EXPORT MARKET CHOICE FOR NEW ZEALAND FIRMS

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ABSTRACT

In this paper we examine product and market choices of New Zealand exporters, using an enterprise level dataset which links firm performance measures with detailed data on merchandise trade. We focus our enquiry not on the broad question of what determines a firm's ability to export, but on the subsequent question: given that a firm has the ability to export, what determines the choices they make about what to export and where to?

We simultaneously consider firm-, market- and product-level determinants of export market entry. Focusing on a sample of firms with observed exports, we control for standard characteristics such as industry and past performance, as well as more novel measures such as general and specific prior export and import market experience and assistance from central government. The market determinants we consider include the macroeconomic performance of destination countries, exchange rate movements and demonstration effects from the export behaviour of other firms.

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Disclaimer

This research was undertaken while Richard Fabling and Lynda Sanderson were on secondment to Statistics New Zealand. The opinions, findings, recommendations and conclusions expressed in this report are those of the authors. Statistics NZ, the Reserve Bank of New Zealand, Motu and the University of Waikato take no responsibility for any omissions or errors in the information contained here.

Access to the data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular, business or organization. The results in this paper have been confidentialised to protect individual businesses from identification.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information is published or disclosed in any other form, or provided back to Inland Revenue for administrative or regulatory purposes. Any person who had access to the unit-record data has certified that they have been shown, have read and have understood section 81 of the Tax Administration Act 1994, which relates to privacy and confidentiality. Any discussion of data limitations or weaknesses is not related to the data's ability to support Inland Revenue's core operational requirements.

Statistics NZ protocols were applied to the data sourced from the New Zealand Customs Service; the Foundation for Research, Science and Technology; New Zealand Trade and Enterprise; and Te Puni Kokiri. Any discussion of data limitations is not related to the data's ability to support these government agencies' core operational requirements.

1 Motivation

Governments around the world provide significant support to assist firms in extending their offshore market reach. These range from foundational activities that aim to reduce tariffs and non-tariff barriers imposed by potential trading partners, to more targeted firm-specific assistance including the provision of training, financial support and market research activities. Similarly, any effect that national governments have on macroeconomic conditions (for example through the application of monetary policy) may also impact on the incentives firms face in expanding their activities offshore. One of the core arguments for such intervention is that although expansion into offshore markets is fundamentally good for firms (and for the economy as a whole), allowing them to expand and increase their revenues and profitability, in the short run firms face significant sunk costs and substantial risks from export market entry which may prevent them from exporting.

While the international literature provides broad support for the assumption that sunk costs influence firms' decisions about entering offshore markets, to date this research area has focused on firms' initial entry decision. We focus our enquiry not on the broad question of what determines a firm's ability to export, but on the subsequent question: given that a firm has the ability to export, what determines the choices they make about what to export and where to? A better understanding of the behaviour of exporting firms is particularly valuable because most growth in aggregate export earnings in New Zealand comes from *incumbent* exporters. Between 1996 and 2005, 90 percent of aggregate export value and almost 70 percent of aggregate export growth was generated by incumbents (Fabling and Sanderson 2008).

In particular, we look at the determinants of entry into new exporting relationships, defined at the level of a specific product exported to a specific destination. Many of the same arguments which can be called upon to justify assisting firms into exporting for the first time also apply to subsequent entries. By extending into new markets and new products, existing exporters can both raise their overall export sales and also diversify the sources of their offshore earnings, making them more resilient to product- or market-specific shocks. To the extent that firms can improve their performance through learning from international competitors and consumers,[1] spreading their export activities across several markets should, in principle, provide greater opportunities for learning-by-exporting than focusing on a single product-market relationship.

The case for sunk entry costs is equally persuasive for subsequent entries. Every geographic or product market provides new challenges for firms – setting up distributions networks, coming to grips with new consumer preferences and the vagaries of government regulations. However, firms may become more adept at handling these challenges over time, building up market specific knowledge and networks as they gain international experience.

To investigate whether firms' export activity, and government efforts to promote this, are likely to be self-sustaining, we look at whether firms' past experience of exporting influences the choices they make about entry to new trade relationships – does an existing trade relationship with a given country tend to increase the probability that new

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[1] The jury remains very much out on whether there is any evidence for these 'learning-by-exporting' effects.

products will be exported to that country? Once a firm has exported a product to one country, is it more likely to send the same product to other destinations? Further, we consider whether helping one firm to reach a new export market will tend to create spillover benefits to other firms by providing an example which they can follow. Finally, we look specifically at the receipt of export development assistance, and consider whether these government programmes are successful in promoting new trade relationships.

These questions are examined using an enterprise level dataset of New Zealand firms which links firm performance measures with detailed data on merchandise exports. In examining export market entry we simultaneously consider characteristics of the exporting firm and the wider economic environment. Existing research on the determinants of exporting has reached a broad conclusion that the decision to export is generally associated with a higher level of ex-ante productivity – high performing firms self-select into exporting.[2] We include firm level performance variables to control for this, but also add in variables which reflect the incentives to enter specific markets, such as the size, wealth and openness of potential trade partners and the relative exchange rate. We also add a number of variables which reflect differences in the sunk costs of entry into new trade relationships, including the firm's own history of international engagement and the potential for demonstration effects from other exporting firms.

Section 2 describes our conceptual model, drawing on existing literature on initial export market entry. Section 3 outlines our data source and sampling strategy, and defines our right-hand-side variables. Section 4 provides more detail of our explanatory variables and outlines our *a priori* expectations. Section 5 discusses the empirical results and Section 6 concludes.

2 Conceptual Framework

Our model considers the probability of entry into specific trade relationships. A relationship is defined as a firm exporting a specific product to a specific destination. As such, a new entry may involve the export of an existing product to a new market, a new product to an existing market, a new product to a new market or a new combination of existing products and markets.

Exporting firms incur a number of costs beyond those they experience in their domestic market. Some of these are variable costs, including transport and insurance and tariffs, which lower the value of each unit of exports to the firm. In addition firms face a number of fixed costs associated with entry into new markets. These largely reflect information costs, such as market research to learn about the structure of demand in a foreign market, setting up distribution networks, and learning about the regulations and institutional requirements of a foreign market. The fixed costs of export market entry are generally expected to be significant relative to the marginal costs of shipping etc.

Although geographical market entry costs are likely to predominate, firms also incur costs from entry into new product markets. These include the direct costs of developing a new product but also many costs associated with market entry, such as identifying market demands and tailoring the firm's marketing strategy to encompass the new product.

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[2] See, for example, Wagner (2007) for a review of the literature.

The assumption of sunk market entry costs suggests a number of testable hypotheses, many of which have been addressed in the literature to date. Here, we recap those hypotheses associated with initial export entry and extend them to cover entry into additional markets and products and to focus on the benefits of different potential export markets.

The basic equation we consider is the export decision equation from the model developed by Clerides et al (1998). According to this model, firms export whenever:

$$\mathsf{p}^f(c_t, z_t^f) - M_t + \mathsf{d}[E_t(V_{t+1}|y_t = 1) - E_t(V_{t+1}|y_t = 0)] \geq F(1 - y_{t-1}), \qquad (1)$$

where:

y_t is a dummy variable indicating whether a firm exports in the current period $(y_t = 1)$, or not $(y_t = 0)$;

$\mathsf{p}^f(c_t, z_t^f)$ is the profit available from foreign markets, given marginal cost c_t (assumed to be constant across units within any given time period) and the current conditions in foreign markets z_t^f;

M_t is the per period fixed cost of being an exporter (eg costs of dealing with Customs and other intermediaries);

$\mathsf{d}[E_t(V_{t+1}|y_t = 1) - E_t(V_{t+1}|y_t = 0)]$ is the expected future value in the next period, conditional on being an exporter in the current period $(y_t = 1)$, less the expected future value in the next period conditional on *not* being an exporter in the current period $(y_t = 0)$, all discounted by the one-period discount factor δ;

and F is the fixed cost of market entry, incurred only when the firm was not exporting in the previous period $(y_{t-1} = 0)$.

In the words of Clerides *et al* (1998) "incumbent exporters continue to export whenever current net operating profits plus the expected discounted future payoff from remaining in exporting is positive, and non-exporters begin to export whenever this sum, net of start-up costs, is positive. Expected future payoffs include the value of avoiding start-up costs next period *and* any positive learning effects that accrue from foreign market experience."

Clerides *et al* then go on to focus on the nature and impact of potential learning effects from exporting on overall firm performance. We instead focus on the component parts which make up the export decision. Due to our focus on export relationships, rather than a simple binary decision of whether or not to export, the first addition to this model would be to add country and product subscripts to each of the relevant variables. That is, we must differentiate between the costs and benefits of entry to each potential geographic market, and for each potential export product. While we leave open the possibility of learning effects which impact on marginal production costs, we focus on the potential for learning to impact on the fixed costs of market entry in future.

