The Economic Relationship between Trade and Immigration in New Zealand

Mingming Qian

Working Paper Number 1

Integration of Immigrants Programme

Massey University, Albany

University of Waikato

November 2008

- ***All enquiries in writing to:***

Integration of Immigrants Programme
College of Humanities and Social Sciences
Massey University
Private Bag 102 904
North Shore
New Zealand

- See our website at: http://newsettlers.massey.ac.nz

ISBN: 978-0-9582971-0-3

Acknowledgements

I would like to express my sincerest thanks to my supervisor, Dr. Martin Berka, who has provided very helpful advice and support for this research report and also gave guidance throughout the whole process of this research with patience.

My special thanks are also given to all the lecturers in the Department of Commerce for providing data and good advice throughout the whole research project.

Finally, I would like to thank my friends, classmates, colleagues and flatmates for their support and encouragement, which helped me overcome the difficulties I encountered during my studies.

This publication was originally submitted as a research report for the Postgraduate Diploma in Business and Administration (Economics) at Massey University, Auckland, in November 2007.

Preface

Kia Ora Tatou Katoa

Ni Hao, Namaste, Annyeong-haseyo

Welcome to the first of the Integration of Immigrants Programme publications. This is a Foundation for Research, Science and Technology-funded programme that examines the settlement outcomes and strategies of five key immigrant groups to New Zealand – Chinese, Indian, Korean, South African and British. The programme got under way in 2007 and is funded through to 2012. It reflects the interest in the contribution of immigrants to New Zealand in the twenty-first century, both economically and socially, and whether New Zealand is gaining the full benefit of the human capital brought to this country by these immigrants. To help answer such questions, a team from Massey University (Carina Meares, Robin Peace and Avril Bell, as well as myself) have joined with a team from the University of Waikato (Richard Bedford, Elsie Ho and Jacques Poot) to explore questions about the quantum of immigrant human capital arriving in New Zealand and its use once here, as well as a range of topics concerning the networks and strategies of immigrant employers and employees, ethnic precincts, lifestyle immigrants and gender. We are aided in this task by other researchers, including the author of the present report.

Mingming Qian is a graduate of Massey University and this paper represents a research report that he submitted as part of his diploma. We are very keen to provide a publication outlet for such research, especially from talented postgraduates such as Mingming, and would welcome submissions and suggestions from others. We will, as here, submit the publication to a refereeing process to ensure that the quality of the material is assured. In this case, the report deals with the economic relations between trade and immigration and provides some new empirical evidence about this relationship and some comments about how to measure such matters. We are pleased that Mingming has agreed to publish his report here and honour him with the fact that it is the first.

New Zealand has a history of both building barriers to exclude those immigrants who some would deem inappropriate to what is a local ongoing nation-building project whilst at the same time experimenting with innovative community building. The nature of the issues changed dramatically with the new immigration policies that have evolved from 1987. The traditional emphasis on immigrants from Europe, specifically from the UK, was first altered with the arrival of migrants from the Pacific in the 1960s and 1970s. But the explicit assumptions concerning preferred source countries was finally abandoned in 1987 and the arrival of significant numbers of immigrants from Asia has changed the cultural mix of immigrants arriving in New Zealand, with consequences for settlement and the social cohesion of the country. By 2006, the proportion of New Zealanders who had been born in another country was such that the country was ahead of Canada and just behind Australia in league tables, while the fact that three of the four local territorial authorities that make up Auckland had 40 percent of their residents from overseas made the city a major immigrant destination. It had leapfrogged other Pacific rim cities that had been traditionally thought of as immigrant gateway cities. This research aims to contribute to an understanding of the resulting dynamics and to ensure that Auckland and New Zealand provide an appropriate welcome and home for these immigrants. We hope that this publication is a contribution to that understanding.

Paul Spoonley

Programme Leader

Integration of Immigrants Programme

Table of Contents

Abstract

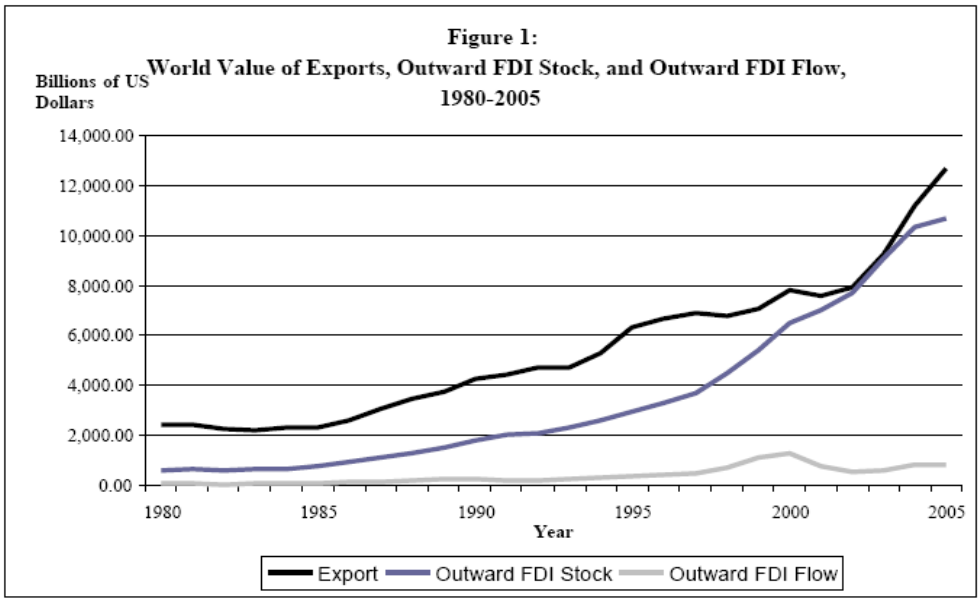
Immigration is an important issue in New Zealand. However, the economic impact of New Zealand's immigrants on trade has not been fully studied or addressed. Although previous studies have, in general, found a positive relationship between trade and immigration, there is little detailed research on the topic. Few studies have measured or compared the different effects of trade and immigration on subgroups of immigrants. Previous studies have also ignored important immigrant-related effects, such as the impact on trade of "temporary" immigrants or visa-holders. This group includes international students, temporary workers and business owners, and visitors. The failure to include visa-holders in research means that an accurate and complete understanding of immigrant-trade in New Zealand has not been possible.

This paper follows the studies done by Bryant et al (2004) and White (2007) and further explores the economic impact of New Zealand immigrants on trade. The framework of a standard gravity model of trade will be applied to immigrants from 190 countries between 1980 and 2005. Applying different classification models and tests, the empirical results suggest that newly-arrived immigrants from low-income countries and from different cultural backgrounds tend to create more trade than other groups. The results also point to the conclusion that the combined impact of immigrants and visa-holders strongly enhances export trade.

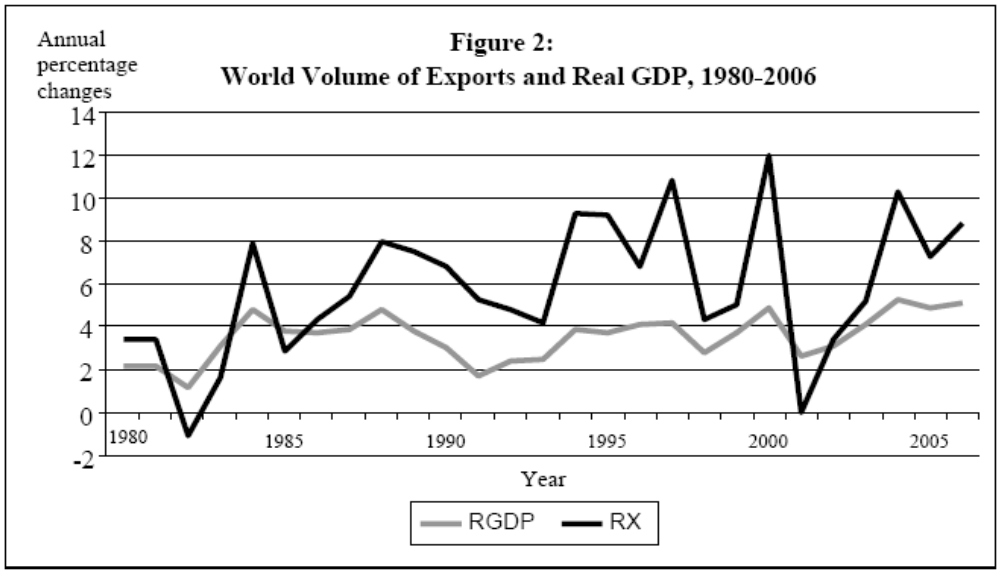
1. Introduction

New Zealand is a traditional immigration country and its economy and social conditions are greatly influenced by its immigrants and what they contribute in various ways. In recent research (Slack, Wu and Nana, 2007), the New Zealand Department of Labour estimated that immigration alone contributed NZ$3.3 billion (nearly 6% of annual GDP) to the New Zealand economy. With their skills, knowledge and access to international markets, immigrants provide New Zealand with a distinctive advantage in trade, thereby helping New Zealand compete more effectively in international markets.

