Entrepreneurship and aggregate merchandise trade growth in New Zealand

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ABSTRACT
In this paper we present a descriptive analysis of firm-level merchandise trade, focussing on the role of entrepreneurial exporting behaviour. We document two aspects of the dynamics of trade – the contribution of novel export activity to aggregate trade growth and, conversely, the substantial exit rates of new trade relationships. The unique contribution of this paper lies in the detailed and comprehensive data we have available on market and product choices. Specifically, we make use of shipment-level goods trade data, linked to information for the universe of economically active New Zealand manufacturers, to examine trade at the firm-level and at the good-country-firm nexus. Our growth decomposition and survival analysis suggest several themes: (a) novel market entry is a significant contributor to aggregate export growth; (b) the study of international entrepreneurial behaviour should encompass not just de nova entrants, but the broad range of trade innovations initiated by incumbent exporters; (c) much expansion in trade appears to be incremental in nature; (d) despite this, such innovations appear to be inherently risky; and (e) experience and scale appear to be key factors in overcoming these risks (or at least proxies for such factors).

Keywords: Entrepreneurship; merchandise trade; export markets; product diversity

1 INTRODUCTION

Export performance is 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 the broader economy. 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. For the economy as a whole, exporting brings wealth into the country and provides jobs, raising overall living standards.

Improved aggregate export performance can come from a wide range of sources. Export value can increase with little change in the composition of products exported, firms involved or trading partners, through increasing volumes or unit prices of existing export products. Alternatively, export growth can involve significant innovation – entrepreneurs choosing to take the plunge into exporting for the first time, introducing new products, or targeting new markets. 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 shifting their focus away from some countries or products.

Innovative export expansion incurs a variety of fixed (sunk) costs, in the form of investments in market information and marketing, developing networks and distribution chains, etc. If these investments are specific to both the product and the country concerned, the costs may be incurred each time a new relationship is begun. However, past experience may reduce the marginal cost of each new entry, as firms are able to build on their existing knowledge and 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. Empirical studies of firm level export behaviour find significant persistence in export performance, implying that sunk costs are important and may hamper export market entry (Bernard and Jensen 2004; Roberts and Tybout 1997).

The purpose of this paper is to quantify the importance of entrepreneurial market entry, defined broadly as novel firm-level exporting behaviour. To that end we examine changes in New Zealand's merchandise exports over time, focusing on the dynamics of entrepreneurial entry both in terms of the contribution such activity adds to aggregate trade growth, and the attrition of firms from the point of their entry. Our analysis uses mandatory administrative Customs filings making this a uniquely detailed trade dataset, representing a near-complete picture of goods exporting by New Zealand manufacturers. In particular, we consider firm-level trade patterns by ten-digit product classification and by destination, giving us over 330,000 trade relationship entry events to explore.

Section 2 begins by discussing the nature of the data, as well as presenting a detailed description of the population of firms. Section 3 decomposes aggregate merchandise trade growth over the last decade, quantifying the important role entrepreneurial

(novel) behaviour plays. Section 4 presents the flipside of that story, focussing on the high exit rates experienced by firms that enter into trade relationships. The analysis points to the potential importance of scale and experience in separating successful (in the sense of survival) and unsuccessful forays into international markets. Section 5 concludes by reiterating the themes of the analysis.

2 DATA AND POPULATION STATISTICS

Our study relies on fine-grained, comprehensive merchandise trade data sourced from the New Zealand Customs Service and linked to Statistics New Zealand's (SNZ's) prototype Longitudinal Business Database (LBD), which includes a frame of all New Zealand businesses meeting minimal materiality requirements.[1] Unfortunately, similarly comprehensive data does not exist for service exporting firms and so they are excluded from this analysis. To narrow our population of firms to those that we could reasonably expect to be exporters of goods, we identify the subset of firms that have ever been manufacturers, defined as those firms in the LBD that are in the private-for-profit sector and that ever had an employing manufacturing plant between 2000 and 2006. After we make adjustments to the way the trade data has been linked to the LBD, we have a population of over 39,000 manufacturers (the details of the trade allocation process is outlined in the Appendix). In a typical year, these firms account for 79 percent of aggregate merchandise trade.[2] Around 25,000 firms employ in any one year, with 34 percent of firms employing in all seven years.

Customs data is available at daily shipment-level frequency and contains detailed information on the nature of the goods shipped, their final destination and the New Zealand dollar value of the trade. This data is extremely rich – we observe over 10,000 distinct goods and 200 destinations across two decades (1988 to 2008).[3] To compare trade across years, we deflate the free-on-board export value using SNZ's implicit price deflator for exports and then aggregate to each firm's financial year.[4]

However we only have LBD data for 2000-2006 and the quality of matches between Customs clients and firms falls prior to 1998. We consequently pick two annualised time periods for presenting results. The first period covers 2000-2006 (ie, seven years) during which we have detailed firm characteristics, including a consistent measure of employment.[5] For our aggregate trade decomposition we use a longer period of 1996-

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[1] Specifically, the threshold for mandatory Customs filing is NZ$1,000 and the primary threshold for appearing on SNZ's business frame is NZ$30,000 in annual taxable income.

