclusion above, that many exporting firms maintain exports while shifting between products and markets frequently.

Comparing across different characteristics of the destination income level and product type reflect the results at the firm-level. Relationships with OECD countries are somewhat longer than with non-OECD countries, although the difference is quite small (Figure 24). Agricultural products have the longest spell durations, while manufactured goods have the shortest (Figure 25).

In contrast, while Manufacturing firms have the longest average export spell duration, with Agriculture, Forestry and Fishing, and Wholesale Trade firms having significantly lower survival rates at the firm level (Figure 21), at the product and destination relationship level, firms in Agriculture, Forestry and Fishing have longer export relationships than in other industries (Figure 26). This is likely to reflect the relative stability of the products they are producing, compared to manufacturers which may have a greater variety of products exported for a shorter duration.

Clearly, many of these factors are interrelated. Similarly, there are a number of additional factors that could be put forward to explain why some trading relationships last longer than others – it could be specific to the product (some products inherently experience more continuous demand – butter, stationery and paper, while others are likely to be required only in response to specific circumstances – helicopters, exposure meters), the country concerned (the depth of our relationship and trading experience with that country eg Australia vs China), or the relationship between product and country (eg. having a trading history in some areas but not in others). In

future work we will examine in more detail the interrelationship between various factors which are associated with both entry and exit.

6. Summary and Conclusions

In this paper we have presented a range of descriptive statistics about New Zealand's merchandise trade relationships. Here we summarise the main findings in each section and provide some initial discussion on what these might indicate about New Zealand's export performance to date. We also raise some of the questions suggested by our findings and indicate where we might need to look further in order to inform the policy debate.

Our first finding is that over the last 18 years, New Zealand has experienced a significant amount of diversification in both the products it exports and the countries with which it trades. However, most of this diversification occurred prior to 1996, and the last ten years have seen little change in the degree of concentration at any level.

At the firm level, the very high concentration of exports among a small number of firms is widely regarded as being a negative sign. However, there are positive signs in terms of substantial increases in the number of firms which have begun to export over the past ten years.

As noted at the beginning of Section 4 it is difficult to establish whether product diversification should necessarily be seen as a good thing, particularly at the aggregate level. On the one hand, a more diverse portfolio of products and partners implies that we are less at risk from shocks to particular product markets or regions. Alternatively, however, concentration may be seen as a positive sign of increasing focus on the products which New Zealand has existing comparative advantage in, and may suggest greater opportunities for learning-by-doing through clustering of industry and supporting activities. A better understanding of the sources of changing composition is required to judge whether New Zealand's experience in this area should be seen as encouraging.

In order to begin to understand the sources of changing product composition, we therefore decomposed export value growth over time according to whether it came from the introduction of new products, new market entry, or the entry of new firms, or whether it was rather through increases in the value of existing trade relationships. The SITC 5-digit analysis suggests that New Zealand has seen little entry of new products, and that almost all of our export growth has come from increasing exports of existing products (less than 1 percent of export growth can be attributed to new products). In contrast, a significant amount of export growth came from the geographical spread of existing products to new markets.

There also remains room for substantial change within product groups, through increasing variety and quality. Future work will examine this in more depth by considering changes in the unit value of export products.

The results for the HS10 data are not easily comparable to that for the SITC5 data, due to differences in the time period considered and the definitions of entry and exit. These results would suggest somewhat greater change in export composition at the

product and relationship level, with greater shares of value coming from the entry of new products and new partners, but also substantial destruction of value through product and market exit.

Individual export spells at the product-market level are relatively short on average, but the probability of failure drops dramatically after the first few years. There are substantial differences across a range of product and market characteristics, with higher value relationships and those involving OECD countries tending to last longer than others. There are also differences across product types, with agricultural and forestry products tending to maintain longer export spells than manufactured goods.

At the firm level we see a lot of firms have only very short spells of exporting, such that they are classed neither as entrants nor exits. However, over time there has been significant growth in both the number of exporters in any given year and the share of active firms with exports. Many of the firms which are observed to enter or exit from export markets are firms which also begin operation or cease over the period considered.³¹

Firms tend to alter their product and partner mix within continuous spells of exporting, such that export spells tend to last longer than the relationships that underlie them. Among continuing exporters, product changes appear to outweigh partner changes in determining the dynamics of changing export relationships. Many new firm-product-market relationships involve a firm sending a product which they had not previously exported to one of their existing partners. Conversely, firms often maintain trade with a certain destination but stop sending a particular product.

The duration of firm level export relationships also differs across industries and product types. While manufacturers tend to have relatively long export spells, compared to firms in the agriculture forestry and fishing or wholesale trade industries, they are more likely to alter the mix of products and destinations which underlie these relationships than are primary producers. Interestingly, firms whose main activity is wholesale trade tend to have relatively short export spells, both at the firm and the relationship level.

This paper has outlined a number of patterns observable in New Zealand's export data. In all cases, these results are merely descriptive, and further work is required to determine the appropriate areas for policy development, both through improving the data to capture better link enterprises over time, and to better understand what is driving the observed patterns.

³¹ Some of these apparent events will be due to changes in legal units.

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Tables

Table 1: Data Coverage of Active Firms

	ANZSIC	GST non-missing	IR4 Non-Resident control Indicator	Number of Firms with Observed Activity
1996	0.00%	99.84%	0.00%	398,158
1997	0.00%	99.79%	0.00%	419,030
1998	0.00%	99.80%	0.00%	431,057
1999	98.27%	90.32%	22.66%	537,823
2000	99.10%	89.66%	24.24%	551,279
2001	99.19%	89.20%	25.92%	558,771
2002	99.10%	88.67%	27.93%	573,817
2003	99.32%	89.09%	30.38%	587,235
2004	99.42%	89.31%	34.43%	597,841
2005	1.05%	99.73%	0.44%	496,978

Source: LFPD

Table 2: Share of Export Value by Customs Client Type

Year	NZ based firms	Overseas firms	Individuals & Unmatched Firms	Aggregate Export Value
1996	91.13%	0.21%	8.66%	\$20.1bn
1997	93.42%	1.33%	5.25%	\$20.8bn
1998	96.58%	2.61%	0.81%	\$21.7bn
1999	96.28%	3.16%	0.56%	\$22.6bn
2000	95.49%	3.99%	0.52%	\$28.1bn
2001	96.62%	3.01%	0.37%	\$31.6bn
2002	98.38%	1.22%	0.40%	\$29.8bn
2003	98.46%	1.13%	0.41%	\$27.3bn
2004	98.60%	1.03%	0.37%	\$29.5bn
2005	98.49%	1.07%	0.44%	\$29.4bn

Source: LFPD

Table 3: Share of Exports by ANZSIC Main Exporting Industries

	As Stated in LBF				Modal Industry			
	AFF	MANU	WST	OTHER	AFF	MANU	WST	OTHER
1996	3.12%	41.40%	40.81%	14.67%	3.11%	41.14%	41.04%	14.71%
1997	3.65%	41.86%	41.70%	12.79%	3.65%	41.61%	41.84%	12.91%
1998	3.15%	43.76%	43.32%	9.77%	3.14%	43.56%	43.24%	10.06%
1999	3.01%	45.69%	39.03%	12.26%	3.02%	45.46%	39.00%	12.53%
2000	2.79%	46.57%	39.94%	10.70%	2.79%	46.97%	40.06%	10.18%
2001	2.80%	44.65%	43.68%	8.88%	2.78%	44.65%	43.74%	8.83%
2002	3.29%	51.61%	20.28%	24.82%	3.25%	51.74%	34.40%	10.60%
2003	2.80%	59.38%	22.84%	14.98%	2.81%	59.44%	28.04%	9.71%
2004	2.09%	60.03%	25.20%	12.67%	2.16%	60.21%	28.62%	9.01%
2005	2.21%	62.04%	23.87%	11.88%	2.27%	62.09%	26.20%	9.44%

Source: LFPD

Table 4: Sample and Percentage of Active Firms which have Merchandise Exports, by Modal ANZSIC Group (AFF, MANU, WST)

	AFF			MANU			WST			Total	
	Num active firms	Num Exporters	% exporting	Num Active Firms	Num Exporters	Percent exporting	Num Active Firms	Num Exporters	Percent exporting	# Exporters	Num Active firms
1996	90,490	108	0.12%	25,670	1,790	6.97%	19,413	1,656	8.53%	3,554	135,573
1997	91,187	199	0.22%	26,695	2,365	8.86%	20,387	2,395	11.75%	4,959	138,269
1998	91,178	245	0.27%	27,108	2,578	9.51%	21,010	2,560	12.18%	5,383	139,296
1999	106,328	275	0.26%	30,565	2,729	8.93%	25,218	2,601	10.31%	5,605	162,111
2000	108,017	284	0.26%	30,702	2,792	9.09%	25,304	2,666	10.54%	5,742	164,023
2001	108,630	280	0.26%	30,887	2,901	9.39%	25,103	2,797	11.14%	5,978	164,620
2002	109,778	320	0.29%	31,157	3,104	9.96%	25,038	2,979	11.90%	6,403	165,973
2003	108,666	351	0.32%	31,402	3,244	10.33%	25,060	3,190	12.73%	6,785	165,128
2004	107,035	368	0.34%	31,630	3,451	10.91%	25,078	3,366	13.42%	7,185	163,743
2005	89,909	358	0.40%	28,123	3,435	12.21%	21,743	3,321	15.27%	7,114	139,775

Source: LFPD

Table 5: Share of Export Value by Export Percentiles (AFF, MANU, WST)

	Export Value Quartiles				Top 10%	Top 1%
	<\$10,000*	<\$50,000*	<\$350,000*	\$350,000+*	\$2.74m+	\$50m+
1996	0.03%	0.18%	1.12%	98.67%	94.2%	69.3%
1997	0.03%	0.18%	1.08%	98.71%	94.6%	70.4%
1998	0.03%	0.16%	1.09%	98.71%	94.3%	68.7%
1999	0.03%	0.18%	1.18%	98.61%	93.9%	66.9%
2000	0.03%	0.17%	1.04%	98.77%	94.5%	69.0%
2001	0.02%	0.14%	0.95%	98.88%	94.8%	71.5%
2002	0.03%	0.16%	1.00%	98.81%	94.5%	68.8%
2003	0.03%	0.16%	1.07%	98.74%	94.0%	67.3%
2004	0.03%	0.15%	1.02%	98.80%	94.4%	67.7%
2005	0.02%	0.15%	0.97%	98.86%	94.6%	68.0%

Source: LFPD

* Values are indicative only. Actual figures differ from year to year.