Currently, trade is particularly important for an economy and widely believed to be "an engine of economic growth" (Krueger, 2006). Empirical data from the International Monetary Fund illustrates a close link between trade (especially exports) and the real GDP growth rate (see Figures 1 and 2).

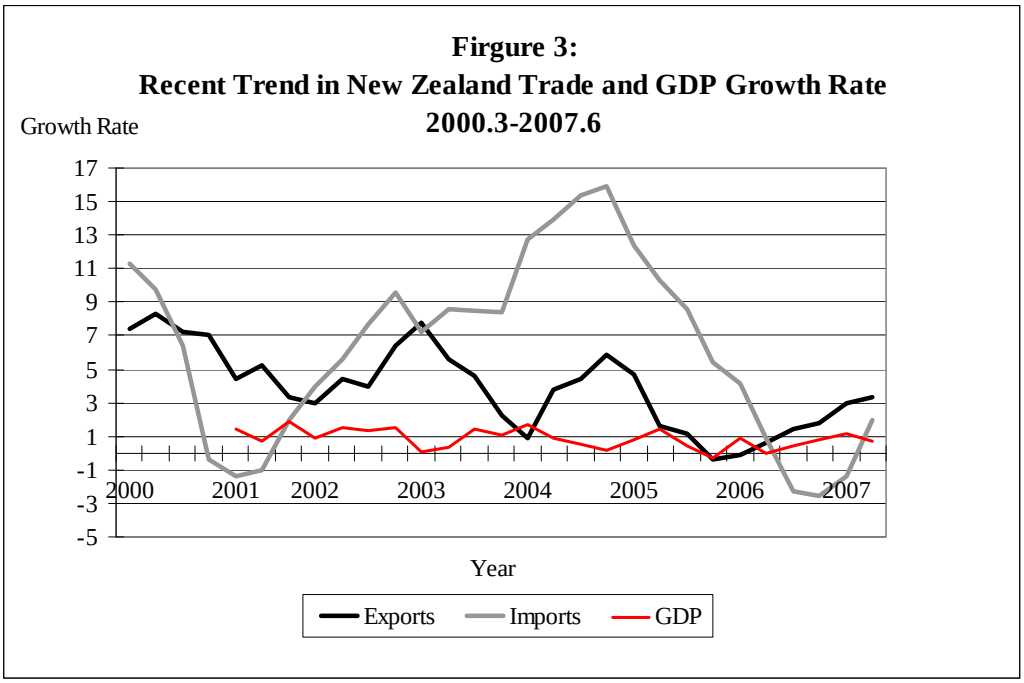


Sources: International Monetary Fund (2006) and UNCTAD, http://stats.unctad.org/fdi/



Source: International Monetary Fund (2006).

However, it is even more important for New Zealand policy-makers to understand the driving forces behind trade in order to further develop the New Zealand economy and improve New Zealand's OECD ranking. Despite constant economic growth in recent years, New Zealand does not do well in trade performance measures and this greatly affects the economy's overall performance (see Figure 3).



Source: Statistics New Zealand (2007)

Figure 3 indicates that New Zealand has experienced a relatively constant, albeit decreasing, growth rate in exports and volatile fluctuations in imports. In addition to the relatively unstable exchange rate fluctuations of the New Zealand dollar, this volatility in trade also causes real GDP to change. This further underlines the point that trade, especially export trade, is a critical driving force behind New Zealand's economic growth.

For traditional immigration countries such as New Zealand, international bilateral trade is believed to be closely associated with international migration labour flows. Recent studies point to a close relationship between trade and immigration across many different countries including New Zealand (Bryant et al, 2004). Nearly all of these studies find both a positive and a significant relationship between trade and immigration. However, the effect of immigration on exports and imports is found to be different (see Table 1), although there is no consensus as to how, and to what extent, immigration influences export and import trade.

Many studies fail to recognise that other forces relating to the mobility of people may also influence trade. Immigration involving permanent settlers might not be the only factor affecting trade; New Zealand visa-holders, such as international students, workers and visitors, might also be of significance. The Department of Labour (Slack et al., 2007) estimated that they contribute $NZ8.1 billion to the New Zealand economy every year. It is important to acknowledge and analyse these influential groups and their impacts further. This paper will test how these groups individually effect trade and then explore their combined effect on trade.

Another issue ignored by much of the previous literature is the cultural and ethnic composition of immigrants and the effect of this particular aspect on trade. Most previous studies only view immigration data as involving a single or homogeneous group and do not examine specific cultural or national groups within the broader category. Head and Ries (1998) and White (2007) do take this approach, however, and focus on the different subgroups within the larger immigrant community. Head and Ries studied the impacts of

immigrants from different continents and also explored the effect of the class of immigrants. They found that independent immigrants have the largest impact on trade with family and entrepreneurs next. East Asian and North American immigrants are found to have the largest import and export elasticity. In White's research, trading partners are classified into three subgroups: high-income, medium-income and low-income origin countries. He found that immigrants from low-income countries tended to export more than other groups. This finding is especially important for policy-makers as it enables them to be aware of the potential trade and export opportunities from particular groups.

This paper will continue this approach and expand it to consider new classifications. The approach will divide the immigrant community into six continental or regional subgroups, namely, Asia, Europe, Oceania, North America, South America and Africa. Given the increasing importance of Asian countries to New Zealand - especially from East and South-East Asia - the following will also test these two areas of the Asian continent and compare their immigrant-trade effects with those of other continents.

In general, this paper will present a detailed economic analysis of the effects of New Zealand immigrants on trade. Following on from the Bryant et al (2004) research, the relationship between trade and immigrants will be further investigated by comparing groups of immigrants from different continents/regions. Additionally, this paper will analyse the individual and combined effects of New Zealand visa-holders. The findings should provide policy-makers and the New Zealand public with more understanding and an awareness of the economic impact of immigrants and enable the creation of more effective policies in the future.

The remaining parts of this paper are structured as follows: Section 2 reviews previous studies on the relationship between immigration and trade; Section 3 introduces the gravity model of trade as a theoretical framework; Section 4 presents data sources and variables; and Section 5 sets out the empirical findings and attempts to explain them; Section 6 concludes.

2. Literature Review

2.1 Underlying Mechanisms

It is commonly believed that there are two main mechanisms through which immigration influences bilateral trade. These are:

1) Home Bias Effect; and
2) Network Effect.

The Home Bias Effect refers to the fact that immigrants generally prefer products from their home countries - which are not necessarily readily available in their new location - over products from their host countries. Therefore, immigrants tend to import products from their home countries. The Network Effect refers to the tendency for immigrants to create or tap into a wide social network with people from their home countries due to cultural and linguistic similarities. Through these social networks, immigrants gain superior local market knowledge which enables them to benefit from lower transaction, transportation and other costs. This results in increased economic benefits for immigrants when importing to, and exporting from, the host country.

Studies have attempted to identify which of these effects dominates in any given country by using empirically estimated import and export elasticities (see Table A1 in Appendix 1). In other words, the Home Bias Effect is expected to dominate in a country where immigration has a stronger impact on a host country's imports and, conversely, the Network Effect is predicted to dominate where immigration more heavily influences exports.

Based on these expectations, it is clear that both Home Bias Effect and Network Effect increase import elasticity but only Network Effect raises export elasticity. Therefore, higher import elasticity is expected in the empirical results.

However, Parsons (2005) argues that these mechanisms may not adequately explain the immigrant-trade link. He further contends that mechanisms such as remittances and the taste for foreign products can also influence trade. Remittances are especially important in explaining trade with developing countries because these countries are the biggest recipients of remittances in the world. The remittances received from a host country may help to develop a preference or bias toward that country and, consequently, create more exports. For example, immigrants from low-income countries who migrate to New Zealand to work might end up earning more income than they would have earned in their home countries. The remittances provided by a migrant might increase that person's family's wealth and, thus, the family may begin to develop a preference for New Zealand products. This, in turn, increases New Zealand exports to the home country. Although the effect may be small, it points to greater complexity in the immigrant-trade link.

International tastes may also be very important in the immigrant-trade link. Immigrants may enjoy a product from a particular country, regardless of location or proximity. For example, an immigrant might like cheap Chinese clothing or Japanese motor vehicles. Importing more products from a particular country may result. However, Parson (2005) also admits that these effects are difficult to be measured due to data constraints. Therefore, it is difficult to accurately identify how, and the extent to which, these mechanisms influence trade.

Recent studies have begun to research the issue of trade-diversion in the context of immigrant-trade. Researchers contend that immigrant networks may also decrease the volume of trade, rather than only having a trade-enhancing effect. Casella and Rauch (2003) argue that trade-diversion effects are caused by network ties. By using a two-country model, they found a matching problem will occur between domestic producers and foreign markets, due to the limited network and local market information of producers. Trade diversion effects will also depend on the wage differentials between foreign countries. In a three-country model, the trade-diversion effects would be much smaller where the domestic wage in the home country is similar to one of the other two countries. Konecny (2007) identifies and tests the trade-diversion and trade-creation effects and finds the greatest impact of

immigration is from trade diversion. A 1 percent increase in immigrants would create nearly a 6.9 percent decrease in total exports. Although all of these findings and theories contradict each other and add complexities to the immigrant-trade link studies, the Home Bias and Network effects are still believed to be two major forces that influence bilateral trade.