[2] From 1998 onwards, over 99% of aggregate export value is matched to firms in the LBD. Trade not linked to manufacturers is primarily associated with independent wholesale and retail trade firms (Fabling and Sanderson 2008).

[3] Goods are classified to the 10-digit Harmonised System (HS10). The many revisions (mostly minor) to this system are accounted for by grouping together goods that ever share the same code. In effect this slightly reduces the resolution at which we observe goods, but has the advantage of consistently classifying goods over time – an important requirement for our subsequent analysis.

[4] We work in financial years since counts of working proprietors are captured on that basis (via tax records) ensuring we align labour inputs and exports to the same period. Inland Revenue Department rules mean that the great majority of manufacturers report to a 31st March year-end.

[5] Specifically, total employment is the sum of the monthly average employee count as at the 15th of each month plus an annual count of working proprietors. This data comes from the Linked Employer-Employee Database (LEED), which is based Pay-As-You-Earn employer and other tax records. Since non-compliance in this population is likely to be negligible, we assume firms and plants are non-employing if they are absent from the LEED data.

2006 (11 years) accepting that there is some underestimation of export value by firms (though not necessarily for the firms in our population) in the first two years of the sample.

Given the detail we have in the trade data we present analysis at two levels of observation: the firm and the "relationship". Relationships are defined at the good-country-firm nexus (eg, firm A exporting apples to Fiji) and, to our knowledge, this level of micro analysis constitutes a truly novel contribution to the literature. Employing the relationship-level analysis allows us to ask questions like: if I already export apples to Fiji, does that make me more likely to subsequently export other goods there or would I be more likely to take that existing product and ship it to another country?

Throughout the paper, statistics presented that require a measure of prior export experience exclude the period 1996-1999 so that all firms have at least four years during which prior trade activity could be observed. Excluding that four year period overcomes some of the left-censoring we might expect to encounter with long-lived firms. However, left-censoring of the trade data will inevitably cause some exporters to appear to be novel entrants when in fact they are not. As a consequence, we will tend to underestimate the distinction between incumbent firms and those doing new things. Insofar as hands-on experience, or the value of networks, "depreciates" with disuse, this may not be a material issue.

Another issue that may cloud the accurate identification of entrants relates to the way firm identifiers are maintained by SNZ. Essentially we have two measures of business continuity in the LBD – one based on firm identifiers (ENTs) and the other based on individual plant identifiers (PBNs). PBNs provide continuity through certain kinds of business events (such as changes of legal structure) that normally result in firm identifier changes. Being able to identify continuity of firm activity is an essential component of correctly establishing prior export experience. For an analysis of entrepreneurship, some of these breaks in firm identifier may be desirable since they could imply changes of ownership. However, we cannot distinguish desirable breaks in identifiers from undesirable ones. For robustness then, we test two extreme assumptions: either that all firm identifier changes imply real-world firm entry and exit; or that continuity of any manufacturing plant implies firm continuity even if the firm identifier has changed.[6] Except where discussed below in relation to our aggregate trade decomposition, these extreme assumptions make virtually no difference to our reported statistics on the entrant sub-population, giving us confidence that our findings are robust.[7]

Figure 1 shows the distribution of firm size (measured in total employment) for our population. Several points are worth highlighting. The vast majority of manufacturing

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[6] In fact, we could think of this sort of link as either implying firm continuity, or as simply recognising that knowledge of, eg, how to export could be maintained in continuing plants.

[7] It turns out that very few firms are affected by this issue – without using PBN links we have 2,736 firms that appear not to be exporting between 1996 and 1999, who are exporting over 2004-2006. When we allows for PBN links, this number drops to 2,583. To understand why relationship level statistics are not affected either, we need simply observe that the average duration of a firm identifier is much higher than the average duration of a relationship so that, at random, only a very small proportion of relationships would be "cut in two" by firm identifier breaks.

firms have less than $100(\approx e^{4.6})$ employment, the threshold at which SNZ normally defines firms as "large". While the population contain firms with over 1,000 employees, they constitute less than one percent of firm-year observations. There are very large spikes in the total employment distribution at one $(=e^0)$ and two $(\approx e^{0.7})$, primarily due to working proprietor-only firms.

Figure 1: Employment distribution of firms (2000-2006)
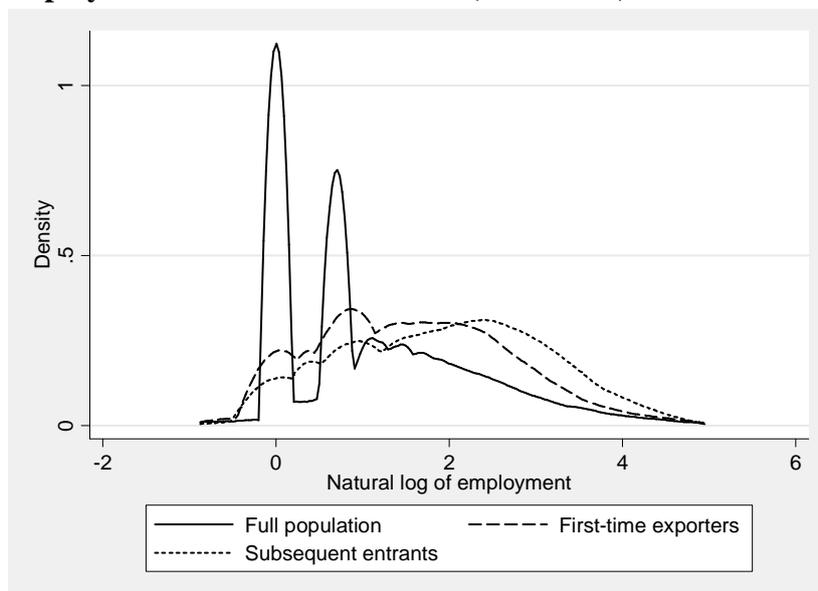
*Kernel density plot using Epanechnikov kernel function. Top and bottom 1% of distribution excluded to comply with SNZ confidentiality rules.