Consider first the situation of firms deciding whether to export for the first time, and incumbent exporters deciding whether to enter a new product or geographic market. For non-exporters, this decision is effectively identical to that proposed by Clerides et al, with the addition that firms must choose which market(s) is likely to provide the best returns and, for multi-product firms, whether to export all or only part of their range. Each

geographic or product market entry involves additional fixed costs (identifying market demands and adapting products accordingly, setting up distribution networks, marketing for additional products etc). However, when there are shared costs between different geographic and product markets, firms may be able to gain economies of scope by entering into multiple relationships. For example, by exporting multiple products to a single country firms incur additional development and marketing costs for each new product but can spread the costs of learning about demand structure and institutions of that country across a wider range of goods.

We explicitly allow for learning effects by including indicators of firms' past history of international engagement. A range of studies have shown the importance of past export experience in determining today's export activity.[3] In examining each potential entry to a new relationship (a specific product to a specific country), we look at whether the firm has previously exported other goods to the same country, or the same product to other countries. We allow for learning effects to fade over time by modelling these effects as the inverse length of time since a firm last dealt with that product or country. Our expectation is that firms which have exported to a country more recently will be more likely to enter with new products as the networks and connections which a firm builds up through exporting will begin to weaken over time, while market demand and institutional factors may also change, requiring new research and development.

Clearly exporting is not the only way in which firms may learn about other potential markets. Other forms of engagement such as FDI, joint ventures, offshore production and direct imports also build firms' knowledge of and experience dealing with international markets. Our dataset provides some indications of these alternative forms of international engagement (though not a comprehensive set of measures). We therefore add to our set of export history variables a similar set of import history variables (eg. has this firm *imported* from this country before?) and an indicator of foreign ownership.

As well as learning by experience, firms may also be able to learn from the experiences of others. Demonstration effects are posited to occur in two ways. By observing those around them, firms may be able to mitigate the risks associated with market entry. Hausmann and Rodrik (2003) discuss the role of demonstration effects in allowing firms to recognize market opportunities. In their model, entrepreneurial behaviour is limited by the inherent risks associated with such behaviour. By observing other firms' entrepreneurial efforts additional firms can recognize potential product and market opportunities. In the export sense, firms may observe their competitors moving into new markets and recognize that there may also be a market for their own products, allowing them to better choose markets and reduce the risks associated with market entry.

At the same time, demonstration effects may help firms to directly reduce the costs of market entry. If they have contact with others working in the same market, firms may have easier access to information and networks needed to smooth their entry into a new market. To capture potential demonstration effects from other firms, we include the proportion of manufacturing firms which have entered a given relationship in the past 12 months.

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[3] See, for example, Greenaway and Kneller (2004b), Bernard and Wagner (2001), Campa (2004).

Research looking at firms' overall export propensity (the probability of entering their first export relationship) has tended to find little evidence for export demonstration effects,[4] though there have been some exceptions. For example, Greenaway and Kneller (2004) find consistently positive export propensity spillovers, and that a large number of new entries to the export market have a greater effect than a high concentration of existing exporters.

Market entry costs are only one side of the equation. To reflect the benefit side of the firms' implicit cost-benefit calculation, we include indicators of foreign market demand, including population, GDP, import intensity and relative exchange rates. We also allow for export entry to be a response to domestic conditions. Early studies of New Zealand export supply behaviour found that changes in manufacturing exports could be explained in a large part by domestic GDP - when domestic incomes were low, exports rose as firms sought new outlets for their output (Tweedie and Spencer, 1981; Morgan, 1977).[5] We include the change in New Zealand GDP as an indicator for domestic demand conditions.

Finally, as noted above, governments the world over provide a wide range of services designed to assist firms to break into new export markets or to increase their current exports. New Zealand is no different in this respect. While our key focus has been on the extent to which initial entry encourages further expansion of markets, we also wish to consider whether the direct involvement of government plays any part in firms' ability to enter new markets. We consider two types of government assistance: export development assistance (services and grants specifically designed to aid firms in their efforts to internationalise); and capability building programmes, including subsidies for R&D and training.

It has been widely recognised that pre-existing capabilities are a key factor determining firms' ability to export. Therefore while we might expect export development grants to have a larger or more immediate relationship to firms' export activities, we may also find a relationship between more general capability building assistance and later international activities.

3 Data

The key data source used in this paper is the prototype Longitudinal Business Database (LBD), developed by Statistics New Zealand (SNZ). This database contains longitudinal administrative and survey data on all 'economically significant' firms in the New Zealand economy.[6] The data covers approximately 750,000 private-for-profit firms over 7 years (2000-2006), with around 450,000 to 500,000 active firms in any given year.

The core elements of the LBD consist of SNZ's Longitudinal Business Frame (LBF), which provides information on employment, areas of industrial activity, location and ownership; administrative data from the Inland Revenue Department (IRD) including goods and services (GST) returns, financial accounts (IR10), and company tax returns (IR4); information on employers, employees and wages aggregated to the firm level from

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[4] See, for example, Aitken, Hanson and Harrison (1997), Bernard and Jensen (2004).

[5] Note that these reports were completed before the economic reforms of the 1980s and the relationships may have changed dramatically since that time. To our knowledge, this type of analysis has not been performed for New Zealand since the reforms.

[6] The threshold for economic significance is currently set at an annual turnover of NZ$40,000, being the threshold at which firms must file a Goods and Services Tax (GST) return.

the Linked Employer-Employee Dataset (LEED); and shipment level merchandise trade data provided by the New Zealand Customs Service (Customs).[7] In addition to the core administrative data, a number of additional data sources have been linked to the LBD, including several surveys administered by SNZ and details of firms' participation in assistance programmes provided by five government agencies.[8]

Data in the LBD is provided at the enterprise level. An *enterprise* is defined as a business or service entity operating in New Zealand. While each enterprise represents a distinct legal unit, not all enterprises operate independently from others. The LBF records information about ownership, including the relationship between parent and subsidiary enterprises. Initial examination of trade and financial performance data suggests blurring of the roles of individual enterprises within groups sharing a common group-top enterprise. For example, exports sometimes appear to shift between enterprises within the group, due to a change in the role of group members. Most notably, we see evidence of merchandise exports being attributed to enterprises in industries such as finance and insurance, or business services, which we would not normally expect to have significant merchandise export potential. In order to correct for this apparent misallocation of export activity to the 'head-office' and business services enterprises, we aggregate our data to the group level.[9] Table 1 shows the implications of this aggregation for the number and size distribution of 'firms' in the economy in 2001. While most enterprises operate independently, those which are part of group structures are larger than the average independent firm. As such, while there are relatively few groups they account for a substantial proportion of total employment and value-added. From this point on we will use the word *firm* to mean both independent enterprises and the aggregated groups of enterprises.

In this paper we restrict our attention to a subset of the firms in the LBD. Due to our focus on export market choices we restrict our sample to only include those firms with a revealed ability to export. Our sample therefore includes firms which meet the following criteria:
- private-for-profit firms located in New Zealand, excluding those in government administration and defence
- firms which have ever been predominantly classified to manufacturing industries
- firms which are active in all 7 years of the LBD[10]
- firms which have observable merchandise exports over the period 2000 to 2006.

These restrictions reduce our sample to 3921 firms in each year. This sampling strategy will tend to bias our sample towards high-performing firms, as these firms will be more

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[7] Detailed information about the LBD is provided in Statistics New Zealand (2007) "Improved Business Understanding via Longitudinal Database Development (IBULDD): Potential Outputs from the Longitudinal Business Database", Statistics New Zealand, Wellington; and Fabling, R., A. Grimes, L. Sanderson and P. Stevens (2008) "Some Rise by Sin and Some by Virtue Fall: Firm Dynamics, Market Structure and Performance" MED Occasional Paper 08/01, Ministry of Economic Development, Wellington.

[8] The Ministry of Research, Science and Technology; New Zealand Trade and Enterprise; the Ministry of Tourism; Te Puni Kōkiri (the Ministry of Māori Development); and the Ministry of Social Development.

[9] This misallocation within groups may occur, for example, because some group members have reporting responsibilities or because Customs clients are probabilistically matched to LBF enterprises based on names and addresses, which may be common across legal units within the group.

[10] This restriction is imposed to mitigate the risk of mis-identified entry and exit. Because enterprises in the Longitudinal Business Frame are defined as legal units, a change in the legal status of the firm (for example, a change from a partnership to a limited liability company) may result in false births and deaths being recorded in the LBF.

likely both to survive throughout the period and to have observed exports. By compressing the distribution of firm performance to the higher end this may in turn reduce the estimated impact of performance on export entry.[11]

3.1 Defining Potential Entries

In this paper we define a relationship entry as being the first time a firm is observed to export a given product to a given country since January 1996 (the earliest consistently available firm level export data).[12] In each quarter, and for each product and country, a firm can be either an entrant, an incumbent exporter, or a potential exporter. Incumbents, including firms which have exported the relevant product-country combination in the past, are excluded from our estimation, as they do not have the potential to enter that relationship for the first time.