2.2 Review of Previous Empirical Studies

Estimates of import and export elasticities vary (see Appendix 1 for previous estimates). Gould (1994) initiated the first research in this field by studying the United States and its 47 trading partners between 1970 and 1986. In general, he found immigrants have a positive significant impact on bilateral trade. A 10 percent increase in immigration will lead to a 0.2 percent increase in exports but only a 0.1 percent increase in imports. In addition to comparing immigrant skill levels and lengths of stay, he also compared consumer and producer goods and found that the impact of immigration is much stronger on the trade of consumer goods than producer goods.

Head and Ries (1998) conducted a similar study on Canada using a larger sample of 136 countries between 1980 and 1992. In order to assess the impacts of immigration, they classified all immigrants according to country of origin and visa type. They concluded that a 10 percent increase in immigration would lead to a 1 percent increase in exports and a 3.1 percent increase in imports. They also found that immigrants with families have the biggest impact on trade among all of the categories of immigrants. A 10 percent increase in this category would increase imports by 3.56 percent and exports by 1.13 percent. Canadian immigrants from East Asia were found to have the strongest home countries network connection. East Asian immigrants were shown to have the most significant import elasticity, whereas North American immigrants were shown to have the strongest export elasticity.

Girma and Yu (2002) focused their study on the United Kingdom and 48 trading partners between 1981 and 1993. They compared the impact of immigrants from Commonwealth

and non-Commonwealth trading countries. Their original hypothesis was that similarities in cultural and institutional factors among Commonwealth countries would increase trade between them. Instead, they found a trade-substitution, rather than a trade-enhancement, effect of immigration from Commonwealth countries. In other words, immigrants from different cultural and institutional backgrounds are found to trade more. However, they failed to explain the underlying cause.

Later, Wagner, Head and Ries (2002) studied Canada again but they focused more on provincial trade with 160 countries between 1992 and 1995. In this study, the authors were particularly aware of the importance of specification with regards to regression. The authors applied the fixed effect estimation method and added a decreasing marginal effect variable (Mill's ratio) to control for trade effect. A common language between trading partners is found to have a strong influence on trade. In general, they found export elasticity and import elasticity to be 0.16 and 0.41 respectively.

Rauch and Trindade (2002) took a very different approach and studied a particular group (Chinese) network to assess the ethnic impact on trade in 63 countries. By using pooled ordinary least square methodology, they analysed two cross-sectional data sets in two different years: 1980 and 1990. Rauch and Trindade (2002) also classified trade goods into different groups and found that an ethnic network has the largest impact on the differentiated commodity group.

In the wake of European Union (EU) expansion, Parsons (2005) studied the impact of East-West European immigration by analysing 225 EU-15 provinces and 15 EU-expansion country pairings for the period 1994 to 2001. Using a similar approach to Wagner et al (2002), Parsons found 0.12 export elasticity and 0.14 import elasticity.

Bacarreza and Ehrlich (2006) extended this field of research into a small, developing country with a closed economy, Bolivia. They investigated the impact of emigration on 30 trading partners from 1990 to 2003 and found that a 10 percent increase in immigration in Bolivia

led to a 0.83 percent increase in exports and 0.89 percent increase in imports. They also found that a 10 percent increase in emigration brought about a 0.30 percent increase in exports and 0.35 percent in imports. The conclusion they reached is that both immigration and emigration support trade flows for a developing country.

White (2007) re-investigated United States' immigration impacts with respect to 73 trading partners for the period between 1980 and 2001. He found that the United States' immigrant-trade link is mainly driven by immigrants from low-income countries. By using "fixed effects estimation", he demonstrated that a 10 percent increase in immigrants from low-income countries will bring about a 6.9 percent increase in total trade, compared to a 2.18 percent increase from medium-income countries and 1.08 percent decrease from high-income countries.

Only one known study has been conducted on New Zealand immigration. In 2004, the New Zealand Treasury conducted research into New Zealand's immigrant-trade link. Bryant et al (2004) collected data from 170 countries between 1981 and 2001. This study specified unobserved heterogeneity in the model and added a dummy for the year 1995 to control for census data errors. They found export elasticity to be 0.14 and elasticity to be 0.22. Despite this finding, there is a distinct lack of detailed studies on New Zealand.

In summary, studies have produced very different findings. However, there is an increasing interest in decomposing the immigrant-trade effect in recent research. Recent studies focus on subgroups (eg Head and Ries, 1998; White, 2007), and others extend to countries with different characteristics (such as Bacarreza and Ehrlich, 2006). Immigrant-trade link studies on New Zealand are still limited and need to be furthered explored.

Since a new Immigration Act was passed in 1987, people from diverse backgrounds and countries have been emigrating to New Zealand bringing a corresponding increase in ethnic diversity and economic development. Given the growing importance of different groups and regions for New Zealand, there is a need to identify the actual influences of different groups.

The next section of this paper will investigate and analyse the effects of different groups on trade in New Zealand.

3. Theoretical Framework

3.1 Model Description

This paper tests the data using the Gravity Model of Trade. This model is commonly applied in the immigrant-trade link literature because it has proven to be a success in describing empirical patterns of overseas trade (Fratianni, 2007). The Gravity model is based on Issac Newton's (1687) 'Law of Universal Gravitation', which states that every object attracts every other object by a force pointing along the line intersecting both objects. The force is proportional to the product of the two masses and inversely proportional to the square of the distance between the masses:

$$F = G * m_1 m_2 / r^2 \qquad (1)$$

Where:

F is the magnitude of the gravitational force between the two point masses;

G is the gravitational constant;

m_1 is the mass of the first object;

m_2 is the mass of the second object; and

r is the distance between the two point masses.

However, it was not until the 1960s that the Gravity model was first applied to trade. Tinbergen (1962) and Poyhonen (1963) applied the model when examining international bilateral trade effects. Thirty years later, Gould (1994) applied the Gravity model to study the immigrant-trade link and many researchers have since done the same.

The model is commonly written as:

$$T_{ij} = Y_i Y_j / D_{ij} \qquad (2)$$

Where:

T_{ij} is flow of bilateral trade between country i and country j;

Y_i and Y_j are GDPs of the trading partners, country i and country j respectively; and

D_{ij} is measure of distance between country i and country j.

The equation (2) applies the Gravity model to international trade and shows that the trade flow between two countries is positively determined by their respective GDPs but negatively determined by the distance between these two countries. More commonly, equation (2) is converted in log-log form as:

$$\ln T_{ij} = \ln Y_i + \ln Y_j - \ln D_{ij} + \varepsilon_{ij} \qquad (3)$$

In equation (3), ε_{ij} measures errors as well as other variables that can influence trade. Other control variables are also included in the model for empirical studies although the selection of variables in the model is quite controversial. The following section will discuss the selection of control variables in detail.

3.3 Variable Selection

Nearly all of the studies in this topic include GDP and population as control variables to measure economic mass. This is because these two measures are believed to better capture the effects of a countries' economic resources and production on trade (Parson, 2005). Larger countries with big populations and GDPs, such as the United States or China tend to conduct more trade with New Zealand. However, some emphasis is also given to per capita income (Frankel, 1997). The argument is that per capital income does not only capture the relative wealth of nations or their standard of living, but also correlates to trade barriers in most cases. For this reason, the following includes both population and per capita income to control for the effects of economy size.

Exchange rates also partially determine bilateral trade volumes. Given the recent volatility of the New Zealand dollar, it is crucial to include a variable to control for movements in the rate. However, previous literature has focused only on the appreciation and depreciation of a currency as a control variable. This cannot adequately explain the movement and certainty of the New Zealand dollar. Therefore, this paper introduces a new variable - "exchange rate volatility" - to explain the data trend.[1] This variable measures uncertainty of long-term international contracts. As a currency becomes more volatile, it will become more risky to trade on that currency. Consequently, trade has a negative relationship with exchange rate volatility.

It is important to restrict the number of dummy variables in a regression, as degrees of freedom are lost as more dummies are added. Therefore, this paper will choose only the most relevant and important dummy variables. Many previous studies include a neighbour country dummy variable - "adjunct" - because a country tends to trade more with its neighbours. However, this paper will test different continents or regions individually, including Oceania, where distances between most neighbouring countries and New Zealand are relatively equidistant. A "border" dummy, "language dummy English" and "Commonwealth countries" dummy will not be tested in the model. A "Free Trade Agreement (FTA)" variable is included in the regression analysis due to its significant influence on trade. According to the Ministry of Trade, there are five key free-trade partners for New Zealand: Australia, Singapore, Thailand, Brunei and Chile.[2]

The key variable in the regression is "immigrant population". All the previous studies focus solely on the stock of immigrants, not the flow of immigrants or visa-holders, and this is mainly due to the lack of data concerning flow and visa-holders. However, Statistics New Zealand's Information Network for Official Statistics (INFOS) has provided an almost complete record of annual migration flow figures since 1979. This research will test the impact of both variables, based on INFOS data. In addition, immigrant stock figures have

[1] I appreciate the advice received from my research supervisor Dr. Martin Berka on this matter.
[2] See the link: http://www.mfat.govt.nz/Trade-and-Economic-Relations/Trade-Agreements/index.php#negotiation

been obtained from the New Zealand census and New Zealand visa statistics have been sourced from the New Zealand Immigration Service of the Department of Labour.