Figure 1 also shows size distributions for entering exporters based on whether they have exported previously. Perhaps not surprisingly, micro enterprises are less likely to enter into exporting as indicated by the rightward shift of the entrant size distributions (relative to the full population). First-time exporters tend to be larger than the average manufacturer, but are smaller than firms that have exported previously, stopped, and then entered again.[8] We return to this observation in Section 4 where we present our results on survival, experience and scale.

Table 1: Number of goods/countries/relationships in a year (2000-2006)

ALL FIRMS				
	Mean	**Median**	**N=1 (percent)**	**N≤10 (percent)**
Goods	9.9	3	27.3%	79.4%
Countries	4.3	2	43.0%	90.8%
Relationships	18.6	4	23.9%	71.4%
In first year of exporting				
	Mean	**Median**	**N=1 (percent)**	**N≤10 (percent)**
Goods	2.3	1	60.8%	97.6%
Countries	1.4	1	80.0%	99.4%
Relationships	2.7	1	57.4%	96.6%

Our final set of summary statistics examines the diversity of export portfolios. There is a wide dispersion in the number of countries that firms export to and the number of products that they export (Table 1). Across the seven year period 2000-2006, the

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[8] We reiterate, this distribution is visually identical if we include PBN links.

median firm exported to two countries, and three products, but these distributions have very fat tails. For example, the mean firm exported close to ten distinct goods, and 20 percent of firms have export portfolios with more than ten goods in them.

In contrast, first time exporters are far more homogeneous, and far less ambitious, in their breadth of export activity. By far the predominant first-step is to begin exporting one good to one country. In particular the choice to only enter one country in the first year of exporting is made by four fifths of all entrants. Where these entrepreneurs do manage multiple trade relationships, they have a clear preference for trading multiple goods to a single country over "simultaneously" entering multiple countries. The questions we ask in the following sections are: how much does entry contribute to aggregate trade growth; and how sustainable are these market relationships?

3 DECOMPOSITION OF AGGREGATE TRADE GROWTH

In this section we decompose aggregate trade growth to isolate those components we feel can comfortably be attributed to entrepreneurial activity. In real terms, New Zealand's aggregate merchandise export value grew steadily between 1996 and 2006 (figure 2). On average, the annual level of trade between 2004 and 2006 is $7.6 billion higher than it was between 1996 and 1998 – a substantial improvement on the initial level. At the same time, we observe a large number of firms entering exporting, with the proportion of employing manufacturers that export rising steadily from 12 to 14 percent.

Figure 2: Aggregate real trade derived from the manufacturing population and the proportion of firms exporting
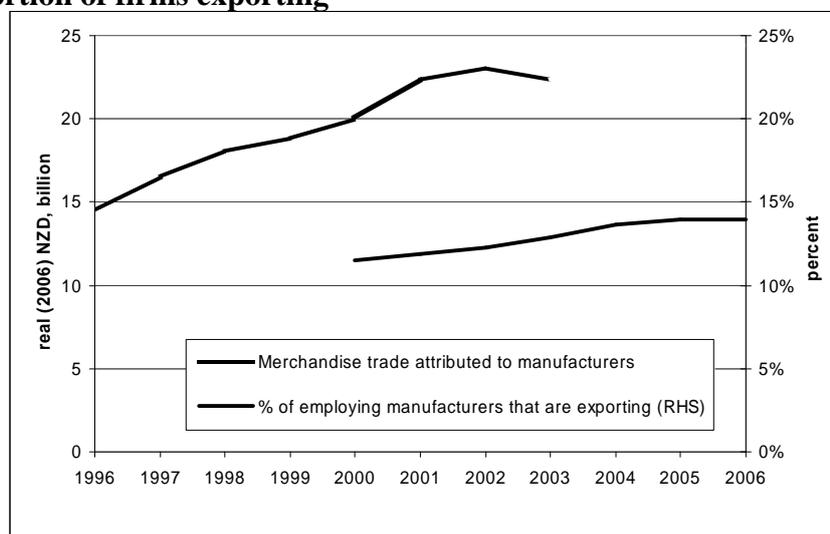
In a purely numerical decomposition, changes in the value of exports over time can come from a number of sources. It may be that aggregate export growth occurs through larger volumes or through increases in the unit value of goods sold offshore. Alternatively, growth in exports may be driven by the introduction of novel products, the establishment of new markets, or the entry of new firms. Finally, some export value will be lost due to existing export relationships coming to an end and, in the extreme, exporting firms going under. The definitional question we face is: how much of this growth should be labelled entrepreneurial? We choose a broad classification of

entrepreneurial trade, encompassing all new-to-the-firm trade relationships, but further decompose these relationships according to the degree of novelty involved.