Table 6: Probability of Exporting and Share of Export Value by GST Sales Quartile (AFF, MANU, WST)

	Probability of Exporting, by Sales Quartile				Share of export value, by sales quartile				Share in	Share in	Number of Firms
	1	2	3	4	1	2	3	4	Top 10%	Top 1%	
1996	0.12%	0.22%	0.46%	8.59%	0.17%	0.03%	0.13%	99.66%	99.0%	89.4%	135,195
1997	0.25%	0.51%	0.90%	11.23%	0.04%	0.21%	0.24%	99.51%	99.1%	90.2%	137,748
1998	0.28%	0.63%	1.14%	11.83%	0.13%	0.40%	0.24%	99.23%	96.2%	88.0%	138,729
1999	0.28%	0.67%	1.25%	12.16%	0.09%	0.10%	0.30%	99.51%	99.0%	89.9%	140,770
2000	0.30%	0.62%	1.40%	12.32%	0.06%	0.10%	0.29%	99.55%	98.8%	91.1%	142,179
2001	0.39%	0.83%	1.69%	12.40%	0.08%	0.09%	0.32%	99.51%	99.0%	91.5%	142,424
2002	0.43%	0.84%	1.93%	13.25%	0.09%	0.09%	0.31%	99.51%	98.7%	89.6%	142,974
2003	0.49%	1.02%	1.96%	14.14%	0.12%	0.12%	0.39%	99.37%	98.5%	87.8%	142,794
2004	0.47%	1.12%	2.30%	14.82%	0.09%	0.13%	0.42%	99.37%	98.6%	88.3%	141,647
2005	0.53%	1.11%	2.30%	14.72%	0.10%	0.18%	0.34%	99.38%	98.3%	88.2%	138,990

Source: LFPD

Table 7: Probability of Exporting and Average Export Value among Companies (IR\$ Filers), by Ownership (AFF, MANU, WST)

	Percentage with Merchandise Exports		Number of Firms in Sample		Mean Export Value per Exporting Firm (NZD)	
	NZ owned	Foreign owned	NZ owned	Foreign owned	NZ owned	Foreign owned
1999	10.50%	47.33%	32,109	1,143	\$1,342,621	\$4,075,096
2000	10.33%	47.28%	34,671	1,252	\$1,611,963	\$5,752,638
2001	9.96%	47.50%	37,334	1,259	\$1,366,715	\$6,247,767
2002	10.00%	47.88%	40,536	1,295	\$1,386,580	\$6,528,605
2003	10.23%	45.55%	43,712	1,271	\$1,515,510	\$6,000,736
2004	10.23%	46.52%	49,230	1,292	\$1,651,480	\$6,454,629

Source: LFPD

Table 8: Number of Spells of Non-Consistent HS10 Product Exports, 1996-2005

Number of Spells	Number of Products	% of Products
1	2,036	33.79
2	2,532	42.02
3	1,216	20.18
4	234	3.88
5	7	0.12
Total	6,025	100

Source: HS10 Merchandise Trade data

Table 9: Patterns of Firm Exports, 1996-2005 (AFF, MANU, WST)

Total Number of Years Exporting	Number of Export Spells			
	1 Spell	2 Spells	3 Spells	4-5 Spells
1	3894	-	-	
2	1374	652	-	
3	811	469	137	
4	559	364	111	
5	438	275	142	Suppressed
6	344	254	110	
7	344	230	92	
8	354	205	55	
9	595	224	-	
10	1653	-	-	
Total	10366	2673	647	72

Source: LFPD

Table 10: Product Line Counts and Contributions

Status	Freq.	Percent	Contribution
Continuing	2,603	87.5	\$13.6bn
Entry	168	5.7	\$13.3m
Exit	138	4.6	-\$140.0m
Intermittent	67	2.3	0
Total	2,976	100	\$13.4bn

Source: SITC5 Merchandise Trade data

Table 11: Distribution of Status by SITC 1-Digit Groups

	Number of Products by Status				
	Continuing	Entry	Exit	Never	Total
Food and live animals	293	23	8	7	331
Beverages and tobacco	21	0	0	1	22
Crude materials, inedible, except fuels	159	30	28	13	230
Mineral fuels, lubricants and related materials	27	2	3	3	35
Animal and vegetable oils, fats and waxes	37	2	2	1	42
Chemicals and related products, n.e.s.	396	34	22	11	463
Manufactured goods classified chiefly by material	704	27	46	19	796
Machinery and transport equipment	567	28	24	9	628
Miscellaneous manufactured articles	399	22	5	3	429
Total	2,603	168	138	67	2,976

Source: SITC5 Merchandise Trade data

Table 12: Mean Numbers of Destinations, Averaged Across Product Lines

Mean number of Partners 1988-1991	12.22
Mean number Continuing Partners	8.39
Mean number of Lost Partners	3.70
Mean number of New Partners	9.64
Mean number of Partners 2002-2005	18.20

Source: SITC5 Merchandise Trade data

Table 13: Summary of Definitions – 10-Digit Product Level

	Number of Products			Total Value			Value and Share of Growth		
	Any	Two of Three	All	Any	Two of Three	All	Any	Two of Three	All
Entry	1,021	433	190	\$3.2bn	\$3.2bn	\$3.2bn	\$0.8bn (10.6%)	\$0.8bn (10.5%)	\$0.8bn (10.4%)
Exit	1,239	541	191	\$4.4bn	\$4.3bn	\$4.2bn	-\$0.6bn (-8.0%)	-\$0.6bn (-7.8%)	-\$0.6bn (-7.6%)
Continuing	7,481	5,888	4,503	\$244.7bn	\$243.6bn	\$240.5bn	\$7.6bn (97.4%)	\$7.5bn (97.0%)	\$7.8bn (100.1%)
Intermittent	349	3,228	5,206	\$0.0bn	\$1.2bn	\$4.4bn	\$0.0bn (0.0%)	\$0.0 (0.2%)	-\$0.2bn (-2.9%)

Source: HS 10-Digit Merchandise Trade Data

Table 14: Sample Size – Ever Exporting Firms Only (AFF, MANU, WST)

	Exporting in Year	Not Exporting in Year	Total Active Firms Which Ever Export	Percentage of Ever Exporting Firms Exporting in Year
1996	3,554	5,281	8,835	40.23%
1997	4,959	4,606	9,565	51.85%
1998	5,383	4,755	10,138	53.10%
1999	5,605	4,940	10,545	53.15%
2000	5,742	5,131	10,873	52.81%
2001	5,978	5,260	11,238	53.19%
2002	6,403	5,102	11,505	55.65%
2003	6,785	4,857	11,642	58.28%
2004	7,185	4,416	11,601	61.93%
2005	7,114	4,215	11,329	62.79%

Source: LFPD

Table 15: Mean and Percentiles of Number of Destinations Exported to per Year (AFF, MANU, WST)

Year	Mean	Std Dev	p25	p50	p75	p99	N
1996	3.67	5.77	1	2	4	28	3,554
1997	3.44	5.47	1	1	3	27	4,959
1998	3.48	5.47	1	2	3	26	5,383
1999	3.40	5.29	1	2	3	26	5,605
2000	3.41	5.31	1	2	3	25	5,742
2001	3.43	5.38	1	2	3	26	5,978
2002	3.43	5.42	1	2	3	26	6,403
2003	3.43	5.38	1	2	3	26	6,785
2004	3.50	5.50	1	2	4	27	7,185
2005	3.57	5.54	1	2	4	27	7,114
Total	3.47	5.44	1	2	3	26	

Source: LFPD

Table 16: Mean and Percentiles of Number of Products Exported per Year (AFF, MANU, WST)

Year	Mean	Std Dev	p25	p50	p75	p99	N
1996	7.55	20.52	1	3	6	99	3,554
1997	7.30	20.19	1	2	6	86	4,959
1998	7.25	21.09	1	2	6	82	5,383
1999	6.83	19.30	1	2	6	73	5,605
2000	6.76	19.35	1	2	6	70	5,742
2001	7.02	22.06	1	2	6	78	5,978
2002	6.89	21.03	1	2	6	67	6,403
2003	6.88	19.93	1	2	6	72	6,785
2004	7.63	19.79	1	3	7	82	7,185
2005	8.09	21.31	1	3	7	85	7,114
Total	7.23	20.48	1	3	6	78	

Source: LFPD

Table 17: Mean Number of Products and Countries per Year, Averaged Across All Years, by Export Quartile (AFF, MANU, WST)

Quartiles	Number of Destinations		Number of Products	
	Mean	Std. Dev.	Mean	Std. Dev.
1	1.15	0.42	1.55	1.59
2	1.70	1.02	3.14	3.68
3	1.15	0.42	6.36	10.19
4	1.70	1.02	17.87	37.37
Top 1%	27.75	20.62	40.84	42.88

Source: LFPD

Table 18: Distribution of Number of Products Exported by Consistent Exporters (AFF, MANU, WST)

	Mean number of products	sd	p25	p50	p75	p90	p99	N
1996	11.46	26.23	2	5	10	21	129	1,653
1997	13.81	30.05	3	6	13	26	135	1,653
1998	14.38	32.27	3	6	14	27	149	1,653
1999	13.84	29.60	3	6	13	27	149	1,653
2000	13.76	28.30	3	6	13	27	132	1,653
2001	14.66	33.90	3	7	14	28	139	1,653
2002	14.93	32.99	3	7	15	29	158	1,653
2003	15.30	31.05	3	7	16	30	144	1,653
2004	17.44	34.87	4	8	18	35	160	1,653
2005	18.23	38.19	4	8	18	38	171	1,653
Total	14.78	31.96	3	7	14	29	149	

Source: LFPD

Table 19: Distribution of Number of Destinations Exported to by Consistent Exporters (AFF, MANU, WST)

	Mean number of products	sd	p25	p50	p75	p90	p99	N
1996	5.37	7.41	1	3	6	13	34	1,653
1997	6.01	7.80	2	3	7	14	34	1,653
1998	6.25	7.93	2	4	7	14	39	1,653
1999	6.25	7.89	2	4	8	14	36	1,653
2000	6.39	8.04	2	4	8	15	38	1,653
2001	6.54	8.36	2	4	8	15	37	1,653
2002	6.64	8.25	2	4	8	15	38	1,653
2003	6.70	8.12	2	4	8	15	40	1,653
2004	6.96	8.45	2	4	8	15	42	1,653
2005	6.89	8.46	2	4	8	16	42	1,653
Total	6.40	8.09	2	4	8	15	38	

Source: LFPD

Table 20: Definition Summary, Firm Level (AFF, MANU, WST)

	Number of Firms			Percent of Firms		
	Any	2 of 3	All	Any	2 of 3	All
Entries	5,308	1,569	1,569	38.58%	11.40%	11.40%
Exits	2,374	443	443	17.26%	3.22%	3.22%
Continuing Firms	4,495	2,772	1,792	32.67%	20.15%	13.03%
Intermittent	1,581	8,974	9,954	11.49%	65.23%	72.35%

Source: LFPD

Table 21: Export Growth Decomposition for Continuing Firms (AFF, MANU, WST)

New Relationships		
Firm sends a new product to a new destination		3,349
Firm sends a new product to a destination they already exported to at the start of the period		10,856
Firm sends something from their initial product range to a destination they previously didn't export to		534
Firm sends a product from their initial product range to a country they had previously exported other products to.		2,165
Ending Relationships:		
Firm stops exporting product and stops exporting to destination		1,412
Firm continues exporting other products to destination but completely ceases exporting the original product		6,193
Firm continues exporting product but completely ceases exporting to the original destination		2,280
Firm continues exporting product and continues exporting to destination, but does not send the original product to the original destination		306
Ongoing Relationships		11,374
Remainder: Various types of intermittent relationships		245,943
Total number of relationships observed		284,412

Source: LFPD

Table 22: Number of Exporting Spells, by Products, Firms, and Relationships

Number of Spells	SITC 5-Digit Products, 18 years		HS 10-Digit Products, 10 years		Firm Level, 10 years (AFF, MANU, WST)	
	Spells per product	Spells per Product-Market Relationship	Spells per product	Spells per Product-Market Relationship	Spells per firm	Spells per firm-product-market relationship
1	1876	42402	6101	84149	10345	340051
2	750	40304	5064	65540	5352	94046
3	1005	38172	3648	34680	1986	24909
4	952	29216	936	7236	292	3000
5	595	14775	35	240	10	80
6	186	4392				
7	42	658				
8	8	32				
Total	5406	169951	15784	191845	17985	462086

Source: LFPD

Table 23: Distribution of Observed Spell Length, SITC 5-Digit Products

	p25	p50	p75	p90	p99	Mean	Std Dev	N
All Spells	1	4	18	18	18	8.02	7.43	5,414
First Spell Only	2	18	18	18	18	11.94	7.54	2,981
Last Spell Only	3	18	18	18	18	12.23	7.34	2,981
Average Spell Within Product	3.5	18	18	18	18	12.05	7.24	2,981
Only 1 Spell Products	18	18	18	18	18	16.89	4.02	1,876
Only 2 Spell Products	1	4	11	14	16	5.93	5.20	750
Only 3 Spell Products	1	2	5	8	13	3.33	3.05	1,005
Only 4 Spell Products	1	2	3	6	10	2.54	2.09	952
Only 5 Spell Products	1	1	2	4	6	1.94	1.38	595
Only 6 Spell Products	1	1	2	3	6	1.61	0.99	186
Only 7 Spell Products	1	1	1	2	3	1.19	0.45	42
Only 8 Spell Products	1	1	1	1	1	1.00	0.00	8