Taken together, the control variables and the functional form to be used in the following research can be expressed as follows:

Model with country fixed effects(FE):

$$\ln Trade_{ij} = \alpha_0 + \beta_1 \ln Immigrant\ stock_i + \beta_2 \ln Per\ Captia\ GDP_j + \beta_3 \ln Population_j + \beta_4 \ln Distance_{ij} + \beta_5 \ln \text{Exchange rate volatility}_{ij} + \beta_6 FTA + FE_j + \varepsilon_{ij} \quad (4)$$

4. Data and Methodology

4.1 Data Description

The following research relies on data from approximately 190 trading partners (both countries and regions) from 1980 to 2005. The data size is slightly larger than previous similar studies done by Bryant et al (2004).

Data on exports and imports is sourced from the United Nations Statistics Division's Comtrade Database, a copy of which was obtained from Statistics New Zealand. All values have been converted to US dollars. In contrast to Bryant et al (2004), this research deletes any missing or unknown trade in the regression analysis to achieve more accurate analysis.

The foreign-born population data in New Zealand is obtained from Statistics New Zealand's censuses in 1981, 1986, 1991, 1996 and 2001.[3] Similar to Bryant et al's (2004) approach, this paper assumes the population of foreign-born people will be constant over five consecutive years, until the next census is taken. For example, figures for the foreign-born population in 1981, 1982, 1983, 1984 and 1985 are considered to be the same in each year, with any changes taking effect in 1986. Although this may not completely capture changes in population within the short-term, it does explain trends over the medium-term.

Data on GDP has been sourced from the World Bank World Development Indicator database. Data on exchange rates originates from the International Monetary Fund (IFS) and distance information is taken from the online website, *Great Circle Distance between Capital Cities*.[4] Finally, population data comes from the United Nations Population Division's annual estimates and projections.

[3] Thanks to Dr. Murat Genc from Otago University for providing useful advice on the data.
[4] Available at: http://www.wcrl.ars.usda.gov/cec/java/lat-long.htm

4.2 Research Focus

This paper mainly conducts two types of tests, each with a different interest and focus. The first test – the Classification Test - focuses on different classifications (or subgroups) of the total sample and compares the results from different subgroups. The total sample will be classified according to trading partners' income level, geography and culture. The second test – the New Variable Test - introduces new variables in the Gravity model and examines their effects on trade. In particular, immigrant flows and the impact of New Zealand visa-holders will be tested to determine their influence on trade.

4.2.1 Classification Test

(a) Income Level Differences

This income classification is based on the definition used by the World Bank.[5] It divides the total sample into four groups: low-income economy; lower-middle-income economy; upper-middle-income economy; and high-income economy (see Table A2 in Appendix 3). Immigrants from lower income economies are expected to trade more with their home countries as they earn more in New Zealand compared to their home countries and, thus, have more resources to trade.

(b) Continental Differences

All countries are divided into six key continental/regional groups: Asia; Oceania; Europe; North America; South America; and Africa. Given the increasing importance of East Asia and South-East Asia for New Zealand trade and the composition of immigration flows in recent years (see Appendix 2), this paper pays special attention to East Asian and South East Asian countries (see country list in Table 3) and tests their importance to New Zealand in terms of the immigrant-trade link.

[5] See the World Bank official website: http://go.worldbank.org/K2CKM78CC0

(c) Cultural Differences

Due to concerns about the influence of culture and language on trade, this paper also compares English-speaking countries with non-English-speaking countries. English-speaking countries are deemed to be those for which English is an official language or is widely spoken in the local market (see the full list in Table A4 in Appendix 3). A similar approach is taken with respect to comparing Christian-dominant and non-Christian countries. In general, people from English-speaking or Christian countries are expected to be able to more easily integrate into New Zealand society because the predominant New Zealand culture is English-speaking and Christian. Due to these similarities, English-speaking Christian immigrations are expected to desire fewer goods and services from their home countries than immigrants from non-English-speaking and/or non-Christian countries.

4.2.2 New Variable Test

(a) Visa-holders Test

International students, work permit-holders and tourists play important roles in New Zealand trade and immigration according to data[6] obtained from the New Zealand Immigration Service. It should be noted, however, that the data only captures some of New Zealand's visa-holders, not all. For example, it fails to account for illegal over-stayers, which are estimated at 20,000 by the Department of Labour (2006). Additionally, it fails to provide accurate measurements of the average length of stay of visa-holders. However, the figures are a good proxy measure and provide detailed descriptions of visa-holders in New Zealand. This paper will analyse their individual importance as well as their combined impact with respect to immigrant stock on trade.

(b) Immigration Flow Test

Special attention is also given to immigration flow which has not been thoroughly studied

[6] Data obtained from: http://www.immigration.govt.nz/migrant/general/generalinformation/statistics/

and addressed in previous literature. Unlike immigrant stock information, the annual immigrant flow can provide relatively accurate measurements to determine the net impact of new immigrants on trade, and the figure shows the effects of immigration with little or no economic assimilation into the mainstream New Zealand society.

4.3 Research Methodology

4.3.1 Model Selection

The model selected for the purposes of this analysis is the same one used by Bryan et al (2004) and Head et al (2002), which uses pooled ordinary least square method with country fixed effects to run the regression. In this model, the pooled ordinary least square method is preferred over the panel estimation method because some important trade data is missing and unknown in the regression, which makes for unbalanced panel data that is insufficient to run panel estimations.

Countries' effects dummies are also employed in the regression model for estimation because the country fixed effects can capture unobserved effects in the regression.

4.3.2 Statistical Tests

Four methods are employed to ensure a robust estimation. The first is to use the panel estimation method with two-way fixed effects which captures both unobserved time and country characteristics. The estimation works across the total sample and takes into account both time and cross-sectional dynamics.

The second method is to run the regression but exclude major trading partners in the model (i.e. Australia, United States, China and Japan) which are New Zealand's four biggest trading partners (see Appendix 2). These key trading partners are very influential and may in fact

have too much influence on the estimated coefficients. For example, China may drive the whole lower-middle-income economy group and overwhelmingly determine the immigrant-trade link. Therefore, exclusion of these major trading partners could provide more accurate and fairer estimates concerning this total sample.

The third method to ensure robustness is the inclusion of lagged dependent variables (such as trade, exports or imports) as additional, independent variables in the regression. These lagged variables can explain some patterns of trade in the future and, therefore, give migration stock a more robust elasticity measurement.

The last method is to run a "Two-Stage Least Squares" (2SLS) regression by using a lagged immigration stock variable as an instrumental variable. Although immigration stock can influence trade by both the Network Effect and Home Bias Effect, the effect can also work in the opposite direction. In other words, increasing trade between two different countries can enforce strong social networks between people in these two countries. Therefore, it becomes easier for them to move from one country to another. The relationship between New Zealand and Australia is such an example. This issue will create a problem of endogeneity in the regression and bias the estimation of empirical results. Application of the Two-Stage Least Squares will provide a robust check only if the endogeneity problem influences the empirical results strongly.

5. Empirical Results

5.1 General Results

Table 1. Estimated effects of immigrant stock on trade flows

Dependent Variable	ln Trade	ln Exports	ln Imports
ln Immigration Stock	0.03602***	0.05604***	0.13552***
	(0.00403)	(0.01310)	(0.02361)
ln Distance	-0.05067	-0.65985***	3.75451***
	(0.03856)	(0.09409)	(0.29717)
FTA	1.53743***	2.54539***	1.34719
	(0.06134)	(0.30433)	(0.85306)
ln Population	13.35198***	11.17709***	8.66166***
	(0.11205)	(0.18330)	(0.36104)
ln per capita GDP	0.00602***	0.03895***	0.02315**
	0.00143	(0.00726)	(0.01023)
ln Exchange rate Volatility	-0.02155***	-0.04161**	0.00283
	(0.00480)	(0.01744)	(0.03601)
Constant	-20.88614***	-11.81485***	-46.26721***
	(0.52770)	(1.08684)	(3.10443)
N	3152	3897	3305
Adjusted R-squared	0.99660	0.95630	0.88810

Notes:
Country-specific effects are included in all regressions.
Heteroskedasiticity-consistent robust standard errors in parentheses.
***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

Table 1 presents results for the total sample. For the full sample, a 10 percent increase in immigrant stock in New Zealand will lead to a 0.36 percent increase in total trade with other trading partners and will raise exports and imports by 0.56 percent and 1.36 percent respectively. These results are very similar to Bryant et al's (2004) estimation for New Zealand, in which they found that a 10 percent increase in immigrant stock will lead exports and imports to be increased by 0.87 percent and 1.50 percent respectively.