Some of what we identify as novel may, in fact, represent a very small extension of capability to the firm involved, perhaps implying overestimation of the entrepreneurial component. On the flip side, our data does not allow us to consider other elements in existing trade relationships that could well be considered highly entrepreneurial. For example innovations that raise the market price or demand for the firms' products such as tailoring marketing strategies to international consumer tastes, or product innovations in areas such as quality or design that do not result in product reclassification. Providing a comprehensive picture of certain aspects of entrepreneurial export activity has come at the expense of the detailed, though less representative, nuance that could be achieved from a sample survey of entrepreneurs regarding their broader innovation activities (as in, eg, Fabling 2007).

Figure 3: Decomposition of aggregate annual trade growth (between the periods 1996-1999 and 2004-2006) based on initial trade relationships
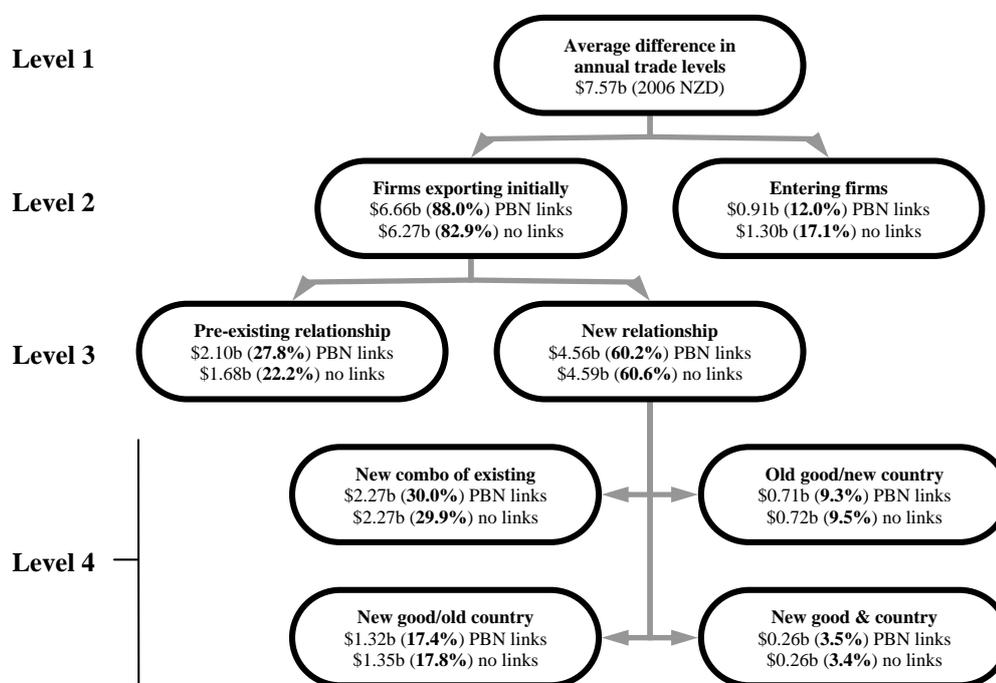
Figure 3 presents a decomposition of export growth at both the firm- and relationship-level. The first level of the diagram reiterates the value we are decomposing – the average difference in the annual level of trade between the two periods 1996-1998 and 2004-2006. Level 2 of the figure shows a firm-level decomposition, while subsequent levels are broken down by relationship characteristics. At each level of the diagram, we report the net dollar contribution and the share of that contribution to the total $7.57b in trade growth.[9] Thus, at each level, percentages and dollar values sum (allowing for rounding) to the numbers at the next level up. As noted earlier, without controlling for PBN links, some entry events may be spurious, in the sense that they may reflect simple changes in legal status that have little to do with the management

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[9] These figures are net in the sense that the contribution of firms that are exporting in both periods is net of the losses in trade arising from firms that were initially exporting subsequently exiting from exporting.

or ownership of the firm. For this reason we report results with and without these historical links.

Applying those two approaches, we estimate that firms that become exporters over the period contribute between 12 and 17 percent of the aggregate increase in trade (level 2 of Figure 3). Given the assumptions of the calculation, these numbers probably represent reasonable bounds to the true value added by entering exporters. Even at the lower bound, de nova exporters make a substantial ($0.9billion) contribution to the growth in trade, though obviously a far smaller share of overall later period trade (~$24billion).

As might be expected, most of the change in aggregate trade comes from incumbent exporters (ie, those firms that were exporting in both time periods), accounting for between 83 and 88 percent of trade growth.[10] This does not mean that these firms are all about "business as usual". Quite the contrary – only a third of that trade growth is associated with increased export income derived from pre-existing market relationships.