Source: SITC5 Merchandise Trade data

Table 24: Distribution of Observed Spell Lengths, SITC 5-Digit Relationships

	p25	p50	p75	p99	Mean	Std. Dev.	Number
All spells	1	1	2	18	2.74	3.75	169,951
First Spell Only	1	1	2	18	3.08	4.60	86,367
Final Spell Only	1	1	3	18	3.40	4.76	86,367
Average Spell within Relationship	1	1.333	3	18	3.22	4.46	86,367
Only 1 Spell Relationships	1	1	2	18	4.01	5.96	42,402
Only 2 Spell Relationships	1	1	3	15	2.76	3.34	40,304
Only 3 Spell Relationships	1	1	3	12	2.41	2.36	38,172
Only 4 Spell Relationships	1	1	2	9	2.04	1.67	29,216
Only 5 Spell Relationships	1	1	2	6	1.75	1.21	14,775
Only 6 Spell Relationships	1	1	2	5	1.50	0.87	4,392
Only 7 Spell Relationships	1	1	2	4	1.35	0.67	658
Only 8 Spell Relationships	1	1	1	3	1.19	0.54	32

Source: SITC5 Merchandise Trade data

Table 25: Distribution of Observed Spell Length, HS 10-Digit Products

	p1	p25	p50	p75	p90	p99	Mean	Std Dev	N
All Spells	1	1	2	10	10	10	4.35	3.73	15,784
First Spell Only	1	1	5	10	10	10	5.58	4.00	10,090
Last Spell Only	1	1	5	10	10	10	5.57	4.01	10,090
Average Spell Within Product	1	1.67	4.5	10	10	10	5.56	3.93	10,090
Only 1 Spell Products	1	4	10	10	10	10	7.63	3.71	6,101
Only 2 Spell Products	1	1	2	4	6	8	2.75	1.98	5,064
Only 3 Spell Products	1	1	1	2	4	5	1.86	1.16	3,648
Only 4 Spell Products	1	1	1	2	2	4	1.36	0.65	936
Only 5 Spell Products	1	1	1	1	1	2	1.03	0.17	35

Source: SITC5 Merchandise Trade data

Table 26: Distribution of Observed Spell Length, HS 10-Digit Relationships

	p25	p50	p75	p90	p99	Mean	Std Dev	N
All Spells	1	1	2	5	10	2.30	2.36	191,845
First Spell Only	1	2	4	10	10	3.31	3.29	8,613
Last Spell Only	1	1	2	3	10	1.69	1.72	8,948
Average Spell Within Relationship	1	1	2.5	7	10	2.48	2.60	134,332
Only 1 Spell Relationships	1	1	3	10	10	2.75	3.11	84,149
Only 2 Spell Relationships	1	1	3	5	8	2.13	1.66	65,540
Only 3 Spell Relationships	1	1	2	3	5	1.71	1.03	34,680
Only 4 Spell Relationships	1	1	2	2	4	1.36	0.63	7,236
Only 5 Spell Relationships	1	1	1	1	2	1.08	0.28	240

Source: HS10 Merchandise Trade data

Table 27: Distribution of Observed Spell Length, Firm Export Spells (AFF, MANU, WST)

	p25	p50	p75	p90	Mean	Std. Dev	N
All Spells	1	2	4	9	3.26	3.01	17,985
First Spell Only	1	2	5	10	3.60	3.25	13,758
Last Spell Only	1	2	6	10	3.68	3.24	13,758
Average Spell Within Product	1	2	5	10	3.63	3.19	13,758
Only 1 Spell Firms	1	2	8	10	4.12	3.49	10,345
Only 2 Spell Firms	1	2	3	5	2.30	1.75	5,352
Only 3 Spell Firms	1	1	2	3	1.71	1.05	1,986
Only 4 Spell Firms	1	1	2	2	1.31	0.58	292
Only 5 Spell Firms	Suppressed				1.20	0.42	10

Source: LFPD

Table 28: Distribution of Observed Spell Length, Firm Export Relationships (AFF, MANU, WST)

	p25	p50	p75	p90	Mean	Std. Dev	N
All Spells	1	1	2	3	1.62	1.48	462,086
First Spell Only	1	1	1	2	1.19	0.72	10,929
Last Spell Only	1	1	1	2	1.17	0.65	10,929
Average Spell Within Product	1	1	1.5	3	1.61	1.48	396,143
Only 1 Spell Relationships	1	1	1	3	1.59	1.56	340,051
Only 2 Spell Relationships	1	1	2	3	1.73	1.29	94,046
Only 3 Spell Relationships	1	1	2	3	1.51	0.89	24,909
Only 4 Spell Relationships	1	1	1	2	1.27	0.57	3,000
Only 5 Spell Relationships					1.05	0.22	80

Source: LFPD

Figures

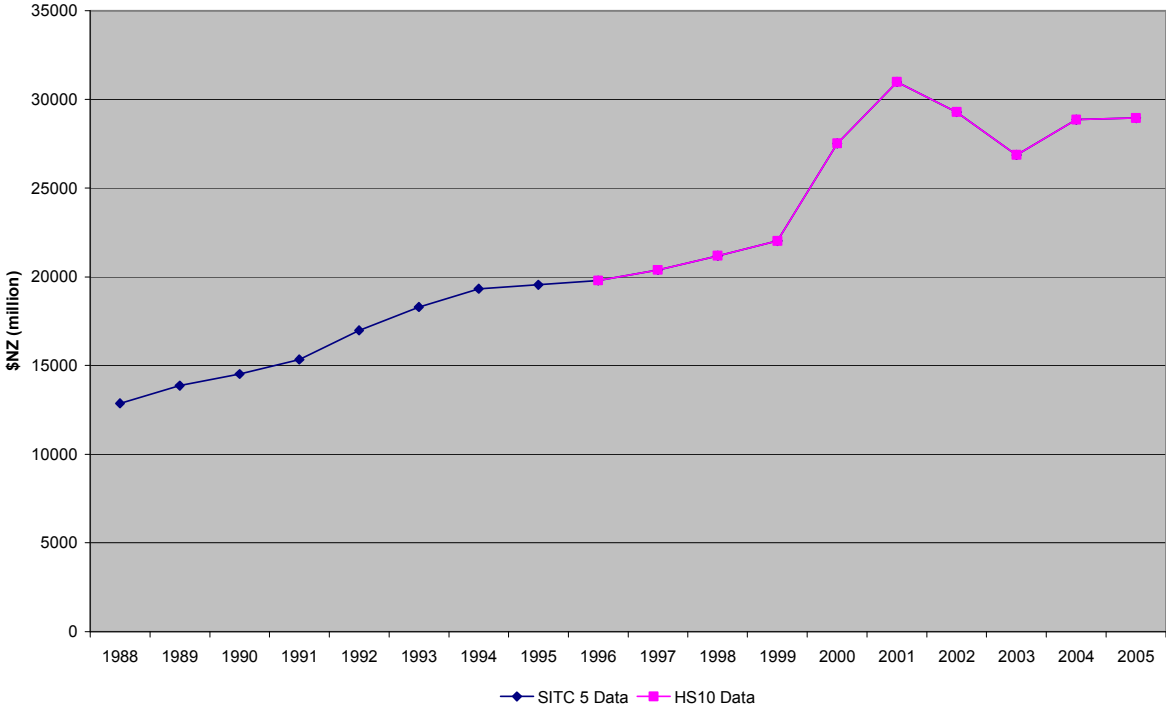


Figure 1: Aggregate Export Values 1988-2005
 Source: SITC5 and HS10 Merchandise Trade Data

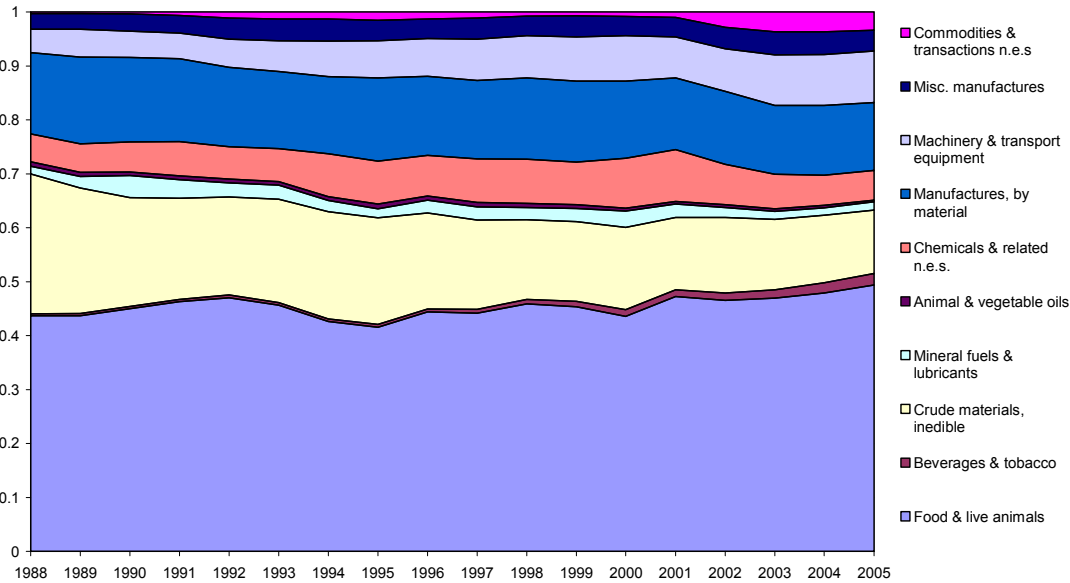


Figure 2: Share of Export Value by SITC 1-Digit Product Groups, 1988-2005
 Source: SITC5 Merchandise Trade Data

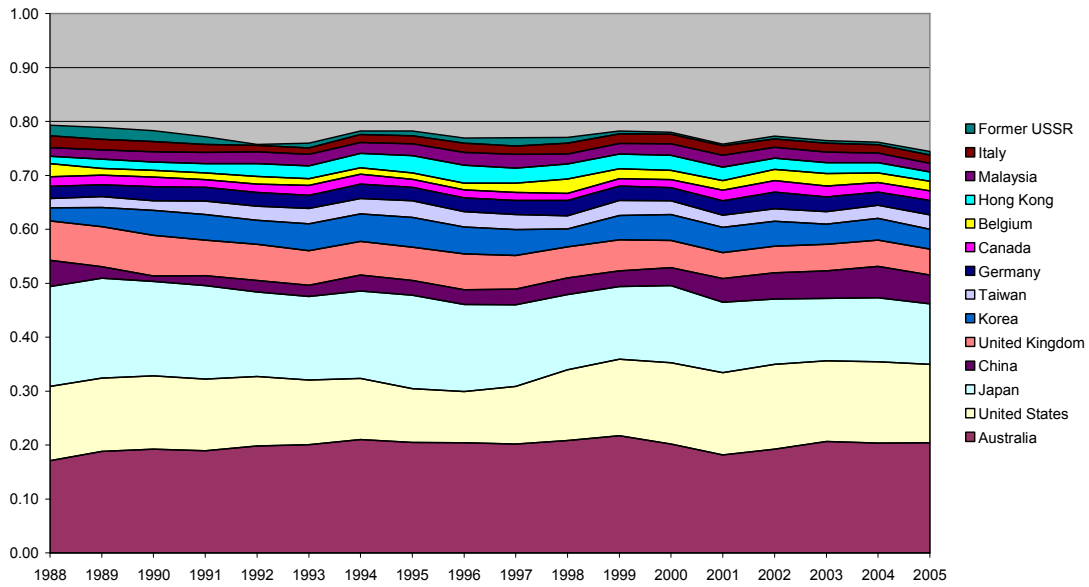


Figure 3: Country Share of Annual Export Value, 1988-2005
 Source: SITC5 Merchandise Trade Data