In order to estimate our variant of equation (1), we therefore need to define a set of firms that could enter but don't. This definition, of *potential* entrants, is more complicated. Aside from their existing set of trade relationships, every existing firm can in principle, in any given time period, begin exporting any product to any country. That is, if our system of product codes covers some 13,300 possible products, our Customs data records 250 geographical destinations,[13] and we have a sample of 3921 active firms over 24 quarters, we have 313 billion potential entry events. We therefore take a number of pragmatic steps to limit the number of observations of potential entry. Firstly, for practical reasons we restrict our country sample to those countries for which we have a consistent set of macro data over the period in question.[14]

Secondly, we restrict the number of 'potential' products which a firm could be expected to export. This restriction is based on observed export products by industry. Taking our sample of firms over the period in question, we assume that for every product actually exported by one of our sample firms, that product is a potential export for every other firm in the same 3-digit manufacturing industry.[15] That is, if one firm in the Electrical Equipment and Appliance Manufacturing industry is observed to export toasters, then every other firm in that industry has the potential to export toasters. By applying this restriction we reduce our sample of potential products to a range of 26 for firms in industry C214 (Oil and Fat Manufacturing) to 2274 products for firms in industry C217 (Other Food Manufacturing).

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[11] Comparing manufacturing firms that are ever observed to export during our sample period with those that are not indicates that there are large differences in mean productivity and value-added between these groups. Firms who ever export perform substantially better on both counts. In contrast, when we consider only ever-exporting firms and compare their performance between years in which they do and do not export, we find no significant differences in MFP, and only one industry in which mean value-added is higher in exporting years than non-exporting years (C217 - Other Food Manufacturing).

[12] Future work will consider the impact of distinguishing between apparently one-off export events and ongoing export relationships.

[13] Recorded Customs destinations are defined on a combination of geographic and political entities. For example, the Customs data lists United States Minor Outlying Islands separately from the United States and separates Vatican City from Italy. The Customs data also lists some non-country destinations, such as Ships Stores and Passengers Effects, and has separate codes for countries before and after independence or unification.

[14] By excluding destinations which are not independent nations and excluding some countries for which consistent macroeconomic data is not available (eg. Iraq and Afghanistan), we reduce our sample of countries from 250 to 168. A full list of the countries covered is available in Appendix A.

[15] A small number of three digit industries had too few firms to be treated separately, while other 3-digit industries were too diverse to treat as a single industry. Appendix A contains a list of the actual "3-digit" industry groupings used, based on the Australia and New Zealand Standard Industrial Classification system.

However, this restriction still leaves us with between 489,216 firm-quarter-product-country observations (for Oil and Fat Manufacturing) and 4.3 billion observations (for Industrial Machinery and Equipment Manufacturing). Only for the smallest industries could we conceivably complete our estimation. We therefore make another cut in the sample, by separately examining each 2-digit Harmonized System classification. We then estimate the impacts of our explanatory variables on each HS 2-digit chapter.

Even with this final restriction, however, our sample of potential entry events remains large. Very few HS chapters have a small enough number of observations for successful estimation on the full population.[16] In order to expand the number of possible product groups we can consider we therefore run our estimation using data from all observed entrants plus a weighted random sample of 10 percent of those firms which were not observed to enter any new relationships over the estimation period.

In this paper we present results for 3 HS chapters:
- Chapter 4: Dairy Product; Birds' Eggs; Natural Honey; Edible Products of Animal Origin, Not Elsewhere Specified or Included (Dairy)
- Chapter 47: Pulp of Wood or other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper or Paperboard (Wood Pulp); and
- Chapter 92: Musical Instruments; Parts and Accessories of Such Articles (Musical Instruments)

These product groups were chosen for the following reasons:

Dairy products are one of New Zealand's key export product groups. In the year to December 2007, Milk Powder, Butter and Cheese alone made up over 20% of New Zealand's total Merchandise exports.[17] No discussion of export behaviour of New Zealand firms would feel complete without a discussion of the dairy sector.

Wood Pulp was chosen as an example of a product with a relatively small number of observations (a mere 5.9 million) for which we could estimate results using the full population of potential entries to compare with our estimation for the 10% sample of non-entrants. These comparisons are presented below. Wood pulp is also considered as an example of a largely undifferentiated commodity.

Finally, Musical Instruments was chosen as an example of an elaborately transformed good. Musical instruments may also be considered a luxury good, which may be reflected in the behaviour of exporters.

Sample statistics for each group are presented in Table 2. Future work will expand the range of product groups covered to verify the representativeness of the results discussed below.

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[16] This paper was prepared using Stata Special Edition Version 9. Trial and error suggest that, with an active memory setting of around 1200MB, Stata is able to handle up to approximately 9 million observations, with the current set of explanatory variables. 14 of our 99 HS Chapters have less than 9 million observations of actual and potential entries. All of these are in raw materials and simply transformed manufactures (eg. Ch. 45 - Cork and Articles of Cork ; Ch. 24 - Tobacco and Manufactured Tobacco Substitutes).

[17] Overseas Merchandise Trade: December 2007, Statistics New Zealand
http://www.stats.govt.nz/datasets/exports-imports/overseas-merchandise-trade.htm

4 Empirical Model

In our model we distinguish between four groups of variables which may have an influence on export market entry behaviour. We consider a range of firm-specific factors, such as productivity and ownership; indicators of firm's past experience of international trade; demonstration effects from other firms; and macroeconomic conditions in New Zealand and abroad. The relevance of each is discussed below. Refer to Appendix A for more detail on the source and construction of each variable.

4.1 Firm-Specific Factors

It is clear from the international literature than export behaviour is closely related to firm characteristics. Results from a wide range of countries, using a variety of methodologies, have found that exporters perform better than non-exporters on a range of metrics, having higher productivity, sales, employment and wages than domestically focused counterparts, and that prior performance is a strong predictor of firm's initial export entry.[18] Our *a priori* assumption is therefore that higher productivity and employment will tend to be associated with subsequent market entry, as larger and more productive firms will be better able to bear the costs of additional product and market development.

Other firm-specific variables included in the model are indicators of foreign ownership, the receipt of government assistance, and whether the firm consists of a single, independent enterprise or is part of a group structure with other parent or subsidiary enterprises.

The impact of foreign ownership on export market entry will depend on the role of firm within the international portfolio of its owners. Foreign ownership may reduce the costs of exporting, through providing firms with established offshore networks. However, if the firm has been set up or acquired by a foreign owner in order to serve the domestic market, foreign ownership may be negatively associated with exporting.

Government assistance has the potential to raise firms' ability to export through two mechanisms. Targeted government assistance to prospective exporters may help to directly reduce the costs of export market entry – for example by providing funding for trade fairs and infrastructural support for firms setting up an offshore distribution office. Meanwhile, support targeted at building firms' general capability may improve performance and give firms the capability to export without direct export assistance. These two forms of government assistance are included separately in our model.

Finally, we allow for entry rates to differ between independent enterprises and groups of enterprises linked by parent/subsidiary relationships, although we have no priors as to which structure is likely to be more closely associated with export market entry.

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[18] See Wagner (2007) for a review of the productivity literature, and Bernard, Jensen, Redding and Schott (2007) for comments on other metrics.

4.2 International Trade Experience

Much of the discussion in the international literature on exporting revolves around the existence of sunk costs associated with export market entry. In order to successfully enter a new market, firms need to make a range of investments to understand the infrastructural, legal and demand characteristics in their target market and set up sales and distribution networks. If firms have prior experience with that market, these costs may be substantially reduced. For example, if a firm is already exporting toasters and electric kettles to Samoa there may be only marginal costs involved in introducing microwave ovens to the range of products they export to Samoa. However, we would expect that market knowledge built up through past export experience would depreciate over time. If the firm had been exporting to Samoa three years ago, but had not exported since that time, we would expect many of the entry costs to be incurred again. We therefore include as our measure of country-specific export history the inverse of the number of quarters since the firm last exported to that country.

Similarly, for product-specific export histories, we include the inverse time since the firm last exported that product (to any market). For many firms, this variable will capture a combination of product development costs and specific export costs. That is, if a firm has exported a given product before, they have some experience dealing with the transport and logistics involved in exporting that product, which may help them if they choose to enter new markets. However, their past export experience may also show that this is a product within their existing range, rather than something they have had to develop from scratch (even if some modifications are needed to suit the new market). We would therefore expect past product export experience to have a strong impact on observed export market entry.

We also include three measures of import history – the inverse time since the firm has imported the relevant product, has imported from the relevant market, or has imported that product from that market.[19] Country and relationship specific import experience may reduce costs of market entry as a firm may already have some knowledge about conditions in the destination country. Past importing of a product may be important if (a) firms are able to learn to produce a new variety by copying from an established offshore producer[20] or (b) if some portion of their export activities are actually in re-exports. That is, if some of their export products are brought in from offshore, undergo some small alterations (eg. repairs, repackaging), and are then re-exported. We test for impacts of the latter by re-estimating the model excluding relationships involving re-exports.