Looking at the third level of Figure 3, we see that new relationships started by incumbent exporters account for fully three fifths of trade growth.[11] In turn, half of that value comes from "new combinations of existing" trade relationships (level 4) – the export of products from the existing product range to countries that the firm already had a trade relationship with.[12] Depending on the similarities of the markets and goods, this sort of trade diversification may incur relatively low establishment costs – with firms simply make use of existing networks and capabilities in new ways.

The other three categories at level 4 of the figure perhaps represent more novel kinds of entry: adding a new product to the export range; entering a new market; or both. In line with the results of the previous section, the largest share of these innovations (17-18 percent of the aggregate) comes from extending the product range exported to countries with which the firm already has an established trade history. Thus, while trade growth is largely built on entrepreneurship, much of this effort appears to be incremental in nature. Outside of de nova entrants, most export growth is built on some prior understanding of products or markets and established networks. These statistics provide empirical support to models of entry that have fixed (potentially, sunk) costs that can be reduced by relevant in-market experience of the entrepreneur and their staff. As we will see in the next section, export entry appears to be a risky

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[10] Of course, at some point in time every firm has been an entering exporter. This decomposition, in essence, limits our definition of entrant (entrepreneur) to events that are new to the last eight years (1999-2006) and have been sustained into the second observation period (2004-2006). Such an approach, which naturally focuses on the early life of most firms in the population, is a common feature of the emerging "international new ventures" literature (Acs, Dana and Jones 2003).

[11] It is worth noting that this aggregate calculation supports the idea that PBN links should be used for this sort of analysis. To see this, consider the random linking of two firms (ie, not based on a real world change in ownership of a manufacturing plant). In such a case, with 10,000 goods and 200 countries, the chance that the two firms share the same product-country mix is miniscule. Thus, if the PBN links did not pick up true firm (or at least plant) continuity we would expect to see most of the $0.39billion in trade that is reallocated from entering firms to incumbents to be classified as new relationships. This does not happen – the share of aggregate trade growth in new relationships is almost unchanged.

[12] Consider a hypothetical firm which was exporting apples to Fiji and pears to Australia between 1996 and 1998. A "new combination of existing" trade would be the export of pears to Fiji in 2006.

exercise. In such an environment and in the presence of sunk costs, an incremental approach to expansion may well represent an optimal growth strategy.

4 EXPERIENCE, SCALE AND THE PROBABILITY OF SURVIVAL

Sunk costs of entry are likely to differ across industries, products and destinations. For example, they 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. However, for other firms and industries, the costs of export market entry may be high and incurred each time the firm enters therefore shifting preferences towards more consistent market presence, or discouraging initial entry entirely.

The questions of the size of sunk costs, and whether the investment is lost when the trade relationship is temporarily suspended, are not immaterial in the New Zealand context. 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.[13] Intermittent exporting may also translate, 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 that do enter.

This section considers the longevity of trade relationships by analysing the duration of trading spells, with a spell being defined as a continuous period of exports over one or more years. We examine spells at the firm- and relationship-level, breaking down differences in duration according to the scale of the trade and prior experience. The results are purely descriptive, but uncover a number of areas for further investigation.

To our knowledge, the only published studies of the duration of trade relationships are by Besedeš and Prusa (2006a,b) at the good-country level for the United States (ie, not at the firm-level).[14] Besedeš and Prusa (2006a) show that spells of trade are very unstable even at this aggregate level. However, spells that survive the first few years have a very low probability of failure and tend to survive for a long time.[15]

We observe similar patterns in New Zealand at our more detailed level of analysis. Of the 331,935 relationships that start between 1997 and 2006,[16] 79 percent are also observed to cease (defined as stopping for at least a complete year). The mean trade relationship lasts 1.49 year, while the median is only one years, noting that this latter

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[13] This argument has been posited on largely theoretical grounds (eg, Simmons 2002; Skilling and Boven 2006), implied from estimated parameters in gravity models of trade (eg, Feenstra, Markusen and Rose 2001), and reported directly by incumbent and potential exporters (eg, Shaw and Darroch 2004).

[14] Besedeš and Prusa use the 7-digit Tariff Schedule to define distinct goods.

[15] Besedeš and Prusa (2006b) go on to show that there are significant differences in the average duration of aggregate spells depending on the level of product differentiation.

[16] Our primary analysis of trade spells makes use of survival analysis techniques, which econometrically estimate the probability of a trade lasting *x* years. This technique accounts for right-censoring (ie, when we don't observe the exit in the trade relationship), but cannot handle left-censoring (ie, where we do not know the first year of trade). Consequently, this section covers export entry from 1997 onwards, only using 1996 data to separate entrants from incumbents.

figure is our unit of observation. Thus the dominant market model could be characterised as opportunistic, and/or involving substantial experimentation and failure with aspirations towards long-term trade partnerships.

Figure 4 shows the estimated Kaplan-Meier survival function (including 95 percent confidence intervals) for entering exporters, and for starting trade relationships.[17] These graphs show the probability of a new trade lasting for the relevant number of years. Consistent with the low median trade relationship duration, both profiles reflect high failure rates in the first year, with only 36 percent of relationships lasting more than one year. At the firm level, roughly 60 percent of firms are still trading after one year. The marginal probability of exit also declines rapidly in both cases across the first four years of a spell. Nevertheless, at the relationship-level, only around 6 percent of relationships will survive ten years. At the firm-level a quarter of firms are estimated to still be exporting ten years after they enter, implying that many firms stay in exports over the longer term by shifting either the goods they sell abroad or the markets that they engage in.