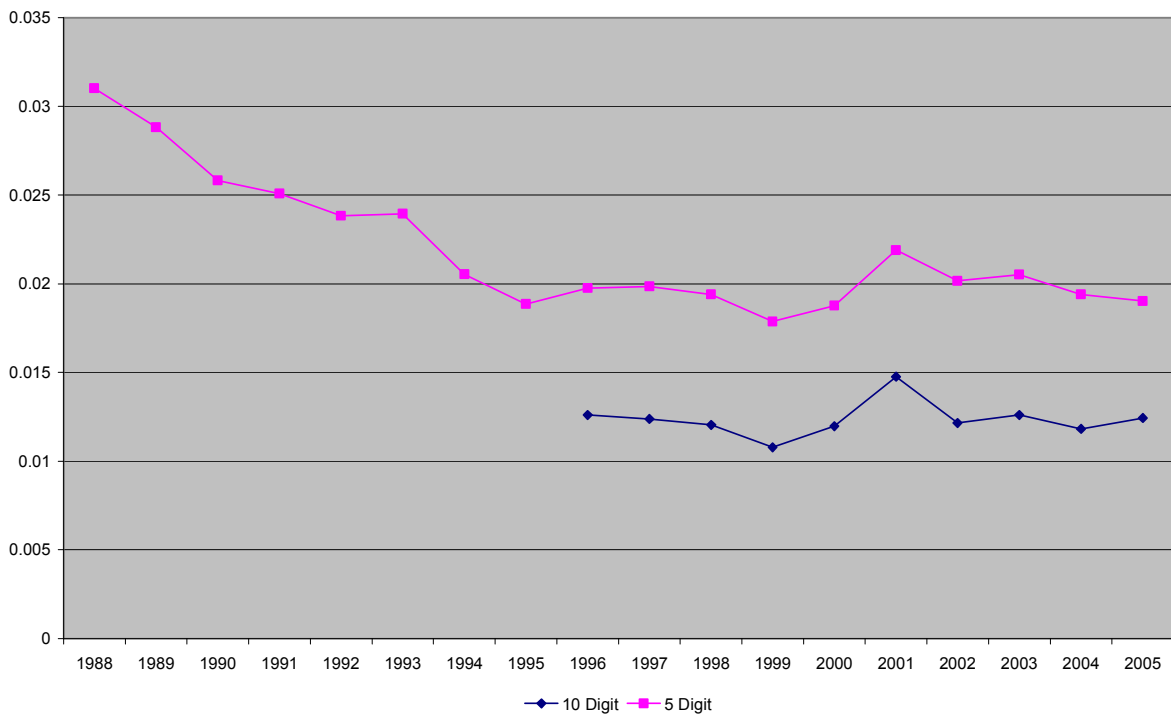


Figure 4: Herfindahl Index of Product Concentration, 1988-2005
 Source: SITC5 and HS10 Merchandise Trade Data



Figure 5: Herfindahl Index of Geographic Concentration, 1988-2005
 Source: SITC5 and HS10 Merchandise Trade Data

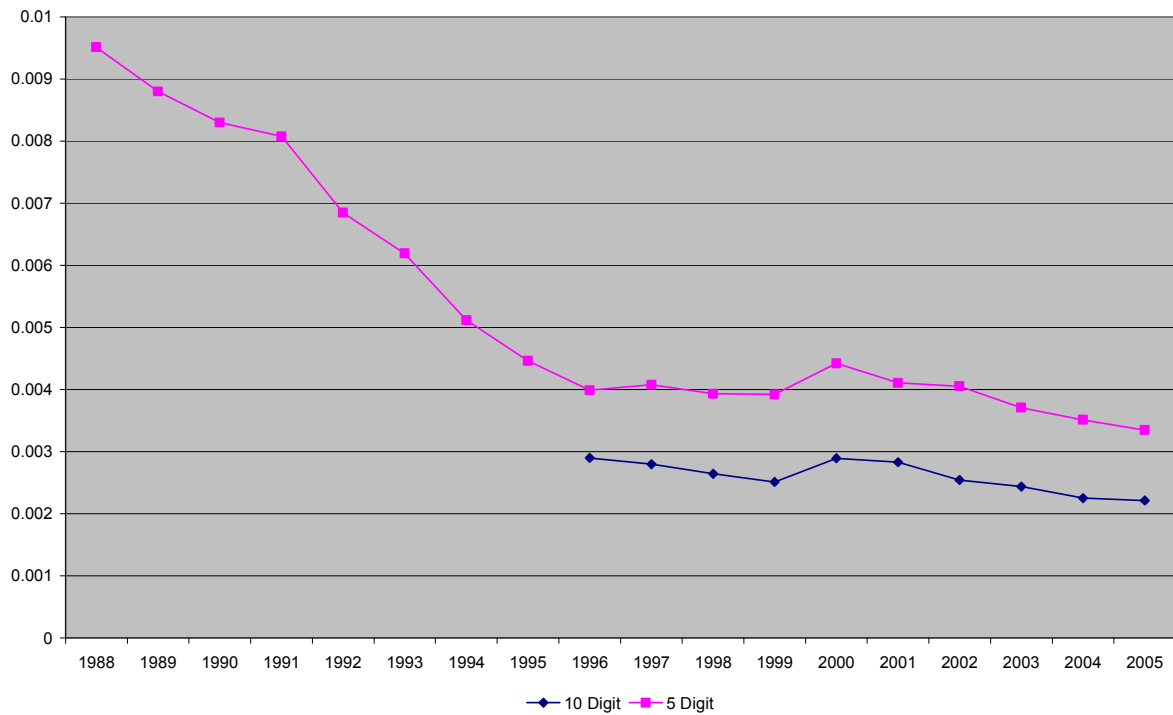


Figure 6: Herfindahl Index of Relationship Concentration, 1988-2005
 Source: SITC5 and HS10 Merchandise Trade Data

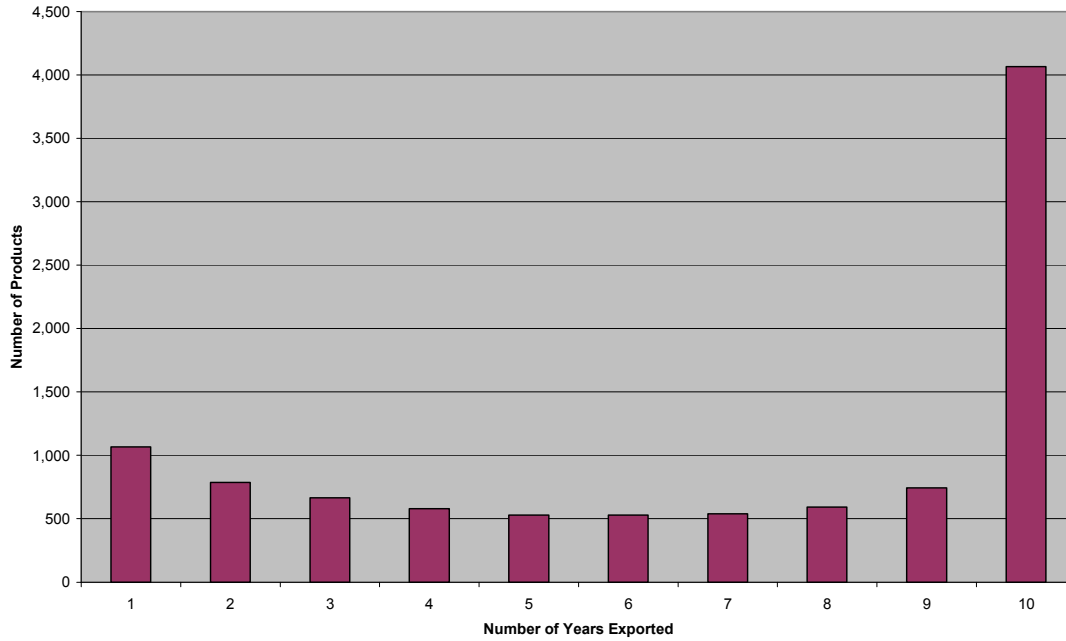


Figure 7: Distribution of Number of Years Product is Exported, 1988-2005
 Source: HS10 Merchandise Trade data

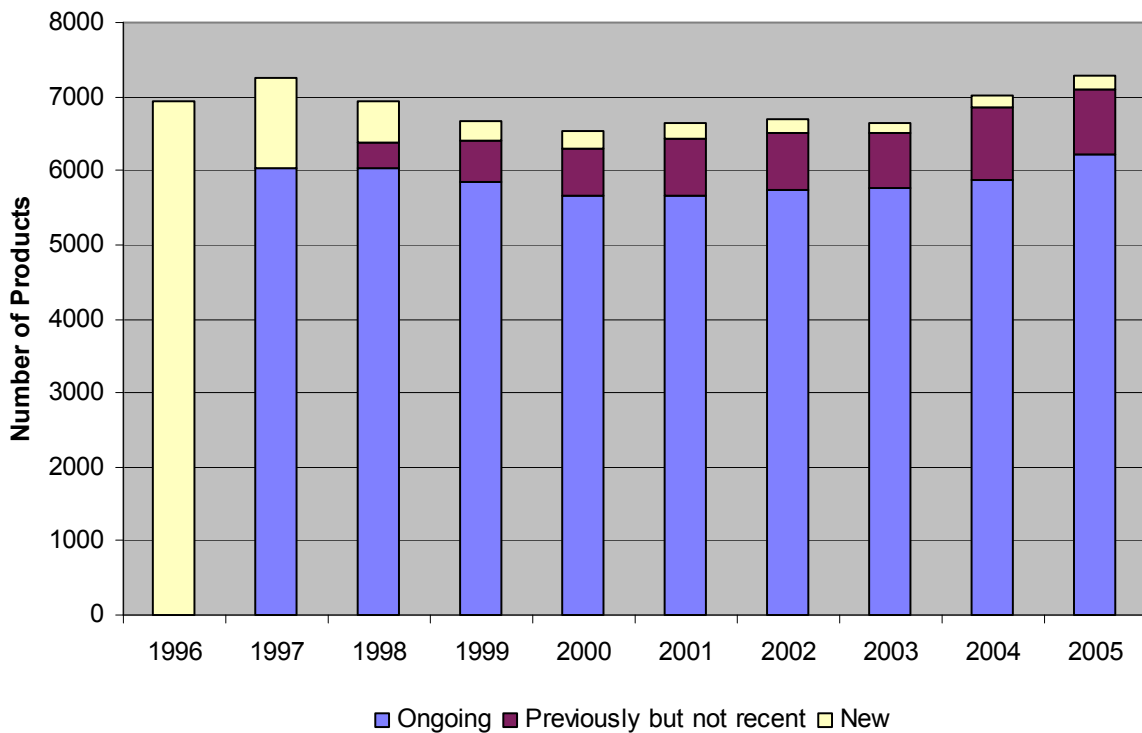


Figure 8: Number of HS10 Products Exported Each Year, by Export History
 Source: HS10 Merchandise Trade data