4.3 Demonstration Effects

As well as learning by experience, firms may also be able to learn from the experiences of others. To capture these effects, we include in our model the percentage of manufacturing firms which begin to export in the relevant product, market or product-market relationship over the past 12 months.[21] One drawback of this measure of potential demonstration effects is that it may also capture the impact of changes in

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[19] This third option – relationship history – is excluded from the export history variables by definition. If a firm had some experience with exporting within that relationship they could not be considered a potential entrant.

[20] Consider, for example, the quality ladder model of Grossman and Helpman (1991)

[21] The average number of live manufacturing enterprises is used instead of the actual number of live enterprises in each year in order to prevent unwarranted variation in the demonstration effect measure caused by changes in the denominator.

macro-economic conditions. For example, if demand conditions in a potential destination market are improving, new firms will have a greater incentive to enter. If firms react to the improving conditions at different speeds, later entrants may appear to be affected by demonstration effects from earlier entrants, when in fact both may be reacting to the same demand stimuli. We control for this to some extent by including macroeconomic variables directly in our model, but also exclude our demonstration variables from one specification to examine the effects on the predicted impact of macroeconomic variables.

4.4 Macroeconomic Factors

Perhaps the most important determinants of firms' *incentives* to export, if not their *ability* to do so, are the demand conditions in domestic and international markets. Firms will be more likely to export in general when demand in international markets is relatively strong, and will tend to target those countries which provide the best opportunities. Here we proxy sales opportunities in destination countries by measures of the destination country size (population), wealth (GDP per capita) and openness (share of imports of goods and services in total GDP).[22] We also include changes in each of these variables, expecting that entry may be more attractive if a country is perceived to provide a growing market.

Although destination country conditions may have a more obvious link to export incentives, domestic sales opportunities may be equally important. If firms face low domestic demand for their products they may have greater incentives to seek out offshore markets. We therefore include the one-year change in domestic GDP as an indicator of domestic market opportunities.

Finally, we consider the impact of relative exchange rates. High exchange rates (a high value of the domestic currency relative to partner countries) reduce the relative purchasing power of potential foreign consumers, and could therefore be expected to reduce entry opportunities. We include the deviation from the three-year average cross-rate as our measure of the relative exchange rate, and also test for asymmetric impacts of exchange rate appreciations and depreciations.[23]

5 Results

Previous examination of the extent of export market entry and the relationship between market entry and exit and aggregate export value growth has shown that the vast majority of potential export relationships are never observed (Fabling and Sanderson 2008). These results are reflected by our three sample product groups. For Wood Pulp exports, of the sample of 5.9 million firm-quarter-country-product observations, a mere 92 involved an entry event. 2,742 observations were of incumbent or past exporters, while the remainder were potential entries. In Musical Instruments we observe a total of 63

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[22] Akerman and Forslid propose an alternative impact of market size, suggesting that firms will face a larger establishment cost to enter large markets (eg because they need to market to a larger number of people). However, it should be recognised that market entry need not involve a full marketing campaign to the entire country. In terms of reaching prospective customers, firms may do better to enter only a single region in a large country (eg. California) rather than the whole of a smaller country (eg. Cyprus). Arkolakis (2006) makes this point by explicitly modelling marketing costs.

[23] While this provides an initial indication of the impact of exchange rates on export market entry, a more robust measure of exchange rates would need to consider the actual currency of trade, which is observable in our data. For example, a reasonable share of trade with China is denominated in US dollars (Fabling and Grimes 2008a).

actual entries and in Dairy we observe 975 actual entries. Table 2 gives further detail on each of the sample industries.

Tables 3, 4 and 5 report our regression results for Wood Pulp, Dairy and Musical Instruments respectively. Reported coefficients are marginal effects from a probit model. The predicted marginal effects, while statistically significant, are very small and at first glance would appear to have little economic relevance. However, this is a natural consequence of the nature of the data we are using. While there is substantial variation across firms and countries in the explanatory variables, the phenomenon we are looking at is a relatively rare occurrence. Strong coefficients would lead to a model which predicted far more entry than is actually observed (or could reasonably be expected).

Five alternate specifications are presented for each product group:

(1) The full model using all the explanatory variables. This is the only specification which includes the government assistance variables. In Wood Pulp, both of our government assistance variables are found to perfectly predict failure. That is, we are unable to estimate the impact of government assistance because none of the successful entrants in our sample had ever received either export related or general capability building assistance. For Musical Instruments, the same was true of export development assistance.[24] While some successful entrants in Musical Instruments had received capability building assistance, and there were observations in Dairy of successful entrants having received both types of assistance, the only evidence of a significant relationship was for capability building assistance in the Dairy sample (results discussed below). Meanwhile, the inclusion of these variables significantly reduces the sample size for both Wood Pulp and Musical Instruments, as all observations of firms receiving assistance are dropped from the estimation. We therefore estimate our remaining regressions excluding these variables.

(2) Our base specification. Excludes only the government assistance variables, as discussed above.

(3) Excludes three of our firm performance variables. These variables are highly correlated with each other (independent firms tend to be smaller than groups, foreign firms tend to be larger and more productive than domestically owned firms etc) making it difficult to separately identify the impacts of each variable.

(4) Excludes the demonstration effect variables. As noted above, these variables may pick up a combination of true demonstration effects and the impact of macroeconomic changes. We therefore examine whether their exclusion affects the estimated coefficients on our macroeconomic variables.

(5) Separates the exchange rate deviation variable into two, to test whether the impact of the exchange rate differs depending on whether exchange rates are above or below average.

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[24] This result should not be taken as an indictment of either the efficacy or targeting of government export assistance programmes. It may be that assistance has helped firms to cement their existing export relationships, or that some multi-product firms have entered into new relationships outside the specific product markets we focus on here. It should also be kept in mind that there are both a small number of observed entries and a small proportion of firms receiving assistance, so the probability of finding a new market entrant who has received assistance is naturally low.

Results for Dairy and Musical Instruments are from weighted estimation on a sample including all firms which ever enter a new export relationship plus a 10% sample of non-entrants. For Wood Pulp, we report results from estimations using all observations.[25]

While there are a number of variables which have reasonably consistent impacts across our three product groups, there are also some differences. Notably, while the results for our two "commodity" product groups (Wood Pulp and Dairy) are quite consistent with each other, they differ in a number of respects from those of our "luxury", "elaborately-transformed" manufactured good (Musical Instruments). The discussion below addresses each group of explanatory variables in turn, drawing out the commonalities and differences across the product groups.

5.1 Firm-Specific Factors

The relationship between our firm-specific factors and export market entry is less clear than we might have expected. In most specifications for Wood Pulp, and all specifications for Dairy, firms' past productivity has no significant relationship to their ability to enter new markets, while the relationship with firm structure (independent enterprises vs enterprise groups) is consistently strong but differs in sign between the two industries.

One possible explanation for the apparent lack of a productivity impact on export entry comes from our sample selection strategy. As our sample was defined to include only those firms who were observed to export at some point over the observation period, it is composed of mainly high-productivity firms. While productivity has consistently been found to be a key factor predicting firms' ability to export at all, it may be less important in predicting their ability to expand into new markets.

Alternatively, as noted above many of our firm-specific factors are correlated with each other. It may be that by including all our firm characteristics variables we are muddying the water and distorting the impact of each variable separately. In column (3) we therefore drop characteristics other than MFP. In the Wood Pulp industry, this explanation seems to make sense, with the estimated coefficient on MFP gaining significance when other characteristics are dropped. In contrast, for Dairy this does not substantially alter the estimate for MFP. Rather, it seems that the key firm characteristic driving our results is that of firm structure. In an alternate specification (not shown) we maintain the productivity and firm structure variables together, and find results similar to the rest of the specifications – multi-enterprise firms are much more likely to enter new markets than independent firms. This may in turn reflect characteristics of the New Zealand Dairy sector, which is dominated by a single, large, export-oriented cooperative.

Results for Musical Instruments differ substantially from those of the other two product groups. For musical instruments, our productivity variable is positively associated with entry in all specifications of the model, though the effect is much stronger when we exclude the other firm-specific characteristics. Further, while productivity has the anticipated positive effect on entry, the impact of firm size (employment) is negative. This may reflect differences in both the type of product and the means of production. If New Zealand musical instrument manufacturers are focused on niche production it may

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[25] Results do not change when the random sampling method is used for this product group.

be that small firms producing high-quality, highly specialized instruments are more likely to be able to export their goods than larger, less specialized producers.

Specifications (3)-(5) were re-estimated for Dairy products including the government assistance variables. While direct export development assistance was not a significant factor in entry to new export relationships, capability building assistance was associated with a higher probability of entry in three of our four specifications. Point estimates of the marginal impact on entry were between $1.07e^{-6}$ for specification 4 (excluding demonstration variables) and $6.49e^{-7}$ for specification 5 (with asymmetric exchange rates). Inclusion of these variables did not have any substantive impact on the size or significance of the other coefficients.