Apart from immigrant stock variables, nearly all other explanatory variables are found to have anticipated results and expected outcomes. The coefficients of "Distance" are all

negative, as expected, as it becomes more costly for New Zealand to trade with countries further away. The only exception concerns "Imports", which results in a positive significant variable. This may be explained by the fact that some of New Zealand's major trading partners, such as the United States, Japan and China, are also distant from New Zealand. Both "Population" and "Per Capita Income" show positive significant relationships with trade. This indicates that countries with bigger populations and economies tend to trade more with New Zealand. "Exchange Rate Volatility" shows a negative significant relationship with trade because volatile fluctuations in the value of the New Zealand dollar add uncertainty to trade.

Table 2. Summary of immigrant stock coefficients, robustness checks

Robustness Check: Two way fixed effects panel estimation		
Dependent Variable	ln Immigration Stock	Robust Standard Errors
ln Trade	0.03602***	0.00331
ln Exports	0.05604***	0.01178
ln Imports	0.13552***	0.02419

Robustness Check: Australia, USA, Japan, and China excluded		
Dependent Variable	ln Immigration Stock	Robust Standard Errors
ln Trade	0.03324***	0.00393
ln Exports	0.05464***	0.01323
ln Imports	0.13014***	0.02378

Robustness Check: Lagged dependent variable included in model		
Dependent Variable	ln Immigration Stock	Robust Standard Errors
ln Trade	0.03200***	0.00385
ln Exports	0.04710***	0.00481
ln Imports	0.04472***	0.00458

Robustness Check: Endogeneity problem tested in model		
Dependent Variable	ln Immigration Stock	Robust Standard Errors
ln Trade	0.04816***	0.00716
ln Exports	0.06772***	0.02124
ln Imports	0.27612***	0.04574

Notes:

Standard errors are heteroskedasiticity-consistent robust

***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

Table 2 shows a robustness check of the previous test results. In general, all of these tests still support previous tests: the elasticity estimates of trade, export and import are almost

identical compared to the previous table. The robustness check on endogeneity shows even stronger import elasticity. Although the inclusion of lagged dependent variables reduces both significance and coefficients on immigrant stock, especially for imports, the elasticity estimates still prove to be valid overall.

5.2 Classification

(a) Income Level Classification

Based on the World Bank's classification of per capita income, New Zealand's trading partners can be divided into four groups. Table 3 illustrates that immigrants from lower-middle-income countries significantly increase trade with New Zealand more than other groups. A 10 percent increase in immigrant stock will lead to a 0.69 percent increase in trade with lower-middle-income countries, compared to 0.38 percent for high-income countries, 0.07 percent for upper–middle-income countries and 0.25 percent for low-income countries. In general, it indicates that immigrants from lower income countries trade higher than those from higher income countries. The trade-enhancing effects, therefore, are much stronger for lower-income countries. This finding is different from Bryant et al's (2004) conclusion that they found the opposite result by using "the average foreign GDP" as a control variable in the trade selection model. It also differs from Co et al (2004), who studied 73 United States trading partners over 22 years and found identical effects from both "developed" and "developing" countries. However, it is consistent with White's findings.

Additionally, the table also shows that lower-income countries have the strongest export-enhancing effect on the basis that a 10 percent increase in immigrant stock will lead to a 1.11 percent increase in exports, compared to 0.85 percent from high-income countries, and 0.22 percent from lower-middle-income countries.

Table 3. Estimated effects of immigration on trade flows by level of per capita income

	High-income countries			Upper-middle-income countries		
Dependent Variable	ln Trade	ln Exports	ln Imports	ln Trade	ln Exports	ln Imports
ln Immigrant stock	0.03837***	0.08540***	0.04798*	0.00688	-0.0196147	0.14412***
	(0.00829)	(0.01884)	(0.02789)	(0.00794)	(0.03091)	(0.05294)
ln Distance	-0.07670	0.13906***	2.870514***	0.37255***	-1.236258***	6.80294***
	(0.05632)	(0.05370)	(0.2033)	(0.1181)	(0.2649)	(1.8979)
FTA	1.08716***	0.14177	4.70823***	0.1239016*	0.22886	2.27673*
	(0.11064)	(0.0941)	(0.3780)	(0.0756)	(0.2211)	(1.2797)
ln Population	14.24532***	10.25121***	18.48435***	13.42355***	11.8641***	10.1763***
	(0.5530423)	(0.3639)	(1.7202)	(0.3175)	(0.3158)	(0.9166)
ln Per Capita GDP	0.00050	0.01035*	-0.00146	0.01384***	0.05007***	0.05827***
	(0.00331)	(0.0060)	(0.0213)	(0.0024)	(0.0117)	(0.0141)
ln Exchange Rate Volatility	-0.01877*	-0.00261	0.01643	-0.02327**	-0.0584752	0.04693
	(0.0073)	(0.0198)	(0.0476)	(0.0096)	(0.0406)	(0.0865)
Constant	-22.96085***	-13.58063***	-63.16408***	-24.84557***	-6.611069*	-79.48946***
	(1.9557)	(0.8548)	(6.0924)	(0.3559)	(2.6116)	(18.3291)
N	1003	1111	1003	622	745	617
Adjusted R-squared	0.99640	0.97790	0.92460	0.99530	0.93410	0.84680

Notes:

Country-specific effects are included in all regressions. Dependent variables are measured in 1995 New Zealand dollars

Heteroskedasiticity-consistent robust standard errors in parentheses.

Statistical significance is indicated as follows: ***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

Table 3. Estimated effects of immigration on trade flows by level of per capita income (Cont'd)

	Lower-middle-income countries			Low-income countries		
Dependent Variable	ln Trade	ln Exports	ln Imports	ln Trade	ln Exports	ln Imports
ln Immigrant stock	0.06847***	0.02172	0.31102***	0.02501***	0.110633***	-0.0408983
	(0.0114)	(0.0220)	(0.0647)	(0.0077)	(0.0344)	(0.0519)
ln Distance	0.22930***	-0.50180***	5.407112***	-0.027135	-1.32472***	0.90946***
	(0.0716)	(0.1313)	(0.2990)	(0.0284)	(0.2231)	(0.2183)
FTA	0.39824***	0.29463*	0.80509*			
	(0.0610)	(0.1585)	(0.4260)			
ln Population	13.26328***	11.99451***	6.48294***	12.66457***	10.45513***	7.771169***
	(0.1684)	(0.3891)	(0.4609)	(0.1669)	(0.2915)	(0.6850)
ln Per Capita GDP	0.00044	0.03778**	0.04013*	0.00885	0.03920***	-0.0018297
	(0.0028)	(0.0172)	(0.0215)	(0.0033)	(0.0149)	(0.0226)
ln Exchange Rate Volatility	-0.0160763*	-0.0122188	-0.0099577	-0.0167605	-0.10715**	0.01387
	(0.0097)	(0.0284)	(0.0708)	(0.0108)	(0.0538)	(0.0800)
Constant	-23.12266***	-13.25375***	-54.18735***	-19.34893***	-4.101949*	-16.13144***
	(0.7367)	(1.9785)	(3.0451)	(0.5514)	(2.2429)	(3.0675)
N	894	1219	959	636	822	726
Adjusted R-squared	0.99600	0.95930	0.86650	0.99520	0.90770	0.81290

Notes:

Country-specific effects are included in all regressions. Dependent variables are measured in 1995 New Zealand dollars

Heteroskedasiticity-consistent robust standard errors in parentheses.

Statistical significance is indicated as follows: ***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

(b) Region Classification

Table 4 provides estimations of the immigrant-trade link for six different continents/regions. Among these continents/regions, North America shows the strongest immigrant-trade link with New Zealand. A 10 percent increase in immigrant stock brings a 1.52 percent increase in total trade. That is followed by Africa and South America (both 0.85%), Asia (0.33%), Oceania (0.22%), and Europe (0.01%).

Together with Oceania, immigrants from North America also show a very strong export-enhancing effect. A 10 percent increase in immigrant stock is very likely to result in a 1.23 percent increase in exports. Asia follows with approximately 0.70 percent. For imports, South America has the largest import elasticity of 0.74 percent, followed by Africa (0.37%) and North America (0.33%).

East Asia and South East Asia deserve special attention due to the fact that many Asian and South East Asian countries are major trading partners for New Zealand (see Chart A1 and Chart A2 in Appendix 2). At the same time, many recent New Zealand immigrants come from Asia (see Chart A3 in Appendix 2). Table 4 shows East Asia and South East Asia have very strong immigrant-export elasticity estimates, with 0.16 and 0.10 respectively. This finding somewhat contradicts Head and Ries' (1998) research findings with respect to Canada. They found a strong Home Bias effect from empirical data and high import elasticity estimates. This difference may be due to distance as New Zealand is relatively close to East Asia and South East Asia. As a result, the transaction costs of trading are reduced.