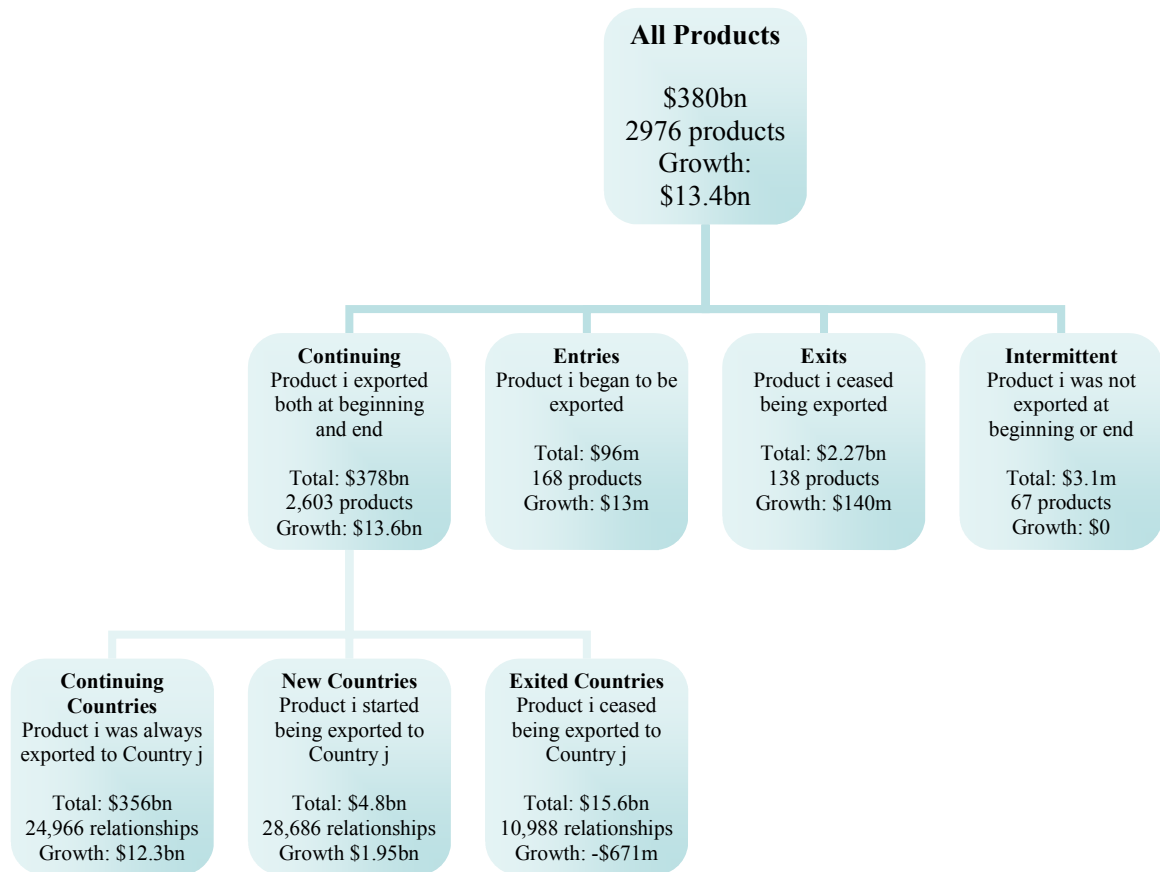


Figure 9: Export Growth Decomposition – SITC5

Source: SITC5 Merchandise Trade data

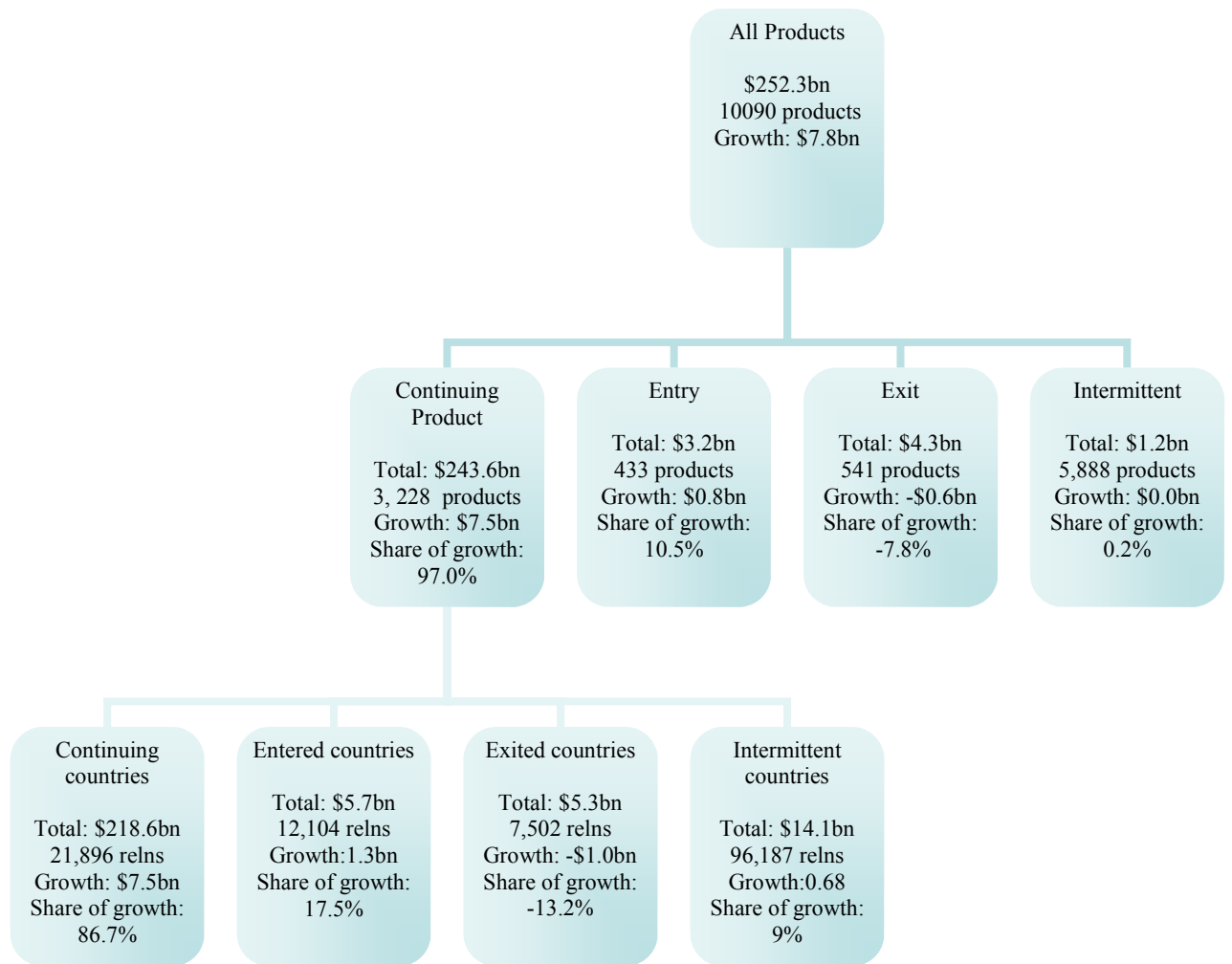


Figure 10: Decomposition of Export Growth - HS10

Source: HS10 Merchandise Trade Data

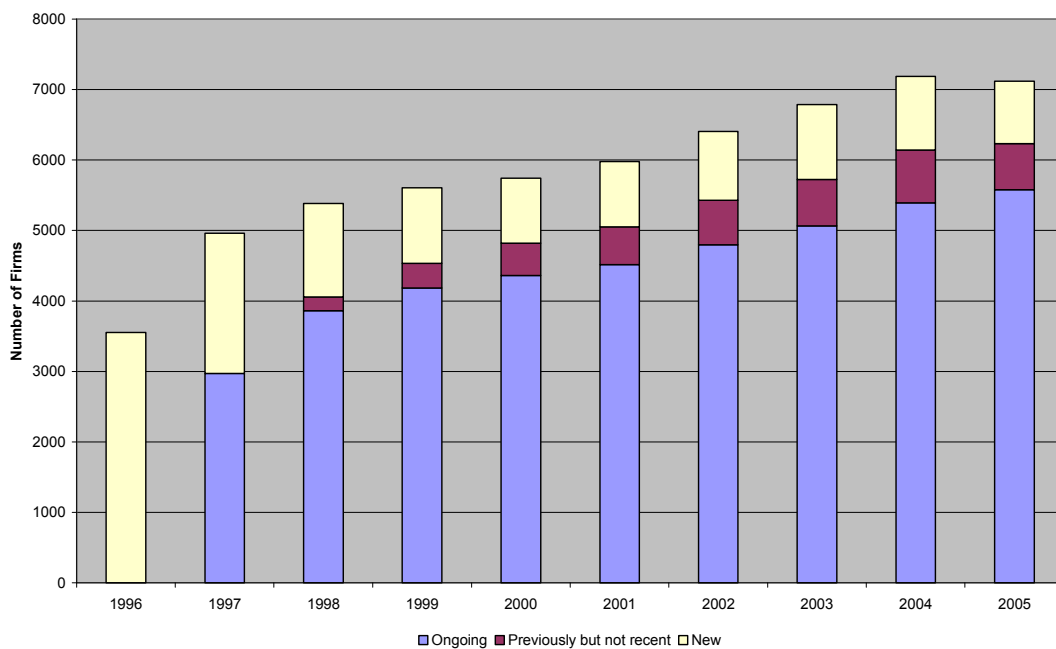


Figure 11: Number of Firms Exporting per Year, by Past Export Experience

Source: LFPD

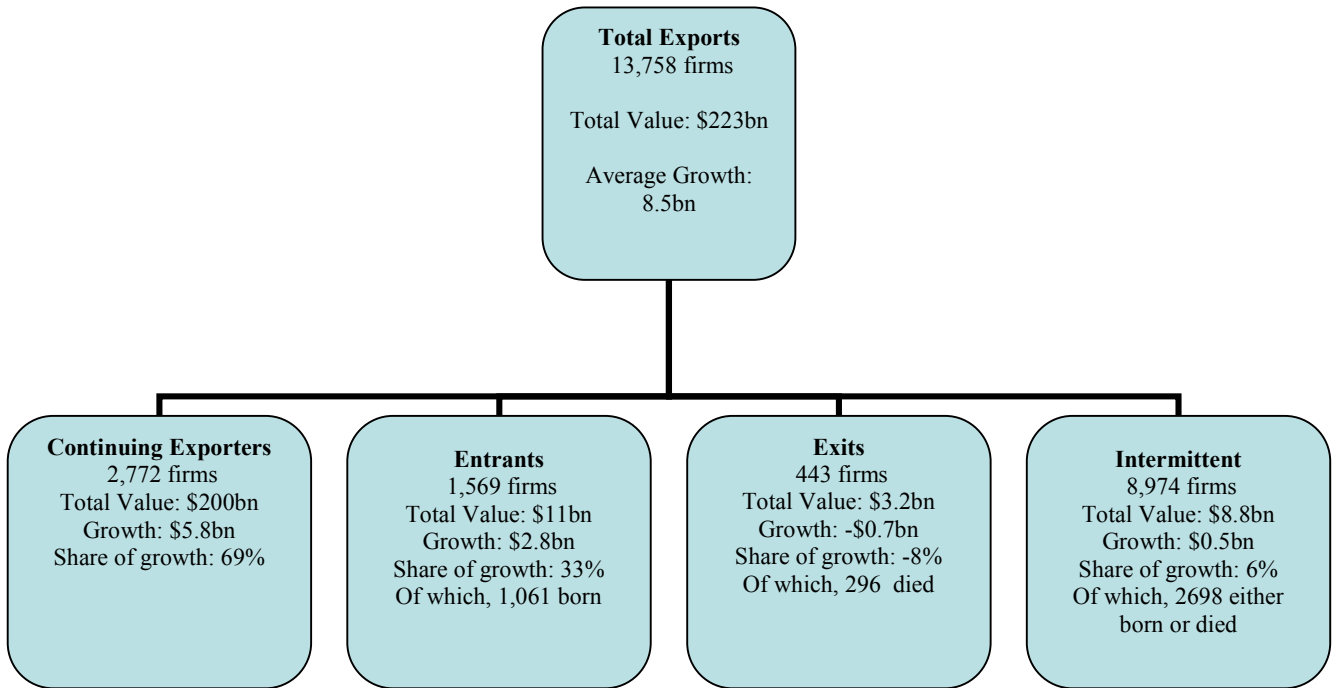


Figure 12: Decomposition of Export Growth - Firm Level
 Source: LFPD

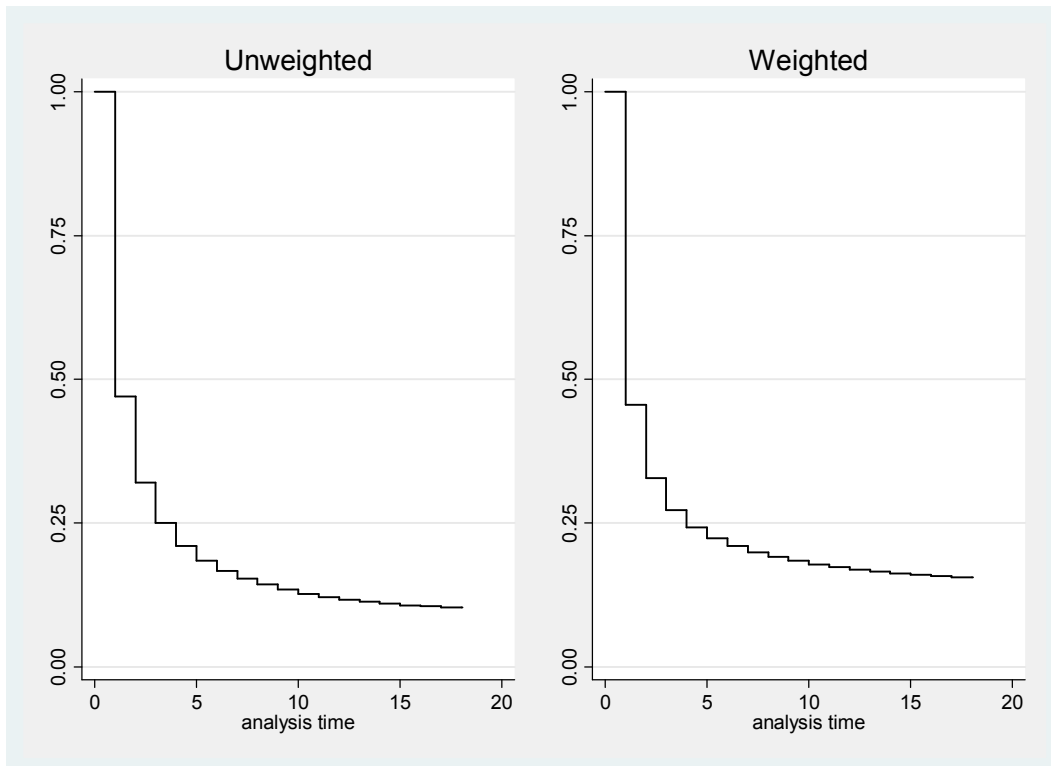


Figure 13: Survival Function for SITC 5-Digit Relationships
 Source: SITC5 Merchandise Trade data