5.2 International Trade Experience

As expected, our variables indicating past export experience are significant across all specification of the models. Firms which have already incurred the sunk costs of product and export market development are more likely to continue to expand their exporting by adding new markets, new products, and new product-market relationships.[26] While the strength of the estimated relationship differs across products, within each product group the impact of product-specific export experience is stronger than that of country-specific export experience. We would expect that this reflects the sunk costs of product development more so than the costs of introducing new products to international markets. Ideally we would like to be able to separately consider exports of products which the firm is already selling on the domestic market but this information is not collected for New Zealand manufacturing firms.

The estimated impacts of past import experience differ substantially across our three product groups. In Wood Pulp, import experience is almost never significant, while for Dairy, past experience of importing the same product is positively related to export entry and for Musical Instruments, both product and product-market import relationships are significant. As noted above, product import experience may reflect a number of different relationships – it may simply reflect that producers may also be involved in import-export trade or repairs, bringing in products from one country, perhaps adding a small amount of value, and then re-exporting them to another (or the same) country. Alternatively, we posited earlier that firms may be able to reverse engineer products that they have previously imported, learn to produce them domestically and then become exporters.

For Musical Instruments, the evidence points to the first explanation. In a supplementary regression excluding re-exports from being counted as export entries, the estimated coefficient on past product import experience becomes smaller and insignificant, while the past relationship import experience variable remains significant but reduces in magnitude by around three quarters.

The re-exports explanation is not suitable for Dairy products, however, as only 1 of our 975 entries in that industry involves re-exports. Instead, we suggest a new potential explanation – that of producer-distributors in a product market which values variety. If

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[26] This result may also be partially related to macro-economic conditions in partner countries. To the extent that a firm has already made an assessment of the potential export markets and chosen to enter certain markets, the factors that motivated the initial decision will also influence their ongoing entry decisions.

consumers value variety, producers may be able to capitalize on economies of scale and scope in their domestic distribution systems by importing foreign varieties and marketing them domestically while simultaneously producing and exporting their own varieties. This explanation seems plausible in the Dairy sector, which includes differentiated products such as cheese and ice-cream.

5.3   Demonstration Effects

Demonstration effects from other firms beginning to export the same products, and beginning to export to the same country are significant for all product groups, and for Dairy other firms' entry into the specific combination of product and market is also important. However, as discussed above, our spillovers variables may also be capturing the impact of changes in demand conditions, with those firms which are slow to react to improved opportunities appearing to be heavily influenced by the actions of other firms when in fact they are merely reacting to demand conditions.

In specification (4) we test this hypothesis by dropping our demonstration variables from the model. The results for Wood Pulp suggest that our demonstration variables are indeed capturing macro-economic conditions, with the coefficients on destination market population and openness becoming much stronger when these are dropped. The impact in Dairy seems to be related to foreign incomes, with GDP per capita in the destination country being positive and significant when the demonstration variables are excluded. In both of these industries we also see population growth gaining significance. This may reflect a shift in New Zealand's overall exports (particularly commodity exports) to rapidly growing Asian markets. In future it would be possible to test this assumption by including region specific-dummies in our model. Finally, in Musical Instruments we also see a change in the strength of one of our macro variables, with the estimated impact of foreign incomes rising substantially.

5.4   Macroeconomic Conditions

Our remaining explanatory variables capture the impacts of macroeconomic conditions at home and abroad, and the impact of exchange rate variation. The key results relating to macroeconomic conditions in potential target markets have been touched upon above, in our discussion of demonstration effects. Here we briefly reiterate those conclusions before moving on to discuss the impact of domestic conditions and changes in the relative exchange rate.

For our two "commodity" product groups, destination country population and our indicator of openness to international trade are both positive and significantly related to export entry. In contrast, for our "luxury", "differentiated" good, the impact of per capita income dominates. While cheese, eggs and wood pulp are all products which are demanded by consumers at almost all levels of the income distribution, the market for musical instruments seems to be stronger in countries where the population has more money (and more time) to spend on leisure activities.

We posited above that export market entry may be driven not only by perceived sales opportunities abroad, but also by a lack of opportunities at home. The coefficients on our indicator of domestic market demand – the one-year change in domestic GDP per capita – does not bear out this hypothesis. Rather, local conditions do not have a significant impact on export entry for either Musical Instruments or Dairy products, and

are positively related to export entry in Wood Pulp. It may be that rather than low domestic income growth implying a need for firms to look offshore for sales opportunities, instead low income growth in New Zealand reflects low levels of onshore production.

Finally, we find that the relative exchange rate level does indeed have an impact on firms' probability of entering new markets for our two commodity product groups. As the value of the New Zealand dollar rises relative to a given trading partner, firms are less inclined to begin new relationships with that country. For musical instruments, however, exchange rate changes do not seem to affect export entry behaviour. This may again reflect the nature of the market for these goods, with relative purchasing power changes being more likely to affect demand for bulk items such as milk power, cheese and wood pulp than the more specialized items in musical instruments.

The final column of our regression results investigates whether the exchange rate impacts observed in Wood Pulp and Dairy products are symmetric between appreciations and depreciations of the New Zealand dollar. We do this by taking the absolute value of the deviation from rolling mean with respect to each destination question separately for positive and negative deviations, and testing whether the size of the negative impact of a high New Zealand dollar (HIGH_DEV) is symmetric with the positive impact of a low New Zealand dollar (LOW_DEV). In both cases we find that the impact of a low New Zealand dollar in encouraging entry is stronger than the discouraging impact of a high New Zealand dollar.

6 Conclusion

Governments the world over have long been proponents of export activity. Support for exporting can range from negotiating trade access and regulatory harmonisation, through exchange rate manipulation, to targeted, firm-level support for exporters or potential exporters. One key justification for directed support is the belief that while expanding export revenue and opening up new markets is good for firms' growth prospects and for economic growth as a whole, many firms are hampered by the fixed costs of export market entry. In this paper we have considered some of the interrelated costs and benefits associated with entering new trade relationships.

In keeping with both anecdotal and empirical literature, we find evidence that sunk costs are an important determinant of export market entry. In particular, firms are more likely to introduce additional products to countries with which they already have an established trade relationship. At the same time, the costs of product development imply that firms will also choose to expand exporting by introducing their existing, successful products to new geographical markets. While there is no evidence that government assistance aimed at promoting export activity helps firms to overcome these costs, this may be due to the sample selection strategy used. However, general capability building assistance is found to be a significant factor in export market entry for Dairy exporters.

Our results also suggest a role for export propensity spillovers from other domestic firms. However, these results should be taken with a degree of caution, as the relationship seems to be driven at least in part by differing speed of reaction to changing macro-economic conditions across firms. In order to entangle these reactions, future work will consider other specifications for our demonstration effect variables, such as localised measures of export intensity.

Conditions in potential trade partners are found to have the predicted impact on export market choices. Population, openness and foreign incomes all have an impact on entry rates but this differs across product types, with incomes more important for our example luxury good while population and import penetration are more important for firms in product groups which include staple commodities such as wood pulp and milk powder. At the same time, exports of musical instruments are less affected by month-on-month variation in demand caused by exchange rate fluctuations (perhaps due to the specialized and one-off nature of purchases). In contrast, exchange rate fluctuations are important for export choice in our example commodities, with asymmetric impacts between appreciations and depreciations.

While the estimated coefficients on each of our explanatory variables are rather small, they may still have a significant economic impact. Previous research using aggregate data on 10-digit product exports suggests that new products and exports of existing products to new countries were worth nearly 9 billion NZD over the 10 years from 1996 to 2005 (Fabling and Sanderson 2008). This figure severely underestimates the value of export diversification at the firm level, as it considers only exporting relationships that are new to the economy as a whole, rather than those which are new to the firm. As such, even small impacts on the ability of firms to expand their export products and markets may have substantial benefits for aggregate export earnings.

7 Tables

Table 1: Comparing Independent Enterprises and Groups of Parent/Subsidiaries
(Full population, excluding zero-employment enterprises)

Unit of Observation		No. Active Firms	Mean Emp. [Std Dev]	Mean VA [Std Dev]	Share of Total Emp	Share of VA
Enterprises	All Enterprises	334,413*	4.48 [48.88]	259,626 [6.45e+6]		
Firms	Independent Enterprises	324,600*	3.08 [10.62]	114,365 [1.04e+6]	0.669	0.428
	Enterprises within groups	9,816*	50.53 [274.74]	5,042,127 [3.68e+07]		
	Groups	4,986*	99.52 [667.27]	8,027,011 [6.75e+07]	0.331	0.572

* Firm counts have been random rounded base three to protect confidentiality.