Table 4. Estimated effects of immigration on trade flows by region

Region	Dependent Variable	Migrant Stock	Robust Standard Errors
Africa	ln Trade	0.08536***	0.01362
	ln Exports	-0.00223	0.03534
	ln Imports	0.37194*	0.14930
Asia	ln Trade	0.03397***	0.00675
	ln Exports	0.07031***	0.01868
	ln Imports	0.14806***	0.03767
Europe	ln Trade	0.00102	0.00441
	ln Exports	0.01007	0.02474
	ln Imports	0.04870*	0.02767
North America	ln Trade	0.15243***	0.02592
	ln Exports	0.12279***	0.03608
	ln Imports	0.32848**	0.13664
South America	ln Trade	0.08453***	0.03096
	ln Exports	-0.01557	0.10815
	ln Imports	0.73905***	0.17011
Oceania	ln Trade	0.02242*	0.00917
	ln Exports	0.12314***	0.02793
	ln Imports	-0.30620***	0.10481
Special Focus			
East Asia	ln Trade	0.06585**	0.03126
	ln Exports	0.15976***	0.02269
	ln Imports	0.26824***	0.04324
South East Asia	ln Trade	0.02276***	0.00744
	ln Exports	0.10242***	0.02408
	ln Imports	0.02295	0.02577

Notes:

Country-specific effects are included in all regressions.

Standard errors are heteroskedasiticity-consistent robust

***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

(c) Cultural Classification

Table 5 shows that people who come from countries with different cultural backgrounds generally trade twice as much as those from similar cultural backgrounds as New Zealand. People from Non-English-Speaking countries tend to trade ten times more than people from English-Speaking countries, especially in relation to imports. This matches previous expectations that people from countries with different language backgrounds tend to demand goods and services that might not be readily available in New Zealand. Therefore, this desire fuels increased trade between different countries. The table also shows that people from different religious backgrounds may trade more but the difference is not huge. Overall, the table meets the expectation and proves that cultural characteristics of immigrants do matter trade to a significant extent.

Table 5. Estimated effects of immigration on trade flows by cultural difference

	Dependent Variable	**Immigration Stock**	**Robust SE**
English Speaking Countries	ln Trade	0.02354***	0.00400
	ln Exports	0.05267***	0.01380
	ln Imports	(0.0196)	(0.0261)
Non-English Speaking Countries	ln Trade	0.04042***	(0.0062)
	ln Exports	0.04728**	0.01982
	ln Imports	0.213020***	(0.0347)
Christian Countries	ln Trade	0.02014***	(0.0052)
	ln Exports	0.04284*	0.02381
	ln Imports	0.12393***	(0.0297)
Non-Christian Countries	ln Trade	0.04752***	(0.0054)
	ln Exports	0.06353***	0.01486
	ln Imports	0.14578***	(0.0348)

Notes:

Country specific effects are included in all regressions.

Standard errors are heteroskedasiticity-consistent robust

***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

5.3 New Variable Test

(a) Visa-holders Influence Test

Table 6. Estimated effects of immigration on trade flows by visa-holder type and stock

Dependent Variable	**International Students**	**Robust Standard Errors**
ln Trade	0.02555***	0.00526
ln Exports	-0.01541	0.02462
ln Imports	0.12373**	0.05163
Dependent Variable	**International Workers**	**Robust Standard Errors**
ln Trade	0.02293***	0.00566
ln Exports	-0.01349	0.02209
ln Imports	0.07097	0.04982
Dependent Variable	**International Visitors**	**Robust Standard Errors**
ln Trade	-0.01653*	0.00781
ln Exports	-0.00249	0.02583
ln Imports	-0.13814**	0.06608
Dependent Variable	**Stock Combined**	**Robust Standard Errors**
ln Trade	0.04697***	0.01259
ln Exports	0.15519***	0.05536
ln Imports	0.00889*	0.12438
Dependent Variable	**Immigration Stock**	**Robust Standard Errors**
ln Trade	0.03502***	0.01019
ln Exports	0.16791***	0.05173
ln Imports	0.01501	0.07607

Notes:

Country specific effects are included in all regressions.

Standard errors are heteroskedasiticity-consistent robust

***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

The first three results in Table 6 summarise the findings for three different New Zealand visa-holder categories and their respective impact on trade between 1997 and 2005. None of these categories demonstrate a particularly strong influence on trade. A 10 percent increase in international students is expected to increase trade by 0.26 percent. Similarly, a 10 percent increase in international workers increases trade by 0.23 percent. International visitors, however, show a significant negative influence on total trade. This might be explained by the length of time that international visitors stay in the country: most visitors

stay for relatively short periods and, accordingly, most do not have an interest in trading.

Nevertheless, the new combined immigrant stock variable shows very different results. This variable includes all the international students, visitors and workers as well as the immigration stock between 1997 and 2005. This new combined stock variable shows a very strong export-enhancing effect. A 10 percent increase in the combined stock generates about a 1.56 percent increase in exports, compared to a 0.09 percent increase in import. The immigrant-export link wholly dominates the import effect. Another interesting finding is the export elasticity for immigration stock between 1997 and 2005 is significantly larger, compared to results in Table 1. It indicates immigrants have more of an export orientation than during the previous period.

(b) Immigrant flow test

Table7. Estimated effects of immigration flow on trade flows

Dependent Variable	ln Trade	ln Exports	ln Imports
ln Immigration Flow	0.04335***	0.03992***	0.17382***
	(0.0043)	(0.0146)	(0.0316)
ln Distance	-0.04955	-1.21011***	3.74508***
	(0.0370)	(0.0957)	(0.2858)
FTA	1.46645***	1.63563***	1.03557
	(0.0652)	(0.3053)	(0.8705)
ln Population	13.30991***	11.14835***	8.47972***
	(0.1108)	(0.1796)	(0.3596)
ln per capita GDP	0.00527***	0.04003***	0.01854*
	0.00145	(0.0074)	(0.0106)
ln Exchange Rate Volatility	-0.01893***	-0.03585**	0.01780
	(0.0048)	(0.0173)	(0.0358)
Constant	-20.70027***	-6.31739***	-45.38207***
	(0.5168)	(1.1507)	(3.0167)
N	3158	3926	3318
Adjusted R-squared	0.99650	0.95670	0.88900

Notes:

Country-specific effects are included in all regressions.

Heteroskedasiticity-consistent robust standard errors in parentheses.

***, **, * represents significance from zero at the 1%, 5% and 10% levels respectively.

The annual immigrant flow data is obtained from Statistics New Zealand and estimated results are presented in Table 7. The table shows strong import elasticity (0.17) but slightly weak trade elasticity (0.04) and export elasticity (0.04). Compared to the immigrant stock estimation results in Table 1, immigration flow estimation shows a greater import-enhancing effect as well as trade-enhancing effect but a weaker export-enhancing effect.

This finding is consistent with previous expectations, as newly arrived immigrants normally desire more things from their home countries. Therefore, import elasticity is relatively strong. After settling into New Zealand society, these immigrants will increasingly adopt a local way of life and decrease their demand for products from their home countries.

6. Conclusion

Trade and export are very important to a country's economic growth. As a traditional immigration country, New Zealand has a distinctive advantage insofar as it attracts people from all over the world to study, live, visit and work. Each activity contributes to New Zealand's development by increasing its trade.

Much of the research in this field has empirically proven that there is a positive significant relationship between trade and immigration, albeit mostly in developed countries. The findings, however, do not fully capture the dynamics of the immigrant-trade link. The analysis provided here has attempted to further develop this immigrant-trade link topic by studying the effects of different subgroups and various classifications. It also studies New Zealand visa holders from a much larger sample group of 190 trading partners between 1980 and 2005.

Through different classification tests, the research has demonstrated that immigrants from low-income countries, and from different cultural backgrounds, tend to create more trade than immigrants from other countries or similar cultural backgrounds. However, the test applicable to immigrant flow further indicates that newly arrived immigrants also tend to undertake more trade. Although empirical tests on New Zealand visa-holders do not show a strong trade-enhancing effect, the combined impacts of visa-holders (international students, workers, visitors and immigrants) points to a much stronger export-enhancing effect.

These findings provide further understanding of the economic impact of immigrants on New Zealand. Policy-makers should notice the strong driving force behind these export-enhancing and trade-enhancing effects and, accordingly, be better able to implement policies that enhance New Zealand's economic position in the OECD. Unlike the view expressed by Bryant et al (2004), this finding does not only have welfare implications. It can also be used to improve New Zealand's economy by helping to shape economic development strategies.

With knowledge of potential export markets and trade opportunities, New Zealand can increase it's level of economic activity and improve the standard of living for its population.

Several interesting areas in New Zealand immigration-trade links still need to be explored. Researchers should analyse the trade-diversion effect of immigrants in New Zealand. Meanwhile, a more advanced model should be employed to study this immigration-trade link. For example, the "Remoteness" variable (Helliwell, 1997) could be included in the regression model to provide a more accurate measure of New Zealand's economic connection to the world. Immigration stock could also be estimated by a stimulated regression, rather than having to rely on fixed census figures every five years.