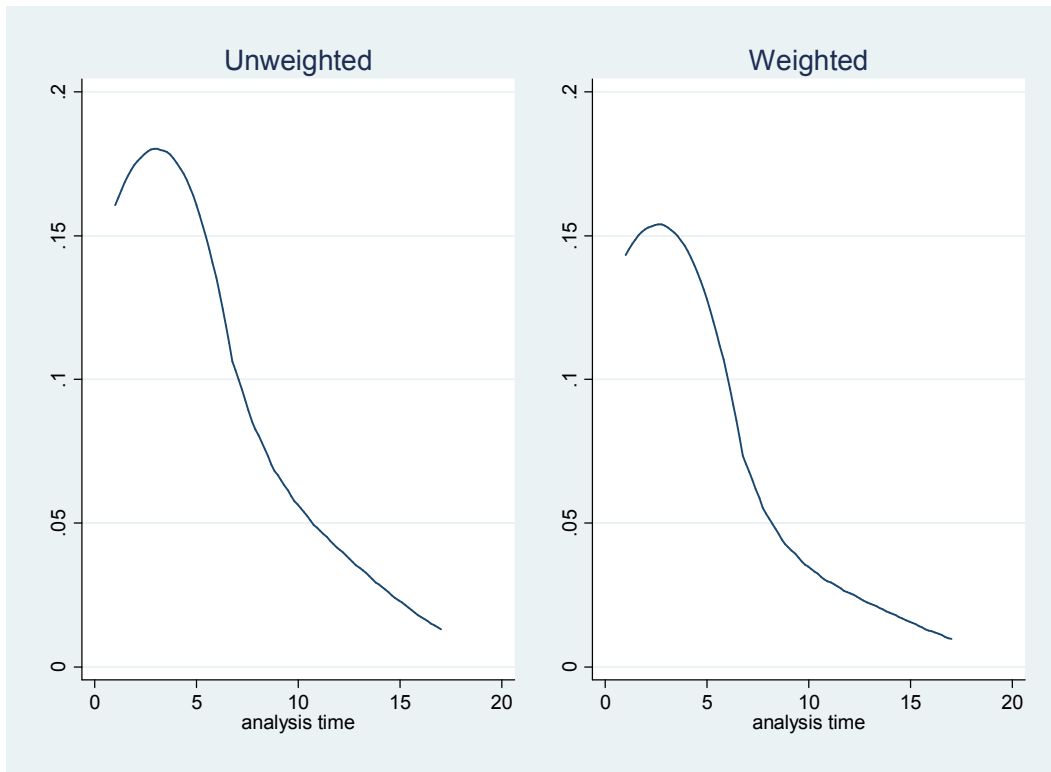


Figure 14: Smoothed Hazard Estimate for SITC 5-Digit Relationships
 Source: SITC5 Merchandise Trade data

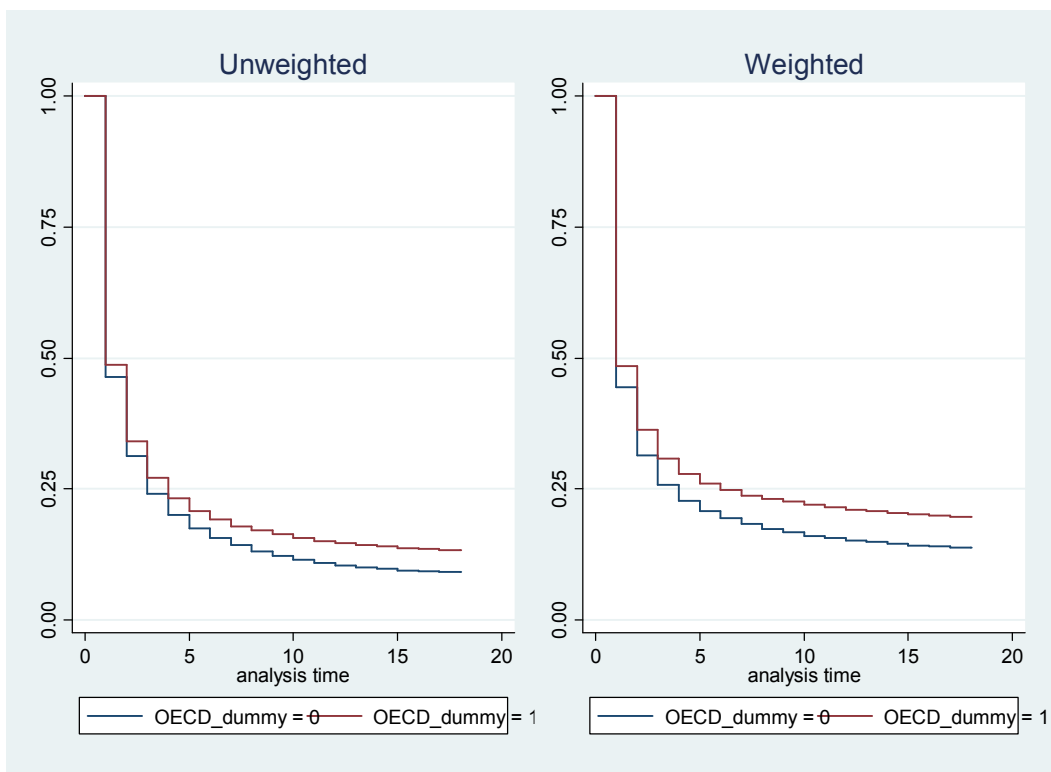


Figure 15: Survival Function for SITC 5-Digit Relationships, by Destination Income Level
 Source: SITC5 Merchandise Trade data

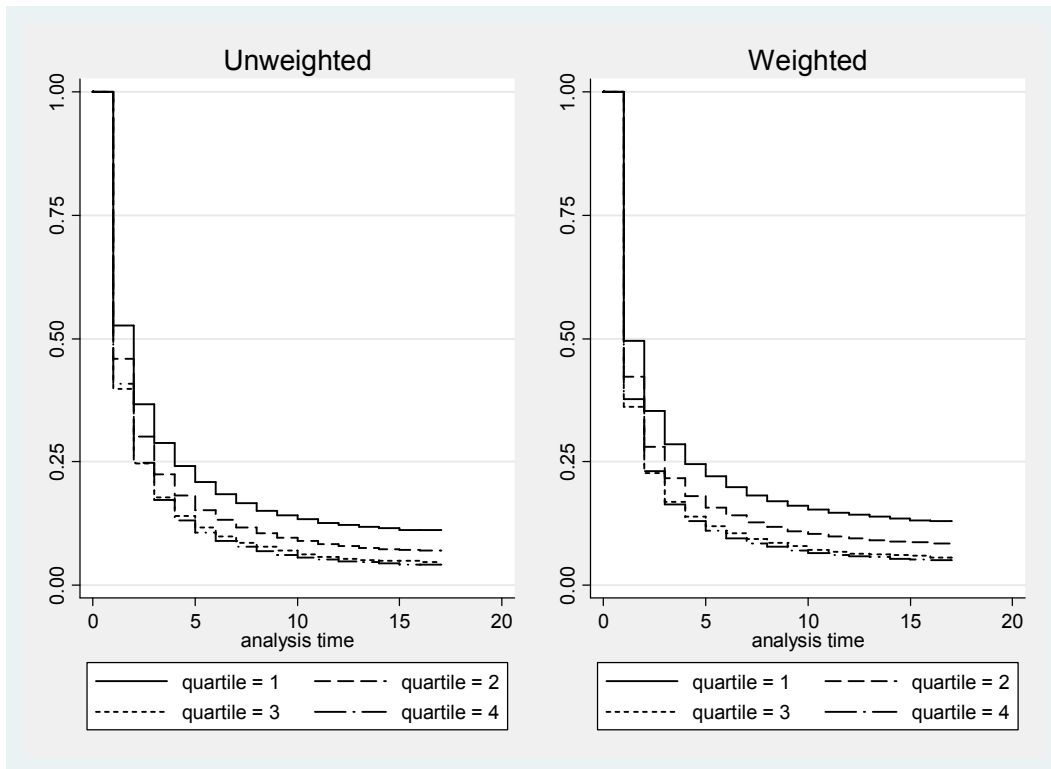


Figure 16: Survival Functions for SITC 5-Digit Relationships, by Export Value Quartiles
 Source: SITC5 Merchandise Trade data

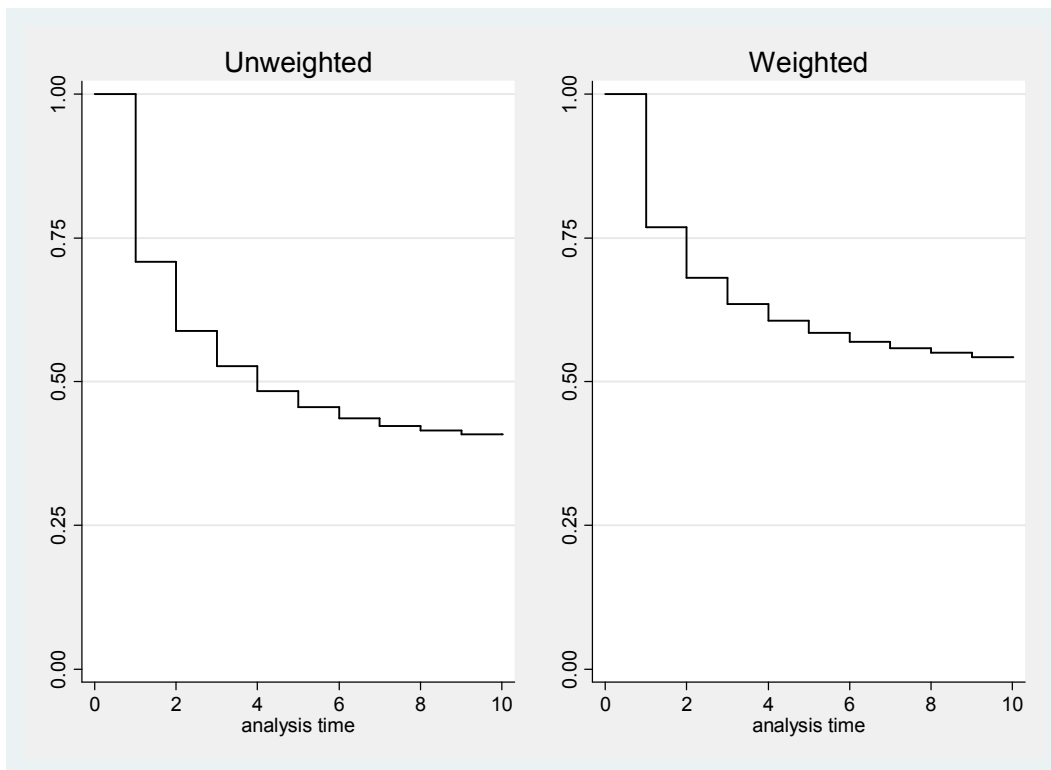


Figure 17: Survival Function for HS 10-Digit Products
 Source: HS10 Merchandise Trade data