Table 2: Descriptive Statistics for Sample Product Groups

	Dairy	**Wood Pulp**	**Musical Instruments**
Number of Firms (Actual or Potential Exporters)	1,500*	579*	2,340*
Number of 10-digit Products Ever Exported	61	10	19
Number of 3-digit Industries Ever Exporting	17	5	17
Number of Observed Entries	975	92	63
Number of Incumbent or Past Export Observations	53,229	2,742	789
Number of Potential Entries	34,902,564	5,904,046	21,489,708
Total number of observations (FxQxPxC)	34,956,768	5,906,880	21,490,560
Average Employment in 2000/01 [Std Dev]	85.0 [584.0]	69.4 [404.1]	36.6 [265.9]
Percentage Foreign Owned in 2000/01	2.1	1.9	1.02
Percentage Independent Enterprises in 2000/01	76.93	76.95	83.66
Percentage ever receiving EDA by April 2006	6.23	5.79	3.94
Percentage ever receiving CAP by April 2006	37.43	28.74	30.24
Note that the percentages calculated above refer to a snapshot of those firms which are in-sample for the year in question. Firms which change industries may move out of (into) sample if their new (previous) industry is never observed to export any product in the relevant HS Chapter. * Firm counts have been random rounded base three to protect confidentiality.			

Table 3: Regression Results for Chapter 47: Wood Pulp

WOOD PULP	(1) Full Model	(2) Excl. Govt Assistance	(3) Excl. Firm Chars.	(4) Excl. Demo. Effects	(5) Asymmetric Exch. Rate
MFP	1.15E-08	7.98E-09	1.649e-08*	3.72E-08	8.00E-09
	[0.412]	[0.471]	[0.091]	[0.345]	[0.483]
EMP	6.65E-09	4.55E-09	--	6.61E-09	4.63E-09
	[0.267]	[0.332]		[0.685]	[0.335]
FOREIGN	7.89E-09	5.61E-09	--	7.00E-09	5.80E-09
	[0.735]	[0.759]		[0.907]	[0.757]
INDEP	4.845e-08***	3.515e-08***	--	1.208e-07***	3.617e-08***
	[0.002]	[0.003]		[0.004]	[0.003]
PROD_HIST_X	2.682e-07***	2.206e-07***	2.668e-07***	6.970e-07***	2.267e-07***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
CTY_HIST_X	7.938e-08***	6.188e-08***	6.935e-08***	2.779e-07***	6.351e-08***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
PROD_HIST_M	-4.39E-08	-3.52E-08	-4.37E-08	-1.69E-07	-3.61E-08
	[0.287]	[0.284]	[0.254]	[0.127]	[0.284]
CTY_HIST_M	-4.31E-09	-3.62E-09	-1.45E-08	5.08E-08	-3.64E-09
	[0.821]	[0.811]	[0.407]	[0.297]	[0.815]
RELN_HIST_M	1.13E-07	9.17E-08	1.12E-07	4.654e-07*	9.35E-08
	[0.223]	[0.216]	[0.201]	[0.076]	[0.220]
DEMO_PROD	5.378e-04**	4.231e-04**	5.239e-04**	--	4.295e-04*
	[0.046]	[0.050]	[0.038]		[0.052]
DEMO_CTY	1.536e-05***	1.222e-05***	1.465e-05***	--	1.263e-05***
	[0.000]	[0.000]	[0.000]		[0.000]
DEMO_RELN	7.10E-04	5.52E-04	6.56E-04	--	5.74E-04
	[0.133]	[0.144]	[0.141]		[0.138]
D1_NZGDP	1.235e-06*	1.003e-06*	1.287e-06**	4.438e-06***	1.037e-06*
	[0.057]	[0.051]	[0.022]	[0.007]	[0.051]
POP	3.641e-08***	2.914e-08***	3.484e-08***	1.039e-07***	2.984e-08***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP_PP	-4.47E-09	-3.60E-09	-3.54E-09	2.210e-08**	-3.73E-09
	[0.334]	[0.329]	[0.421]	[0.028]	[0.326]
OPEN	5.234e-08***	4.202e-08***	5.052e-08***	1.200e-07***	4.336e-08***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
D1_POP	5.40E-07	4.39E-07	5.03E-07	2.562e-06**	4.28E-07
	[0.251]	[0.243]	[0.255]	[0.024]	[0.259]
D1_GDP_PP	5.63E-08	4.61E-08	5.19E-08	2.27E-07	4.40E-08
	[0.617]	[0.607]	[0.619]	[0.449]	[0.639]
D1_OPEN	-2.40E-08	-1.85E-08	-2.47E-08	-4.04E-08	-1.96E-08
	[0.600]	[0.611]	[0.565]	[0.735]	[0.598]
EXRATE	-8.416e-08***	-6.886e-08***	-8.484e-08***	-2.175e-07***	--
	[0.005]	[0.004]	[0.002]	[0.003]	
LOW_DEV	--	--	--	--	8.794e-08**
					[0.034]
HIGH_DEV	--	--	--	--	-6.218e-08*
					[0.058]
EDA	PPF	--	--	--	--
CAP	PPF	--	--	--	--
Observations	3647353	4224283	4224283	4301131	4224283
Pseudo R-squared	0.471	0.475	0.469	0.457	0.475

Robust p values in brackets. PPF: variable perfectly predicts failure
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Regression Results for Chapter 92: Musical Instruments

MUSICAL INSTRUMENTS	(1)	(2)	(3)	(4)	(5)
	Full Model	Excl. Govt Assistance	Excl. Firm Chars.	Excl. Demo. Effects	Asymmetric Exch. Rate
MFP	2.414e-08*	2.323e-08*	4.979e-08***	2.996e-08**	2.257e-08*
	[0.062]	[0.071]	[0.004]	[0.048]	[0.072]
EMP	-3.632e-08**	-3.667e-08**	--	-4.602e-08***	-3.675e-08**
	[0.028]	[0.023]		[0.006]	[0.023]
FOREIGN	7.50E-07	7.75E-07	--	7.84E-07	7.87E-07
	[0.107]	[0.105]		[0.113]	[0.106]
INDEP	3.39E-09	2.37E-09	--	2.26E-08	2.61E-09
	[0.929]	[0.947]		[0.528]	[0.941]
PROD_HIST_X	4.846e-07***	4.808e-07***	5.415e-07***	5.252e-07***	4.767e-07***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
CTY_HIST_X	2.240e-07***	2.203e-07***	2.047e-07***	3.253e-07***	2.190e-07***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
PROD_HIST_M	1.727e-07**	1.719e-07**	1.819e-07**	1.825e-07**	1.711e-07**
	[0.012]	[0.012]	[0.017]	[0.015]	[0.011]
CTY_HIST_M	3.92E-08	4.08E-08	-2.94E-09	1.012e-07***	4.08E-08
	[0.248]	[0.221]	[0.940]	[0.010]	[0.217]
RELN_HIST_M	2.794e-07**	2.756e-07**	3.759e-07***	2.946e-07**	2.722e-07**
	[0.012]	[0.013]	[0.002]	[0.016]	[0.013]
DEMO_PROD	6.944e-04**	6.890e-04**	7.227e-04**	--	6.565e-04**
	[0.013]	[0.014]	[0.019]		[0.021]
DEMO_CTY	1.987e-05***	1.973e-05***	2.543e-05***	--	1.988e-05***
	[0.000]	[0.000]	[0.000]		[0.000]
DEMO_RELN	-5.97E-04	-5.75E-04	-6.32E-04	--	-5.30E-04
	[0.489]	[0.498]	[0.506]		[0.535]
D1_NZGDP	-1.63E-06	-1.52E-06	-1.91E-06	-1.49E-06	-1.42E-06
	[0.185]	[0.210]	[0.154]	[0.247]	[0.232]
POP	3.047e-08*	2.989e-08*	3.343e-08**	3.021e-08*	2.905e-08*
	[0.053]	[0.052]	[0.044]	[0.061]	[0.052]
GDP_PP	4.564e-08**	4.500e-08**	5.120e-08**	7.488e-08***	4.454e-08**
	[0.015]	[0.015]	[0.015]	[0.001]	[0.016]
OPEN	-5.76E-09	-5.96E-09	-7.37E-09	-3.887e-08*	-3.27E-09
	[0.757]	[0.746]	[0.715]	[0.058]	[0.857]
D1_POP	1.84E-07	1.63E-07	3.35E-08	1.68E-06	8.41E-09
	[0.918]	[0.927]	[0.987]	[0.222]	[0.996]
D1_GDP_PP	-6.93E-07	-6.87E-07	-7.06E-07	-7.13E-07	-6.66E-07
	[0.193]	[0.196]	[0.270]	[0.274]	[0.211]
D1_OPEN	7.33E-08	7.05E-08	1.16E-07	1.21E-07	7.69E-08
	[0.639]	[0.647]	[0.511]	[0.443]	[0.621]
EXRATE	8.85E-09	8.24E-09	1.51E-08	4.22E-09	--
	[0.574]	[0.606]	[0.314]	[0.896]	
LOW_DEV	--	--	--	--	1.28E-08
					[0.150]
HIGH_DEV	--	--	--	--	1.22E-07
					[0.500]
EDA	PPF	--	--	--	--
CAP	4.20E-09	--	--	--	--
	[0.932]				
Observations	1325485	1339602	1339602	1339602	1339602
Pseudo R-squared	0.383	0.383	0.372	0.365	0.383

Robust p values in brackets. PPF: variable perfectly predicts failure
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Regression Results for Chapter 4: Dairy Products