Figure 4: Aggregate survival functions

Firms   *Relationships*
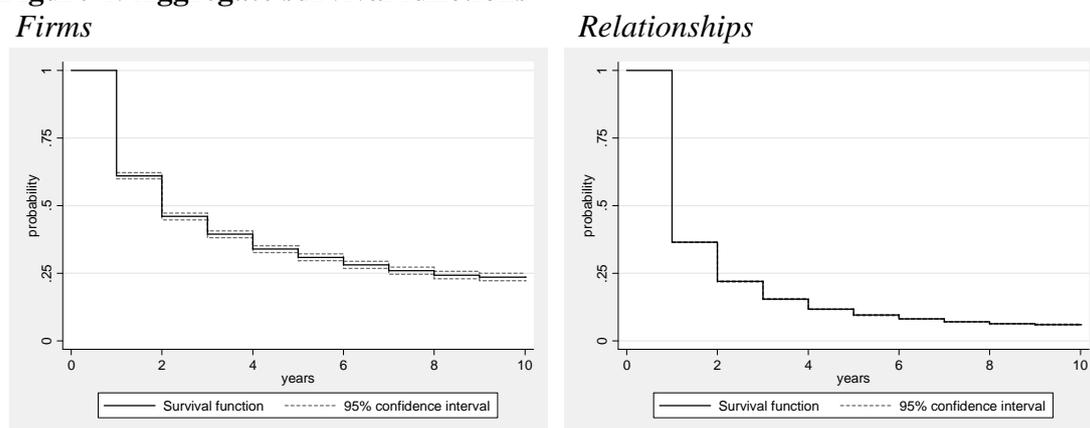
These initial survival functions present an average across firms and relationships, but we know from the previous section that incumbent exporters make a substantial contribution to trade growth. To achieve this, some proportion of their effort must be sustainable over long periods of time. We now break our survival analysis down by two properties that are more likely to be associated with incumbents: scale and experience.[18]

Figure 5 shows the survival functions for firms and relationships broken down into quartiles of the value of trade in the year of entry. Clearly, the very largest entry events at both firm- and relationship-level have a tendency to survive much longer than the smallest trade. At the firm-level, large scale entrants are highly likely to

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[17] Fabling and Sanderson (2008) estimated similar functions on a weighted basis, accounting for the fact that firms may enter more than once during the observation period and that these observations are not independent. Those results were very similar to their unweighted results, so we choose to report only unweighted results in this paper.

[18] There are clearly a number of additional factors that could be put forward to explain why some trading relationships last longer than others – for example, product-specific characteristics (eg, some products such as butter may inherently experience more continuous demand). Given the breadth of potential factors, the difficulty in accurately classifying each relationship to different classes, and the need for brevity, we have restricted ourselves to two.

continue trading into the second year. Over the longer term these firms are almost three times as likely as the smallest group of entrants to still be trading. There is a clear (and statistically significant) ranking across all four size quartiles at the firm-level and a significant distinction in the top quartile at the relationship-level.[19] While the associative relationship is clear, causal interpretation would require more analysis.

Figure 5: Survival functions by trade quartile

Firms   *Relationships*
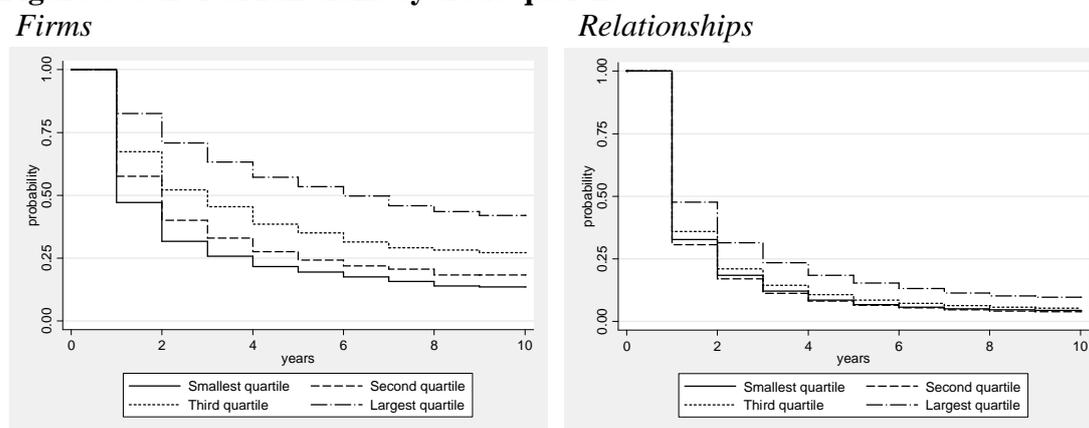
Finally, we break the survival analysis down by prior experience. At the firm-level, the definition of experience is trivial – have you exported before? At the relationship-level, we follow the decomposition of Section 3 and break experience down into five non-intersecting groups: no prior experience; indirect experience (ie, having exported before but not that good or to that country); prior country but not good experience; prior good but not country experience; or having a prior identical (repeat) relationship.