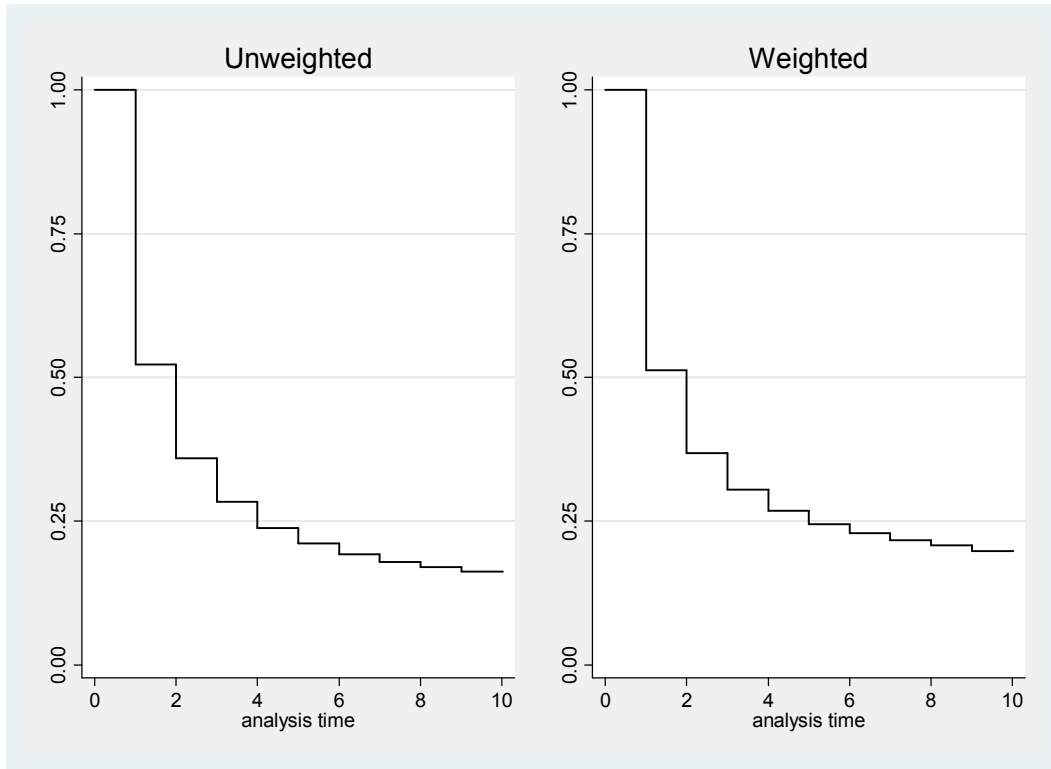


Figure 18: Survival Function for HS 10-Digit Relationships

Source: HS10 Merchandise Trade data

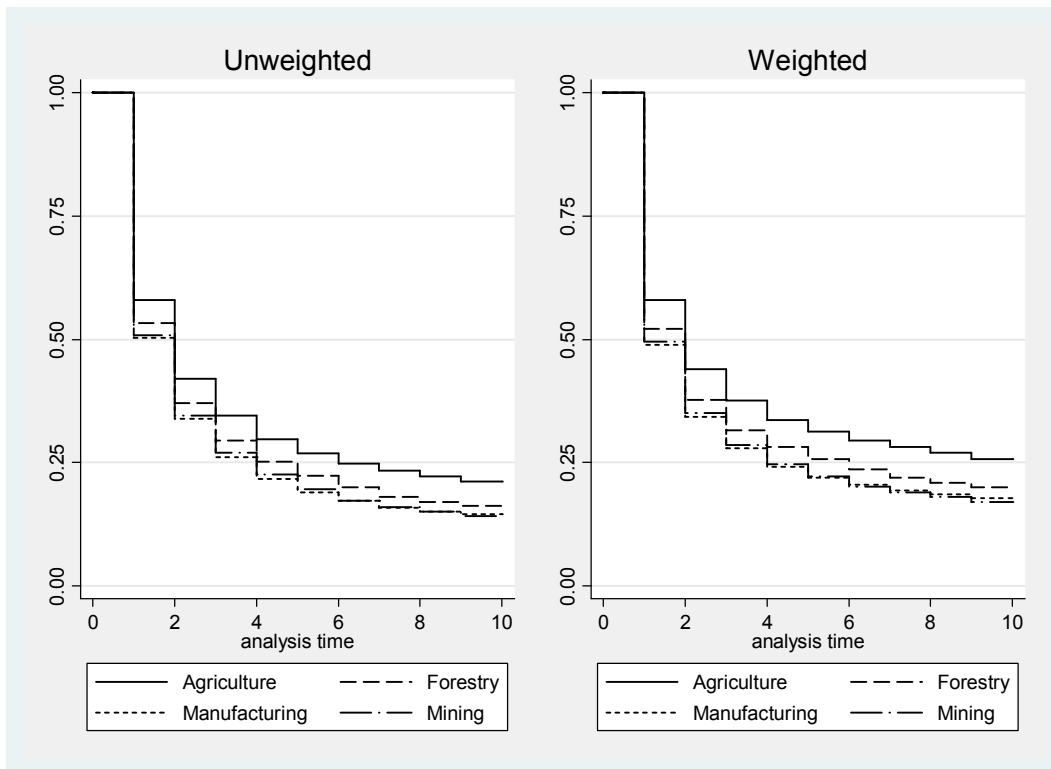


Figure 19: Survival Function for HS 10-Digit Relationships, by Broad Product Group

Source: HS10 Merchandise Trade data

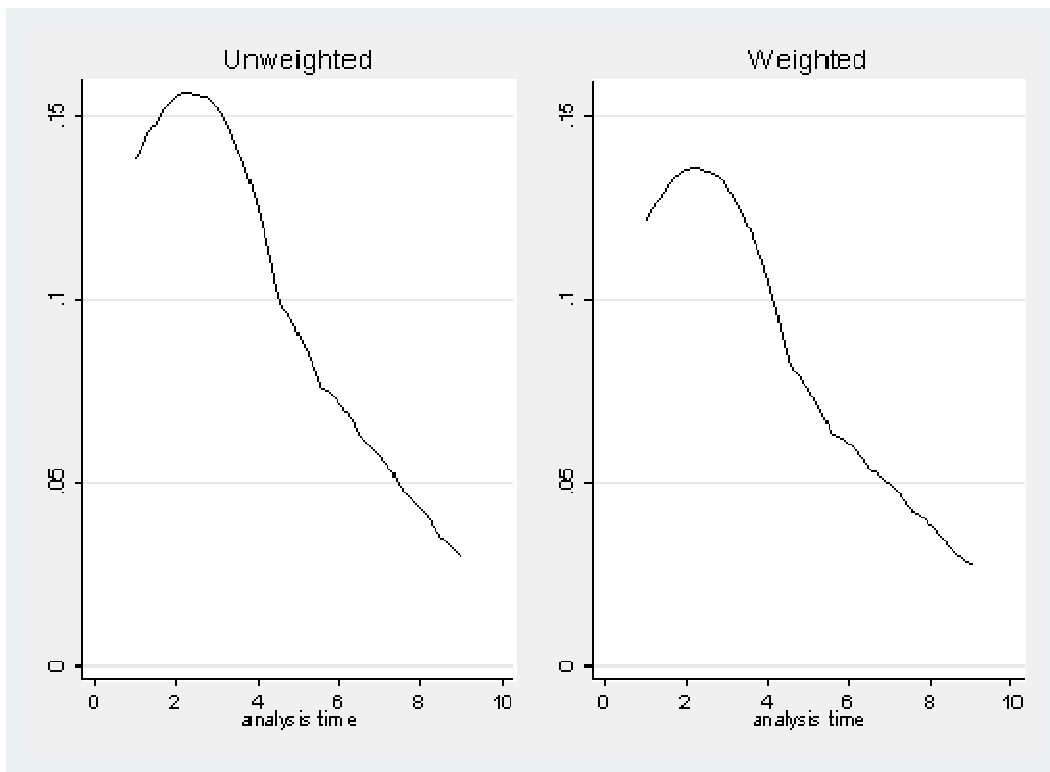


Figure 20: Smoothed Hazard Function for Firm Export Spells
 Source: LFPD

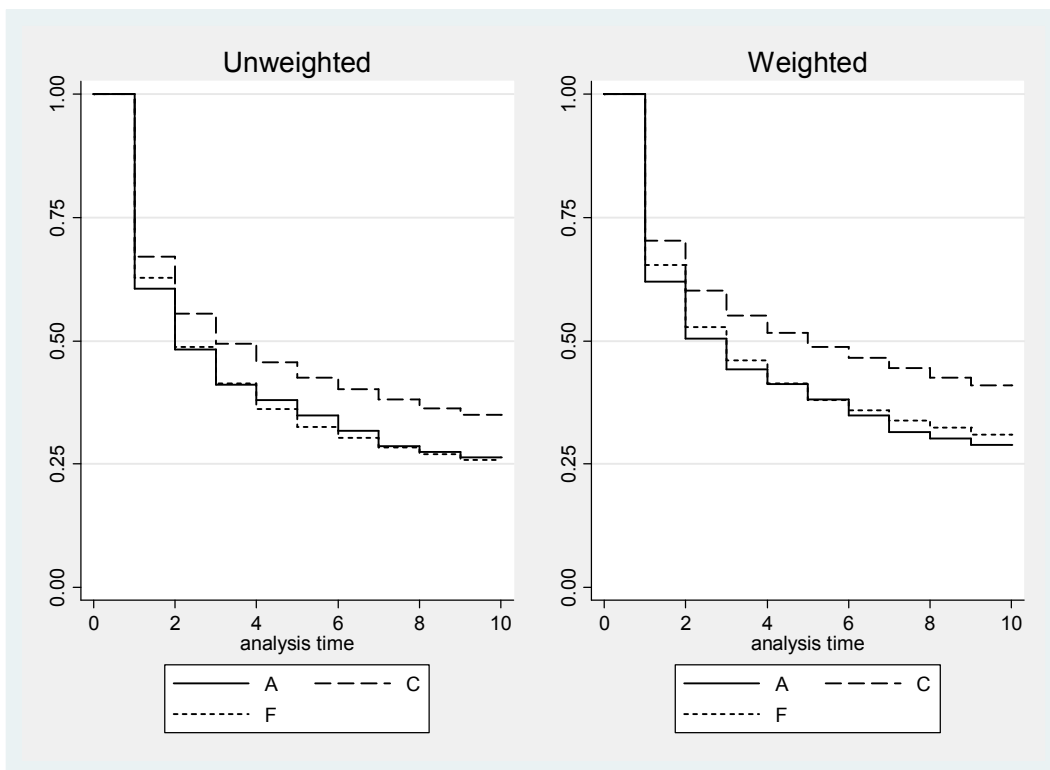


Figure 21: Survival Function for Firm Export Spells, by Modal Industry
 A = Agriculture, Forestry and Fishing C = Manufacturing F = Wholesale Trade
 Source: LFPD

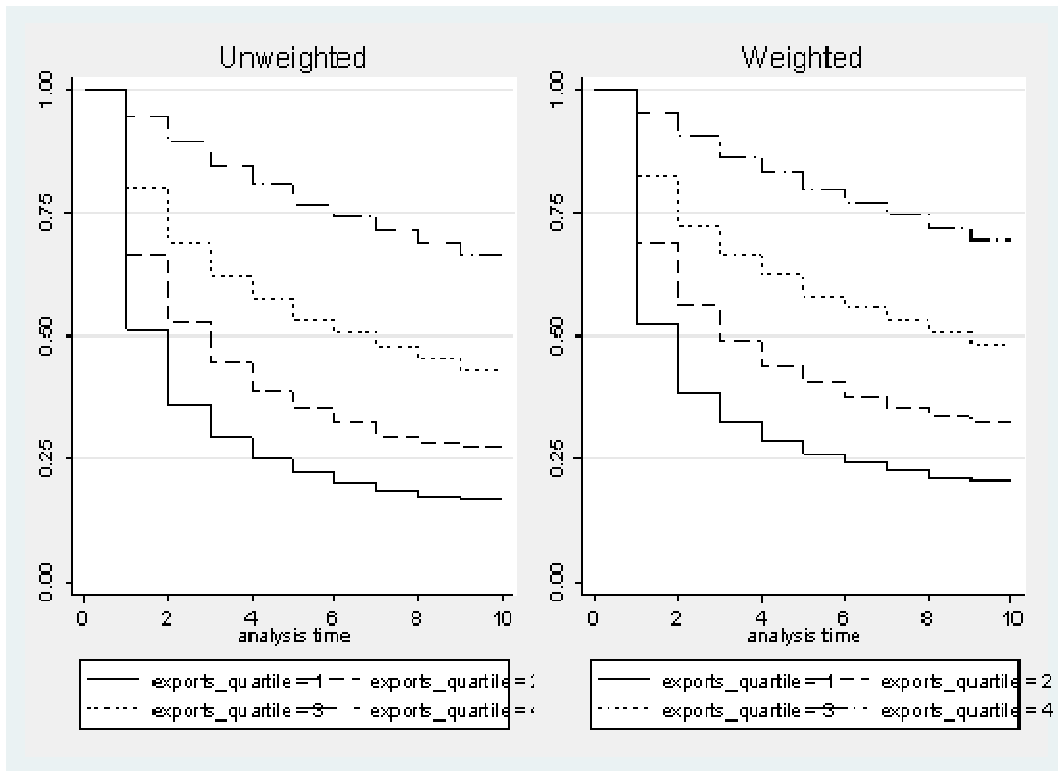


Figure 22: Survival Function for Firm Export Spells, by Export Value Quartiles
 Source: LFPD