Another issue that should be studied is the difference of immigrants trade orientation before and/or after the 1990s. In Table 6, immigrant stocks show very different export and import elasticities compared to the period before 1997. Due to the constraints on data for New Zealand visa holders, the research can only track the effects between 1997 and 2005. There need to be more detailed studies for this particular period to find out the influential effects and causes for the difference of trade orientation. Overall, these improvements will provide more accurate estimates and assessments of the immigration-trade link in New Zealand.

References

Bacarreza, G. and Ehrlich, L. (2006): *The impact of Migration on Foreign Trade: A Developing Country Approach*, Instituto de investigaciones socioeconomicas, Munich Personal RePEc Archive Paper No. 1090.

Bryant, J., Murat G. and David, L. (2004): *Trade Flows and Migration to New Zealand*, Wellington: New Zealand Treasury, working paper 04/18.

Co, C. Y., Patricia, E. and Thomas, M. (2004) "The Export Effect of Immigration Into the USA", *Applied Economics*, 36: 573-83.

Crystal, D. (2003): *The Cambridge Encyclopaedia of the English Language*, 2nd ed., Cambridge, Cambridge University Press.

Department of Labour (2006): *Department of Labour Annual Report 2006*, Wellington: New Zealand Government, obtained from:

http://www.dol.govt.nz/publications/general/ar0506/18b-vote-immigration-class-increase-capacity.asp

Frankel, J. (1997): *Regional Trading Blocks in the World Economic System*, Washington DC: Institute for International Economic Research.

Fratinni, M. (2007): *The Gravity Equation in International Trade*, *Handbook of International Business*, 2nd Edition. Oxford, Oxford University Press.

Girma, S. and Yu, Z. (2000): *The Link Between Immigration and Trade: Evidence From the UK*, Centre for the Research on Globalisation and Labour Markets (GLM), School of Economics, University of Nottingham, Research Paper, No. 23.

Gould, D. (1994): "Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows", *The Review of Economics and Statistics*, 76 (2): 302–316.

Helliwell, J. (1997): "National Borders, Trade and Migration", *Pacific Economic Review*, 2 (3): 165-185(21).

Helliwell, J. (1998): *How Much Do National Borders Matter?* Washington DC: Brookings Institution.

Head, K. and Ries, J. (1998): "Immigration and Trade Creation: Econometric Evidence from Canada", *The Canadian Journal of Economics*, 31 (1): 47–62.

International Monetary Fund. (2006): *World Economic Outlook Database for September14, 2006*; available at http://www.imf.org/external/pubs/ft/weo/2006/02/data/download.aspx

Konecny, T. (2007): *Can Immigrants Hurt Trade?* Centre for Economic Research and Graduate Republic, Academy of Sciences of the Czech Republic Economics Institute; available at http://www.cerge-ei.cz/pdf/wp/abstract/Wp329nts.pdf

Krueger, A. (2006): "A Remarkable Prospect: Opportunities and Challenges for the Modern Global Economy", Lecture at the Claremont McKenna College Claremont, California (May 2), available at http://www.imf.org/external/np/speeches/2006/050206.htm

Moody, C. (2006): *Migration and Economic Growth: A 21st Century Perspective*, New Zealand Treasury, Working Paper 06 / 02.

Newton, I. (1687): *Philosophiae Naturalis Principia Mathematica*, Oxford, UK.

Parsons, C. (2005): *Quantifying the Trade-Migration Nexus of the Enlarged EU. A Comedy of Errors or Much Ado About Nothing?* Sussex Centre for Migration Research, Sussex Migration Working Paper No. 27.

Poot, J. and Cochrane B. (2004): *Measuring the Economic Impact of Immigration: A Scoping Paper*, Immigration Research Programme, Wellington, New Zealand Immigration Service.

Rauch, J. (1999): "Networks Versus Markets in International Trade", *Journal of International Economics*, 48(1): 7-35.

Rauch, J. and Trindade, V. (2002): "Ethnic Chinese Networks in International Trade", *The Review of Economics and Statistics*, 84 (1): 116–130.

Rauch, J. and Trindade, V. (2003): "Information, International Substitutability, and Globalization", *American Economic Review*, 93, 775-791.

Slack, A., Wu, J. and Nana, G. (2007): *Fiscal Impact of Immigration 2005 / 06*, Department of Labour; available at: http://www.dol.govt.nz/PDFs/fiscal-impacts-of-immigration-2005-06.pdf

Statistics New Zealand (2007): "Gross Domestic Product: June 2007 quarter - All tables"; available at: http://www.stats.govt.nz/NR/rdonlyres/8391458E-27E6-4BC1-A851-6E07B32FED14/20943/gdpjun07qtralltables.xls

Wagner, D., Head, K., and Ries, J. (2002): "Immigration and Trade in the Provinces", *Scottish Journal of Political Economy*, 49 (5).

White, D. (2007): "Immigrant-trade links, transplanted home bias and network effects", *Applied Economics,* 2007, 39: 839–852.

Appendix 1. The Findings and Estimates of Previous Studies

Table A1. The effect of migration on exports and imports from previous studies

Authors (Year)	**Sample (observation period)**	**Export elasticity**	**Import elasticity**
Gould (1994)	US and 47 trade partners, 1970-1986	0.02	0.01
Head and Ries (1998)	Canada and 136 trade partners, 1980-1992	0.10	0.31
Dunlevy and Htchinson (1999, 2001)	US and 17 partners, 1870-1910	0.08	0.29
Girma and Yu (2000)	UK and 48 partners, 1981-1993	0.16	0.10
Rauch and Trindabe (2002)	63 Countries; 1980, 1990	0.21/0.47	0.21/0.47
Wagner, Head, and Ries (2002)	5 Canadian provinces & 160 partners, 1992-1995	0.16	0.41
Blanes-Cristobal (2003)	Spain and 40 trade partners, 1991-1998	0.23	0.03
Bryant, Genc and Law (2004)	New Zealand and 179 trade partners, 1981-2001	0.14	0.22
Parsons (2005)	EU-15 & 15 EU-expansion countries, 1994-2001	0.12	0.14
Bacarreza and Ehrlich (2006)	Peru and 30 trade partners, 1990-2003	0.09	0.08
White (2007)	US and 77 trade partners, 1980-2001	0.035	-0.007

Sources: Parsons (2005) and White (2007)