DAIRY	(1) Full Model	(2) Excl. Govt Assistance	(3) Excl. Firm Chars.	(4) Excl. Demo. Effects	(5) Asymmetric Exch. Rate
MFP	-7.72E-08 [0.566]	-7.15E-08 [0.605]	-6.69E-08 [0.685]	-8.08E-08 [0.670]	-8.45E-08 [0.538]
EMP	1.12E-08 [0.885]	-8.75E-09 [0.912]	--	-2.47E-07** [0.018]	-9.85E-09 [0.901]
FOREIGN	2.19E-07 [0.483]	1.82E-07 [0.562]	--	1.02E-07 [0.808]	1.72E-07 [0.586]
INDEP	-2.06E-06*** [0.000]	-1.99E-06*** [0.000]	--	-2.71E-06*** [0.000]	-2.00E-06*** [0.000]
PROD_HIST_X	8.21E-06*** [0.000]	8.54E-06*** [0.000]	1.13E-05*** [0.000]	1.15E-05*** [0.000]	8.56E-06*** [0.000]
CTY_HIST_X	5.08E-06*** [0.000]	5.20E-06*** [0.000]	6.98E-06*** [0.000]	8.16E-06*** [0.000]	5.20E-06*** [0.000]
PROD_HIST_M	2.00E-06*** [0.000]	2.04E-06*** [0.000]	2.60E-06*** [0.000]	2.86E-06*** [0.000]	2.05E-06*** [0.000]
CTY_HIST_M	-7.95E-08 [0.796]	-4.97E-08 [0.876]	4.78E-08 [0.905]	7.69E-07* [0.069]	-4.15E-08 [0.897]
RELN_HIST_M	1.22E-06 [0.488]	1.30E-06 [0.474]	1.57E-06 [0.486]	2.23E-06 [0.387]	1.31E-06 [0.472]
DEMO_PROD	0.006823*** [0.000]	0.007233*** [0.000]	0.008901*** [0.000]	--	0.007293*** [0.000]
DEMO_CTY	0.000276*** [0.000]	0.000287*** [0.000]	0.000325*** [0.000]	--	0.000296*** [0.000]
DEMO_RELN	0.034228*** [0.000]	o.035188*** [0.000]	0.042956*** [0.000]	--	0.034984*** [0.000]
D1_NZGDP	1.16E-05 [0.245]	1.27E-05 [0.204]	1.41E-05 [0.215]	1.51E-05 [0.272]	1.36E-05 [0.178]
POP	2.88E-07*** [0.000]	2.94E-07*** [0.000]	3.62E-07*** [0.000]	4.27E-07*** [0.000]	2.96E-07*** [0.000]
GDP_PP	5.48E-08 [0.510]	5.45E-08 [0.526]	5.79E-08 [0.593]	3.04E-07*** [0.007]	5.28E-08 [0.540]
OPEN	6.01E-07*** [0.000]	6.17E-07*** [0.000]	7.73E-07*** [0.000]	6.60E-07*** [0.006]	6.44E-07*** [0.000]
D1_POP	1.59E-05 [0.113]	1.65E-05 [0.110]	0.00002 [0.122]	2.64E-05** [0.048]	1.58E-05 [0.125]
D1_GDP_PP	1.66E-06 [0.461]	1.79E-06 [0.438]	2.29E-06 [0.428]	3.35E-06 [0.289]	1.73E-06 [0.453]
D1_OPEN	-3.61E-07 [0.659]	-3.26E-07 [0.698]	-3.91E-07 [0.710]	7.79E-08 [0.944]	-3.33E-07 [0.690]
EXRATE	-1.15E-06** [0.017]	-1.14E-06** [0.019]	-1.45E-06** [0.018]	-1.47E-06** [0.018]	--
LOW_DEV	--	--	--	--	2.62E-06*** [0.007]
HIGH_DEV	--	--	--	--	-8.18E-07 [0.105]
EDA	-6.89E-07 [0.217]	--	--	--	--
CAP	6.36E-07** [0.025]	--	--	--	--
Observations	4891533	4891533	4891533	4891533	4891533
Pseudo R-squared	0.365	0.364	0.362	0.356	0.364

Robust p values in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

8 References

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Appendix A: Data Sources, Coverage and Definitions

<u>**Data Sources**</u>

<u>Datasets within the prototype Longitudinal Business Database</u>

AES   Annual Enterprise Survey
BAI   Business Activity Indicator
Customs   NZ Customs Import and Export Entry forms
GAP   Government Assistance Programme participant lists
IR4   Company Tax Returns
IR10   Accounts Information
LBF   Longitudinal Business Frame
LEED   Linked Employer-Employee Database

<u>External Data Sources</u>

IFS   International   Financial   Statistics   database
             http://www.imfstatistics.org/imf/ . Accessed 23 Jan 2008.
UN   United Nations Statistics Division, National Accounts Main Aggregates
             Database. Accessed 23 Jan 2008.

<u>**Export Data**</u>

The export data we use was provided to Statistics New Zealand by the New Zealand Customs Service. It is collected from forms completed by firms whenever they import or export any physical goods. Copies of each form are attached as Appendix B. The data has been made available at the shipment level, including details of the products traded (10-digit Harmonised System codes), value, volume, means of transport, currency of trade, an identifier of whether exchange rate cover has been taken, and country of destination, origin and export.

Over the period from 1996 to 2007, there have been a number of revisions to the 10-Digit Hamonised System classifications, reflecting a combination of the introduction of new goods, changes in the perceived importance of distinguishing between goods with certain characteristics, and changes in the tariff system. In order to maintain a consistent definition of goods over the entire observation period and hence prevent the identification of erroneous entries and exits, we group 10-digit product codes into the smallest possible consistent product groups. That is, where two or more product classifications have been merged, or a single classification has been redefined as multiple separate product codes, we aggregate these codes into a single product.

Source and Definition of Variables		
Variable	Source	Definition and Construction
Independent Variable		
Entry	Customs	Dummy variable indicating the first time a firm exports a specific product to a specific market since January 1996 (the beginning of the available Customs data).
Explanatory Variables – Firm level		
MFP	AES IR10 LEED BAI	Log of lagged MFP, relative to the industry-year average. MFP is calculated using a Cobb-Douglas production function with non-constant returns to scale. Value-added is constructed from firms' IR10 returns and BAI (GST returns). Capital services are constructed as depreciation plus rental and leasing costs plus the implied opportunity cost of owned assets. Employment is the sum of rolling mean employees and an annual count of working proprietors, both from LEED. See Fabling and Grimes (2008b) for a more detailed explanation.
EMP	LEED	Log of lagged employment. Employment is the sum of rolling mean employees and an annual count of working proprietors, both from LEED.
INDEP	LBF	Indicator variable equal to one if the firm is a single enterprise and is not in a parent/subsidiary relationship with any other firm over the period covered by the LBF, and zero if the firm is constructed from a group of related enterprises.
FOREIGN	IR4/LBF	Indicator of known non-resident control. Variable is equal to one for firms answering 'yes' to the question "Is this business owned or controlled by a non-resident?" in their IR4, and firms which do not complete an IR4 but are listed as having at least 50 percent foreign ownership in the LBF. For groups of enterprises, the response of the New Zealand located parent enterprise is used.
EDA	GAP	Indicator that firm has ever been approved for government assistance specifically targeted at export activities. Includes the Enterprise Development Grant – Market Development; and the Enterprise Network Fund from New Zealand Trade and Enterprise.
CAP	GAP	Indicator that firm has ever been approved for government assistance targeted at building firm capability. Includes a range of schemes administered by New Zealand Trade and Enterprise, the Foundation for Research Science and Technology, and Te Puni Kokiri.
Explanatory Variables – International Trade Experience		
TS_PROD	Customs	Inverse of the number of quarters since the firm last exported the relevant product.

TS_CTY	Customs	Inverse of the number of quarters since the firm last exported to the relevant country
TS_PROD_I	Customs	Inverse of the number of quarters since the firm last imported the relevant product.
TS_CTY_I	Customs	Inverse of the number of quarters since the firm last imported from the relevant country
TS_RELN_I	Customs	Inverse of the number of quarters since the firm last imported the relevant product from the relevant country
Explanatory Variables - Demonstration Effects		
DEMO_PROD		Proportion of the average number of other live manufacturing firms which began exporting the relevant product over the past 12 months.
DEMO_CTY		Proportion of the average number of other live manufacturing firms which began exporting to the relevant country over the past 12 months.
DEMO_RELN		Proportion of the average number of other live manufacturing firms which began exporting the relevant product to the relevant country over the past 12 months.
Explanatory Variables – Macroeconomic Conditions		
GDP	UN	Estimates of destination country GDP at constant 1990 prices in US Dollars.
POP D1_POP	UN	Log of destination country population Log 1-year growth in population of destination
GDP_PP D1_GDP_PP	UN	Log of destination GDP per capita Log 1-year growth in destination GDP per capita
OPEN D1_OPEN	UN	Log total imports of goods and services / GDP in destination Log 1-year growth in destination imports/GDP
EXRATE LOW_DEV HIGH_DEV	IFS	Deviation of destination country exchange rate from its three year rolling average relative to the New Zealand dollar. Authors' calculations from monthly SDR exchange rates. LOW_DEV and HIGH_DEV are the absolute values of this deviation when the New Zealand dollar is, respectively, below and above its average valuation relative to the currency of the destination country in question. Authors' calculations from monthly SDR exchange rates.
D1_NZGDP	UN	Log 1-year difference in New Zealand GDP

Countries Included in Analysis

Potential trade partners are included in the analysis if they have a consistent series of macro data available over the time period in question. A number of customs destinations are not independent countries (eg. US Minor Outlying Islands, Antarctica) and therefore do not have macroeconomic data available. We choose to exclude these destinations from the analysis, rather than including them as part of eg. the US, as export costs are assumed to have a geographical component. In addition there are a small number of countries which do not have consistent data available over the relevant time period (eg Afghanistan, Democratic Republic of Congo/Zaire) or have undergone political changes (eg. Indonesia/East Timor). These countries are excluded from the analysis.