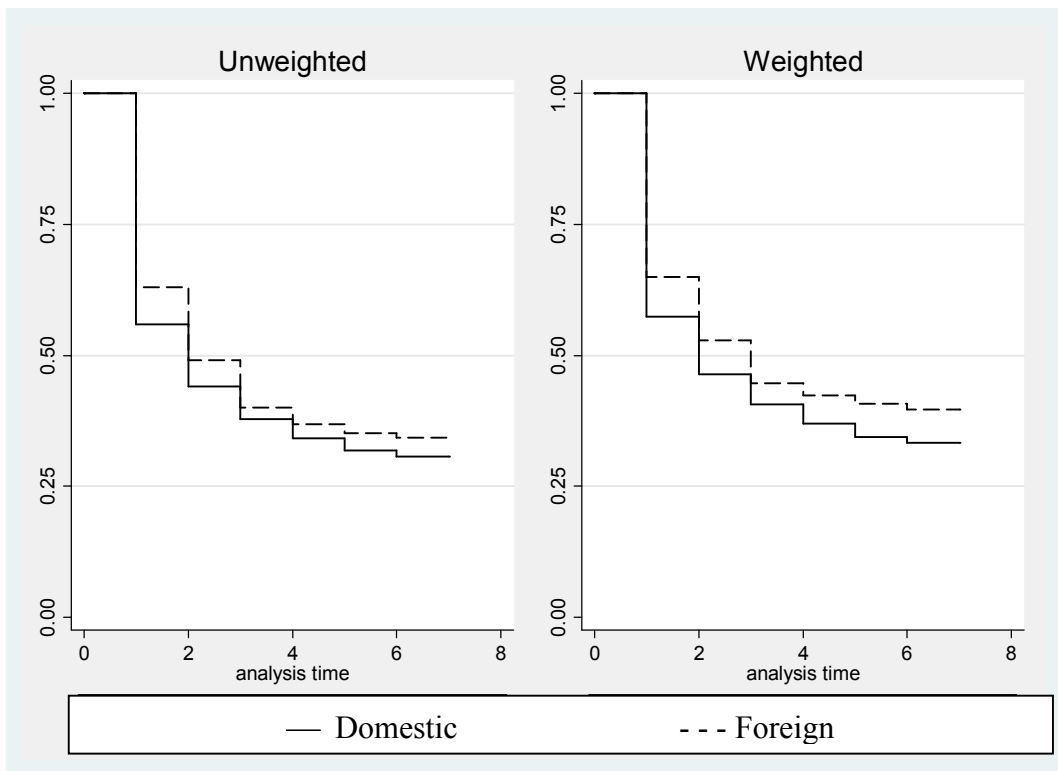


Figure 23: Survival Function for Company Export Spells (IR4 Filers), by Location of Ownership and Control
 Source: LFPD

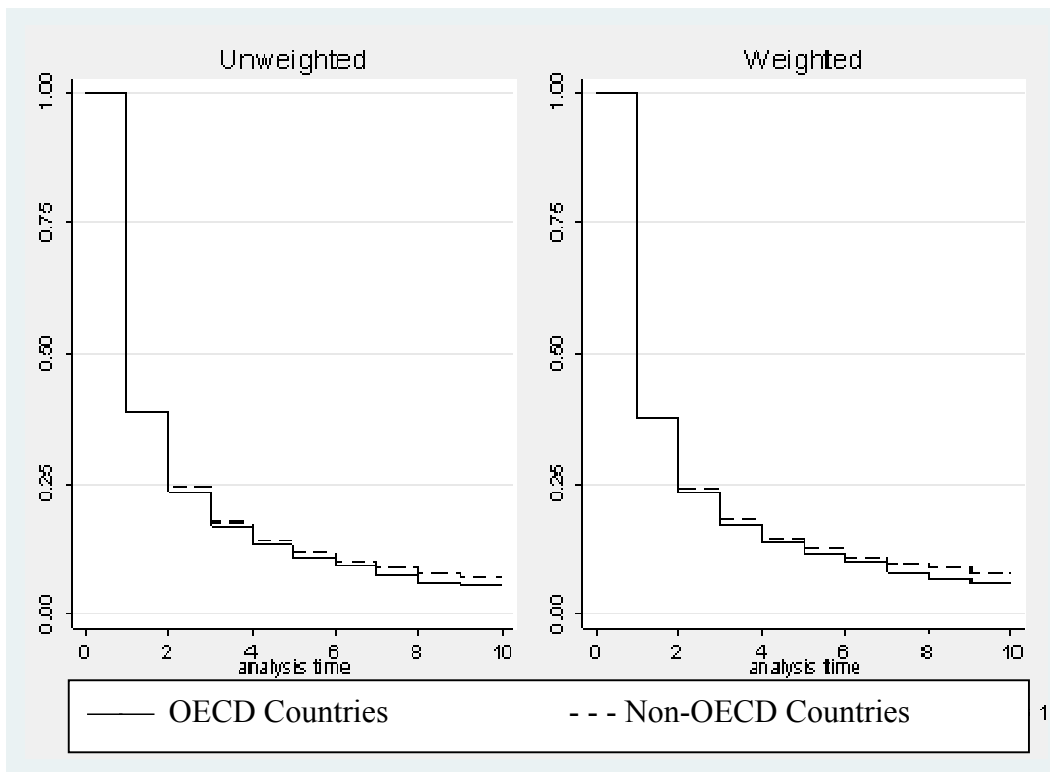


Figure 24: Survival Function for Firm Export Relationships, by Destination Income Level
 Source: LFPD

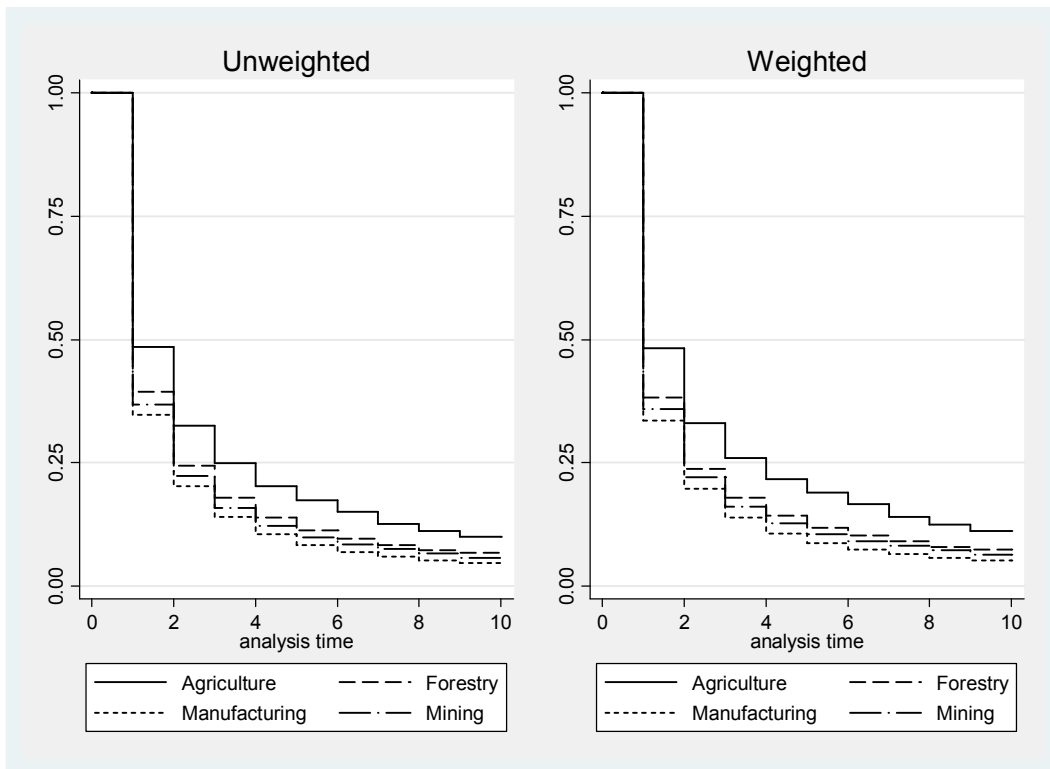


Figure 25: Survival Function for Firm Export Relationships, by Broad Product Group
 Source: LFPD

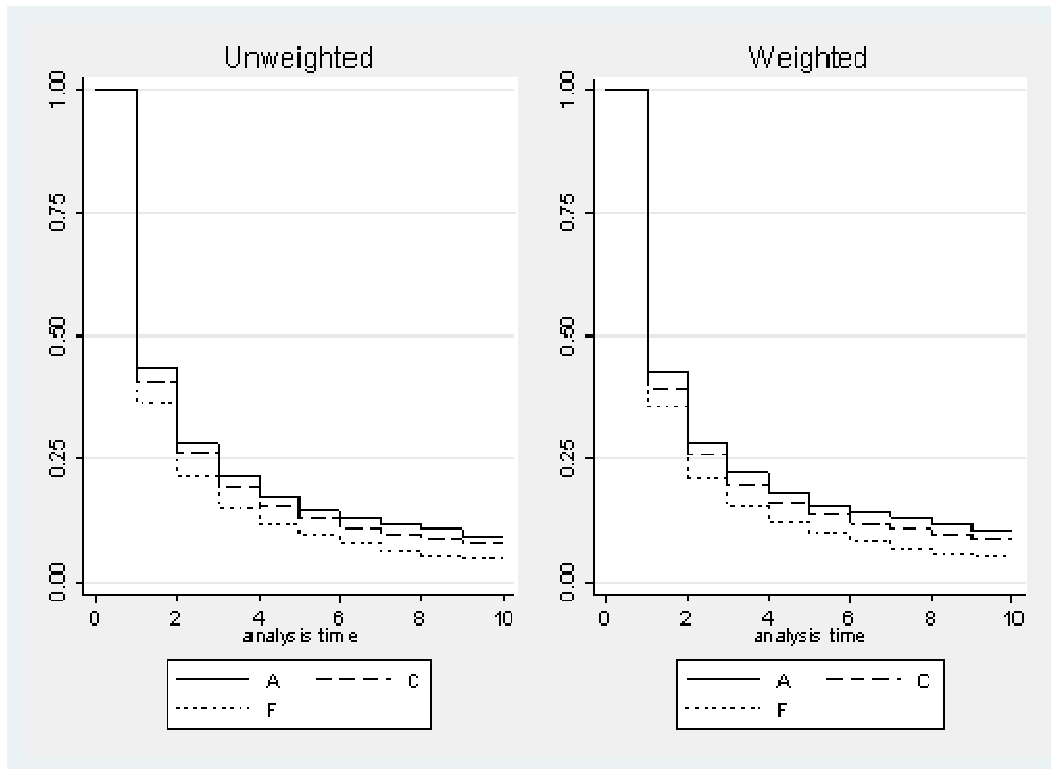


Figure 26: Survival Function for Firm Export Relationships, by Industry
 A = Agriculture, Forestry and Fishing C = Manufacturing F = Wholesale Trade
 Source: LFPD