Table 2: Share of starting relationships by prior experience

|	UNWEIGHTED	WEIGHTED BY FIRST YEAR VALUE
No export experience	3.9%	5.6%
Indirect experience	5.3%	3.0%
Country but not good experience	36.8%	20.0%
Good but not country experience	7.3%	8.8%
Repeat relationship	46.7%	62.6%

Table 2 sets out the share of starting relationships that fall into each of these categories. Consistent with the last section, we see that most new relationships are initiated with countries with which the firm has previous trade experience. Perhaps surprisingly, most of these relationships are repeats – the same good sent to the same country with a break of over a year between trades. These trades account for 63 percent of the total value of new relationships (in the year of entry). First-time exporters constitute a mere 4 percent of starting relationships and less than 6 percent of value on entry.

Figure 6 shows survival functions broken down by export experience. Focussing first on the firm side, it is apparent that subsequent entry is (significantly) more successful

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[19] Figures 5 and 6 do not show 95 percent confidence intervals for legibility. These bands are similarly in width to Figure 4.

in survival terms than first-time entry. As we saw in Figure 1, repeat entrants tend to be larger, suggesting that scale and experience may be capturing the same phenomenon.[20] However, a fitted Cox proportional hazard model that includes scale and experience suggests both variables are important.[21] The question we really face is – what sort of learning is going on during that first export experience? Two candidates stand out: learning to do better next time, and learning not to have a next time. Both options would imply an upward shift in the survival curve – the latter from selection of poor traders out of the populations (a true Schumpeterian world).

Figure 6: Survival functions by export experience

Firms   *Relationships*
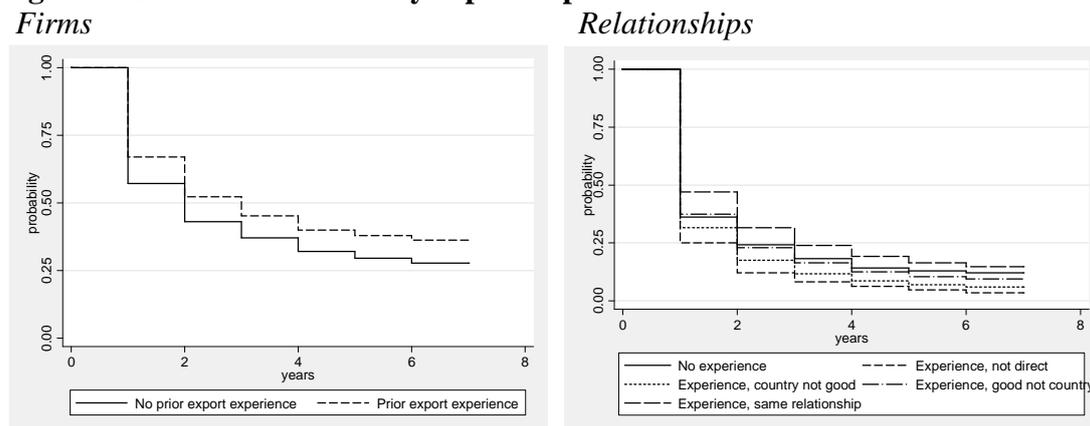
At the relationship level, the picture is more complicated. Only in the case where the firm has previously had the same relationship does the probability of survival exceed that of firms with no prior export experience. Bearing in mind that this type of entry is associated with nearly half of all starting relationships and over 60 percent of the value in starting relationships (Table 2), the right- and left-hand panels of Figure 6 tell a somewhat consistent story. The fact that repeat relationships also tend to be longer second time around is supportive of a model based on learning and improvement, rather than opportunism. If firms merely responded to random demand for their goods we would not expect survival outcomes to improve over time. Even if these entrepreneurs are initially drawn into exporting by chance, their subsequent re-entry into the same market with better outcomes suggest a more deliberate approach.

Outside of repeat relationships, prior export experience appears to leave firms with shorter future trading durations than de nova entrants. We posit two explanations – noting again that more sophisticated analysis is needed to distinguish the relative importance of these (or other) mechanisms. Firstly, a class of opportunistic entrepreneurs may exist that happily undertake short-term trade relationships with no future expectations. Such firms could have export experience, but the "passive" nature of the activity could well lead to the relationship being novel each time. Alternatively, firms that have already entered exporting may have lower costs of entry and may, therefore, have less at risk when they attempt to expand their export base. That is they may try new things with the expectation that the trade may well cease. Again, these firms would tolerate short-term trade relationships knowing that they will gain

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[20] For example, Fabling and Grimes (2008) demonstrate how size proxies for experience in analyses of foreign currency hedging behaviour.

[21] Results not reported. This robustness check does not preclude the possibility that the size and/or experience variable proxies for other factors, in particular the relative performance of the firm.

valuable information about whether the market is right for them, and that the next time they enter the outcome is likely to be more favourable.