Appendix 2. New Zealand Top Trading Partners and Top Migrant Source Countries

Chart A1. 2006 New Zealand Top 10 Importing Partners

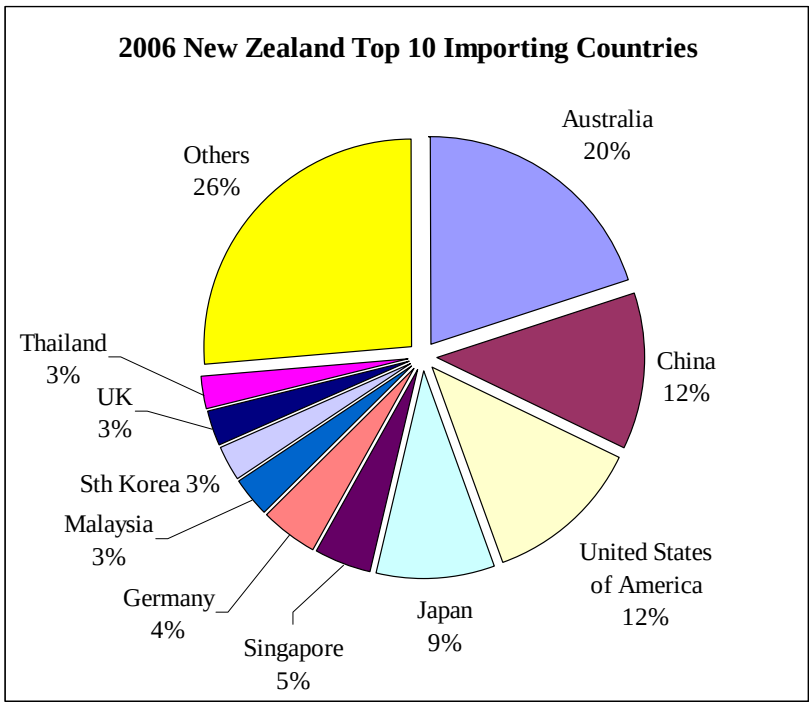
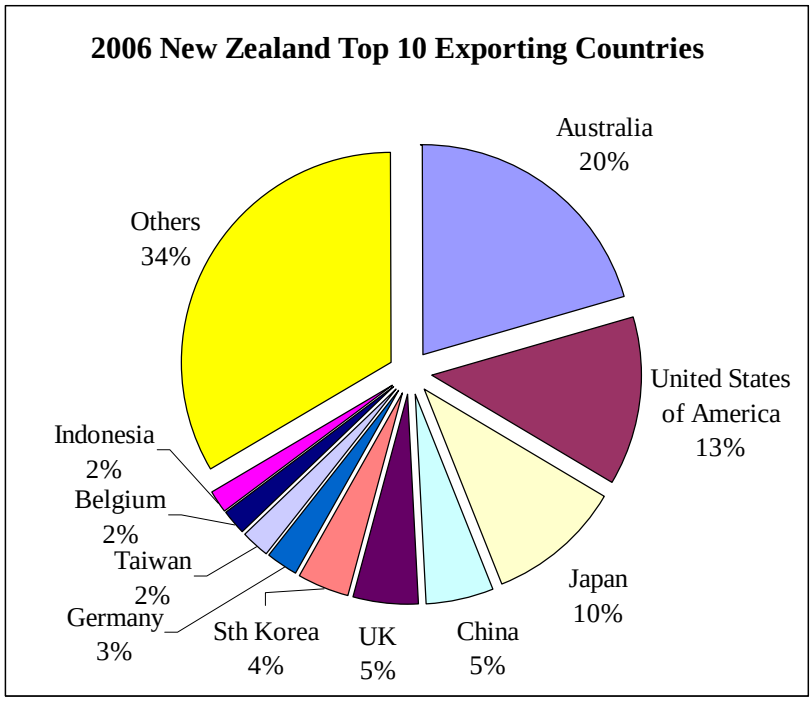
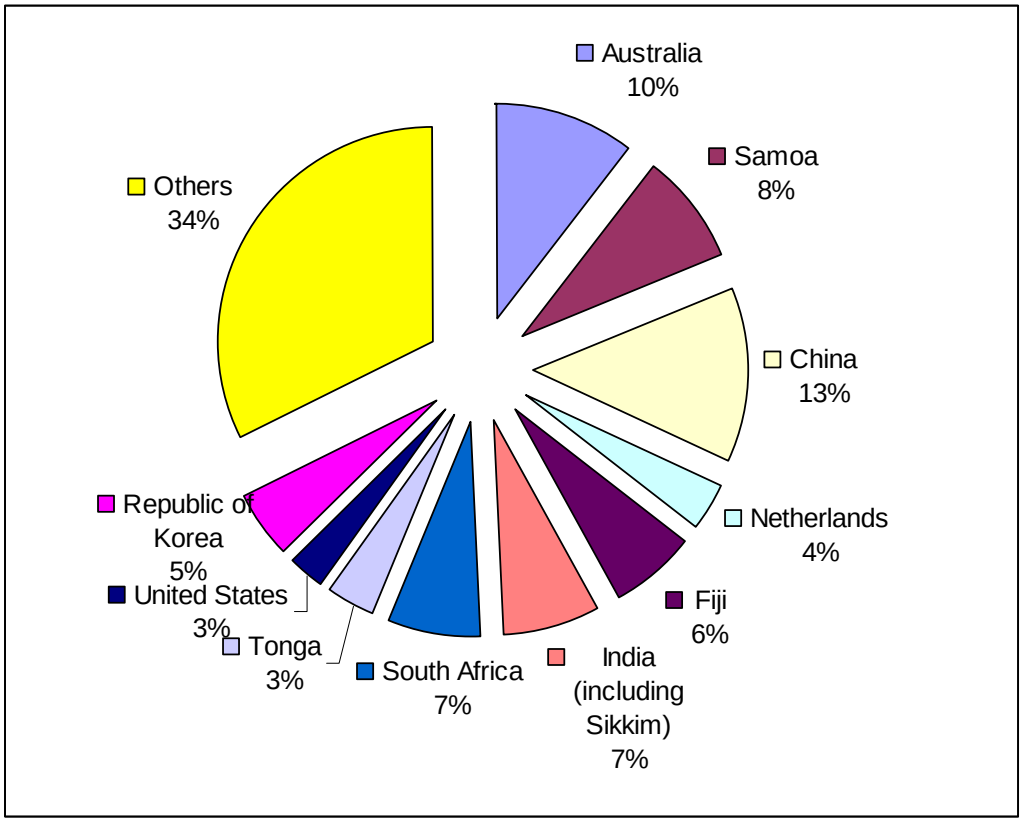


Chart A2. 2006 New Zealand Top 10 Exporting Partners



Sources: Statistics New Zealand, Export and Import Table Builder, 2007

Chart A3. Structure of New Zealand Foreign-Born Population by Country, 2006



Source: Statistics New Zealand, 2006

Appendix 3. Classification of Trading Partners

Table A2. Country Classification by Income Level

High-income countries (45)		**Upper-middle-income countries (37)**	
Antigua and Barbuda	Iceland	Belize	Oman
Aruba	Ireland	Brazil	Palau
Australia	Israel	Bulgaria	Panama
Austria	Italy	Chile	Poland
Bahamas	Japan	Costa Rica	Romania
Bahrain	Kuwait	Croatia	Russian
Barbados	Malta	Dominica	Serbia
Bermuda	Netherlands	Gabon	Seychelles
Brunei	Netherlands Antilles and Aruba	Germany Dem	Slovak
Canada	New Caledonia	Grenada	South Africa
Cyprus	Norway	Hungary	St. Kitts and Nevis
Denmark	Portugal	Kazakhstan	St. Lucia
Estonia	Qatar	Latvia	St. Vincent and the Grenadines
Faeroe Islands	Republic of Korea	Lebanon	Turkey
Falkland Islands	Saudi Arabia	Libya	Uruguay
Finland	Singapore	Lithuania	USSR (Former)
France	Slovenia	Malaysia	Venezuela
French Polynesia	Spain	Mauritius	
Germany	Sweden	Mexico	
Germany Fed	Switzerland	Northern Mariana Islands	
Gibraltar	Trinidad and Tobago		
Greece	United Arab Emirates		
Greenland	United Kingdom		
	United States		

Table A2. Country Classification by Income Level (cont'd)

Lower-middle-income countries (63)		**Low-income countries (45)**	
Albania	Marshall Islands	Afghanistan	
Algeria	Martinique	Bangladesh	Nigeria
Angola	Micronesia	Cambodia	Niue
Argentina	Morocco	Congo	Pakistan
Belarus	Namibia	Eritrea	Papua New
Bhutan	Nepal	Ethiopia	Guinea
Bolivia	Nicaragua	Gambia	Rwanda
Cameroon	Norfolk Island	Ghana	Senegal
China	Paraguay	Guinea	Sierra Leone
Colombia	Peru	Haiti	Solomon
Cuba	Philippines	India	Islands
Yemen (former)	Pitcairn	Kenya	Somalia
Djibouti	Republic of Moldova	Kyrgyzstan	St.Helena and
Ecuador	Reunion	Lao	Dependencies
Egypt	St.Kitts-Nevis-Anguilla	Madagascar	Sudan
El Salvador	Samoa	Malawi	Tajikistan
Fiji	Sri Lanka	Mali	Togo
French Guiana	St.Pierre-Miquelon	Mauritania	Uganda
Georgia	Suriname	Mongolia	United Republic
Guadeloupe	Swaziland	Montserrat	Tanzania
Guatemala	Syrian Arab Republic	Mozambique	Uzbekistan
Guyana	Thailand	Myanmar	Viet Nam
Honduras	Macedonia	Nauru	Yemen
Indonesia	Tokelau	Niger	Zambia
Iran	Tonga		Zimbabwe
Iraq	Tunisia		
Jamaica	Turks and Caicos Islands		
Jordan	Tuvalu		
Kiribati	Ukraine		
Lesotho	Vanuatu		
Lithuania	Wallis and Futuna		
Maldives	Islands		

Source: United Nations (2007) http://go.worldbank.org/K2CKM78CC0

Table A3. East Asia and South East Countries Represented

East Asia	**South East Asia**	
China	Brunei	Myanmar
Japan	Cambodia	Philippines
South Korea	Indonesia	Singapore
Mongolia	Laos	Thailand
	Malaysia	Vietnam

Table A4. English-speaking Countries List

Antigua and Barbuda	Jamaica	Samoa
Aruba	Kenya	Seychelles
Australia	Kiribati	Sierra Leone
Bahamas	Lesotho	Singapore
Bahrain	Madagascar	Solomon Islands
Bangladesh	Malawi	South Africa
Barbados	Malta	Sri Lanka
Belize	Marshall Islands	St. Vincent and the Grenadines
Bermuda	Mauritius	St.Helena and Dependencies
Brunei Darussalam	Micronesia	St.Kitts-Nevis-Anguilla
Cameroon	Montserrat	Swaziland
Canada	Namibia	Tonga
Dominica	Nauru	Trinidad and Tobago
Ethiopia	Nigeria	Turks and Caicos Islands
Falkland Islands	Norfolk Island	Tuvalu
Fiji	Northern Mariana Islands	Uganda
Gambia	Pakistan	United Kingdom
Ghana	Palau	United States
Gibraltar	Panama	Vanuatu
Grenada	Papua New Guinea	Zambia
Guyana	Philippines	Zimbabwe
India	Pitcairn	
Ireland	Rwanda	
Israel	Saint Lucia	

Source: Crystal (2003)