The countries which are included are listed below:

Albania; Algeria; Angola; Anguilla; Antigua and Barbuda; Argentina; Armenia; Aruba; Australia; Austria; Azerbaijan, Republic of; Bahamas, The; Bahrain, Kingdom of; Bangladesh; Barbados; Belarus; Belgium; Belize; Benin; Bhutan; Bolivia; Bosnia & Herzegovina; Botswana; Brazil; Brunei Darussalam; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Canada; Cape Verde; Central African Rep.; Chad; Chile; China, Mainland; China, Hong Kong; China, Macao; Colombia; Comoros; Congo, Republic of; Costa Rica; Côte d'Ivoire; Croatia; Cyprus; Czech Republic; Denmark; Djibouti; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Estonia; Ethiopia; Fiji; Finland; France; Gabon; Gambia, The; Georgia; Germany; Ghana; Greece; Grenada; Guatemala; Guinea-Bissau; Guyana; Haiti; Honduras; Hungary; Iceland; India; Iran, Independent Republic of; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kiribati; Korea; Kuwait; Kyrgyz Republic; Lao People's Democratic Republic; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Luxembourg; Macedonia, FYR; Madagascar; Malawi; Malaysia; Maldives; Mali; Malta; Mauritius; Mexico; Moldova; Mongolia; Montserrat; Morocco; Mozambique; Myanmar; Namibia; Nepal; Netherlands; Netherlands Antilles; Nicaragua; Niger; Nigeria; Norway; Oman; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Romania; Russia; Rwanda; Samoa; Saudi Arabia; Senegal; Seychelles; Sierra Leone; Singapore; Slovak Republic; Solomon Islands; South Africa; Spain; Sri Lanka; St. Vincent & Grenadines; Sudan; Suriname; Swaziland; Sweden; Switzerland; Syrian Arab Republic; Tajikistan; Thailand; Togo; Tonga; Trinidad and Tobago; Tunisia; Turkey; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States; Uruguay; Vanuatu; Venezuela, Bolivarian Republic of; Vietnam; Zambia; Zimbabwe

Industry Coverage

C211   Meat and Meat Product Manufacturing
C212   Dairy Product Manufacturing
C213   Fruit and Vegetable Processing
C214   Oil and Fat Manufacturing
C215 & C216   Flour Mill and Cereal Food Manufacturing & Bakery Product Manufacturing
C217   Other Food Manufacturing
C218 & C219   Beverage and Malt Manufacturing & Tobacco Product Manufacturing
C221   Textile Fibre, Yarn and Woven Fabric Manufacturing
C222   Textile Product Manufacturing
C223   Knitting Mills
C224   Clothing Manufacturing
C225   Footwear Manufacturing
C226   Leather and Leather Product Manufacturing
C231   Log Sawmilling and Timber Dressing
C232   Other Wood Product Manufacturing
C233   Paper and Paper Product Manufacturing
C241   Printing and Services to Printing
C242 & C243   Publishing & Recorded Media Manufacturing and Publishing
C251 & C252 Petroleum Refining & Petroleum and Coal Product Manufacturing nec
C253   Basic Chemical Manufacturing
C254   Other Chemical Product Manufacturing
C255   Rubber Product Manufacturing
C256   Plastic Product Manufacturing
C261   Glass and Glass Product Manufacturing
C262   Ceramic Manufacturing
C263   Cement, Lime, Plaster and Concrete Product Manufacturing
C264   Non-Metallic Mineral Product Manufacturing nec
C271   Iron and Steel Manufacturing
C272 & C273   Basic Non-Ferrous Metal Manufacturing & Non-Ferrous Basic Metal Product Manufacturing
C274   Structural Metal Product Manufacturing
C275   Sheet Metal Product Manufacturing
C276   Fabricated Metal Product Manufacturing
C281   Motor Vehicle and Part Manufacturing
C282   Other Transport Equipment Manufacturing
C283   Photographic and Scientific Equipment Manufacturing
C284   Electronic Equipment Manufacturing
C285   Electrical Equipment and Appliance Manufacturing
C286   Industrial Machinery and Equipment Manufacturing
C291   Prefabricated Building Manufacturing
C292   Furniture Manufacturing
C294   Other Manufacturing
       C2941 Jewellery and Silverware Manufacturing
       C2942 Toy and Sporting Good Manufacturing
       C2949 Manufacturing nec

Appendix B: Customs Export and Import Entry Forms

Form C5

NEW ZEALAND CUSTOMS SERVICE

Te Mana Arai o Aotearoa

EXPORT ENTRY

Client Reference		Entry Type		Entry Number	
Payment Method (Drawback)					

Exporter/Licensee	Code	Agent		Code
Customs Controlled Area	Code		Declarants Code	

Country of Destination

I .... Exporter/Agent of Exporter
declare that the particulars contained in this entry are true and correct

Deposit (Refund)	**Process Indicator** Sold/Consignment

....
Signature   Date

COMPLETION OF SIGHT/TEMPORARY ENTRY		PERMIT INFORMATION		OTHER INFORMATION	
Original Entry Number		Authority	Number	Code	Data

Remarks

SHIPPING DETAILS

Mode of Transport **Sea / Air / Mail**	Voyage No.	Craft/Flight	Date of Export	Total Gross Weight *(kg)*
Port of Loading	Port of Discharge	Delivery Authority		Code

CONTAINER AND PACKAGE INFORMATION

Number & Type of Packages	Container Number	Container Status	Bill Number	Bill Type

DETAIL LINE INFORMATION

Detail Line No. **1**	Description of Goods	Tariff Item
		Country of Origin

Statistical Unit	Statistical Quantity	Supplementary Unit	Supplementary Quantity
FOB *(Whole NZ$)*	Exchange Rate Indicator	Currency Code	Exchange Rate	FOB *(Foreign)*
Misc. Reason Code	Misc. Amount *NZ$*	Drawback Duty *NZ$*	Drawback GST *NZ$*	Total Drawback *NZ$*

PERMIT INFORMATION		PROHIBITED GOODS	OTHER INFORMATION	
Authority	Number	Code	Code	Data

ENTRY TOTAL

	Total Drawback *NZ$*

* An Export Entry Transaction Fee is payable when making this entry.

Form C4

IMPORT ENTRY

New Zealand Customs Service

Te Mana Arai o Aotearoa

Client Reference				Entry Type		Entry Number	
Payment Method							

Importer		Code		Agent			Code
Customs Controlled Area		Code					Declarants Code

Invoice Number(s)	Invoice Terms	
		I .... Importer/Agent of Importer
		declare that the particulars contained in this entry are true and correct
		....
		Signature Date

COMPLETION OF SIGHT/TEMPORARY ENTRY		PERMIT INFORMATION			OTHER INFORMATION	
Original Entry Number		Authority	Number		Code	Data

Remarks

SHIPPING DETAILS

Mode of Transport	Voyage No.	Craft/Flight		Date of Import	Total Gross Weight (kg)
Sea / Air / Mail					
Port of Loading		Port of Discharge	Delivery Authority		Code

CONTAINER AND PACKAGE INFORMATION

Number & Type of Packages	Container Number		Container Status	Bill Number		Bill Type

DETAIL LINE INFORMATION

Detail Line No.	Description of Goods		Tariff Item		Concession Code	
1			Relationship Indicator		Preference Indicator	
			YES / NO		Q / N	

Country of Export		Country of Origin		Supplier Code	Supplier Name	
Statistical Unit	Statistical Quantity			Supplementary Unit	Supplementary Quantity	

VFD (Foreign)		Currency Code	VFD (Whole NZ$)		Exchange Rate
Insurance (Whole NZ$)	Freight (Whole NZ$)		Misc. Reason Code		Misc. Amount NZ$
Duty Payable NZ$		GST Payable NZ$		Total Payable NZ$ *	

PERMIT INFORMATION		PROHIBITED GOODS		OTHER INFORMATION	
Authority	Number	Code		Code	Data

ENTRY TOTAL

	Total Payable NZ$

* An Import Entry Transaction Fee is payable in addition to this Total Payable.