5 CONCLUSIONS

In this paper we have presented a range of statistics regarding the international entrepreneurial activity of New Zealand manufacturers. Over time there has been significant growth in the share of employing firms with exports, and a steady increase in the real value of merchandise trade. Much of that trade growth comes from the decision to innovate, either by becoming an exporter for the first time or by expanding into trade relationships associated with varying degrees of novelty.

A large proportion of the expansion in incumbent firms comes from introducing new goods to current trade partners, presumably leveraging off existing market knowledge and networks. Thus we characterise a large proportion of this novel behaviour as incremental in nature. The existence of sunk costs for export market entry would tend to imply that firms have a strong incentive to maintain their export relationships once they have incurred these costs. In a high risk environment, a strategy of expansion based on existing capabilities might be optimal – in the sense that sunk costs are either lower (placing less at risk) or the probability of failure itself is lower because, eg, of the value of in-market knowledge.

Despite this incremental approach, we find that almost four out of five new trade relationships are destined to end in their first year. The level of intermittent exporting raises questions about whether these entrepreneurs are successfully taking advantage of specific market opportunities (such as a low exchange rate or a fortuitous offshore order) or whether they have made concerted efforts to enter export markets but have encountered barriers and been unsuccessful. When we consider the relationship between prior experience and survival, we find support for learning effects in that repeat relationships and re-entering firms are significantly more likely to have longer trade spells than first time entrants.

However, without more sophisticated analysis we cannot rule out opportunistic behaviour as an explanation for some of the patterns in the data. Such future analysis would benefit from the collection of qualitative data on the ex-ante motives of the entrepreneurs involved, and the strategies underlying further expansion. In the current data, an avenue for understanding causal relationships might include exploiting exogenous shocks, such as favourable exchange rate movements, to understand causal behaviour.

From a policy perspective, better understanding of the learning dimension would also be valuable, since value-for-money from government assistance depends critically on whether firms become self-sustaining when helped to enter markets. Demonstrating that initial assistance into exporting can leverage future entry would add significant weight to the benefits that accrue to the firm supported. The identification of learning effects across, rather than within, firms (say, through tacit information transmitted by business networks, or by staff movement) would imply higher social returns to government investment.

Finally, planned incremental expansion suggests the possibility of there being common "development paths". Future work could examine whether, for example, Australia (New Zealand's largest trade partner) acts as a stepping stone for some firms, or whether firms that enter certain regional markets (eg, Asia or the Pacific Islands) tend to stay within those markets.

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APPENDIX – ALLOCATING TRADE DATA TO MANUFACTURERS

Trade data is linked to the LBD via probabilistic matching on business names and addresses. Within firm group structures (ie, independent firms with parent-subsidiary ownership relationships), this method of linking potentially causes problems since these firms can have similar names and/or addresses.[22] From an economic perspective, enterprise groups could also be organised in a vertically-integrated manner so that trade is actually conducted by wholesale or retail units further up the production chain. In both cases, we wish to identify exports with the manufacturing unit that produced the goods being traded.

These potential issues are further complicated by group restructurings, which can lead to an undesirable "shuffling" of the trade data between group members as reporting lines, Customs details, and/or enterprise identifiers change. Left unaddressed, this issue can result in a substantial proportion of aggregate goods trade allocated to sectors for which no such large-scale trade should exist (primarily in business and financial services), and will overplay the role of entering firms in trade growth (see Fabling and Sanderson 2008).

To allocate trade back to the production unit we take the following steps. First, we use the parent-subsidiary relationships present in the LBD to group together all economically active firms that are linked in a year.[23] We then check for whether there is a manufacturer in the group in that year and if there is merchandise trade allocated to a non-manufacturer within that group. If either condition fails to hold then we have no problem as we can credibly assume that any trade has been correctly linked. This leaves us with enterprise groups that have non-manufacturers appearing to be goods exporters and (potentially multiple) manufacturers to allocate trade to. If there is a single manufacturing firm in the group then we allocate all trade to that manufacturer in that year. If we have multiple candidate manufacturers then we choose to first allocate trade to firms that can be clearly identified as traders (because other Customs data is already allocated to them, or because their Goods and Service Tax filing indicates they are an exporter). If there are still multiple candidates then we cannot determine which unit produces the exported good, so we merge those manufacturers together, treating them as a single unit across all time, and then allocate the trade to that merged unit.

Remaining high value apparent entrants are manually checked to ensure they should not be part of broader group structures and a small number of additional parent-subsidiary relationships are added (typically because an existing group link is only present in a subset of the years in which the firm is observed in the Customs data).

The entire process results in a mere 0.5 percent of firm-year observations being "merged manufacturers". In contrast 67 percent of aggregate trade is in merged manufacturers and 29 percent of trade has been reallocated from non-manufacturers to manufacturers. From manual investigation of the data it is clear that these numbers primarily reflect the vertically-integrated organisation of large New Zealand trading conglomerates.

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[22] Tests by SNZ suggest that the probabilistic matching has a tolerable level of false matches.

[23] To be "economically active" a firm must be observed in our broad-ranging administrative data as either: selling products, purchasing intermediate inputs, employing staff or working proprietors, holding physical capital, or trading (exporting or importing) goods.