A Cross-section Analysis of the Economic and Non-economic Determinants of Economic Migration to New Zealand

Arlene L. Garces-Ozanne and Clayton R. Weatherston
Department of Economics
University of Otago

Abstract

In this paper we investigate empirically the economic and non-economic determinants of economic migrant applications into New Zealand over the period 1997–2001 from 56 origin countries. Potentially important determinants of the decision to apply to migrate are the relative attributes of 56 origin countries which include *characteristics of the origin country* such as measures of the material standard of living in the origin country (as proxied by recent GDP per worker), levels of corruption, returns to education and income inequality; *characteristics of the population within the origin country* such as the age distribution of the population, average years of education and the proportion with tertiary level education; *the affordability of relocation* as proxied by the cost of travel from the origin country and 'ease' of travel from the origin country to New Zealand; and *existing networks in New Zealand* (i.e., the number of people from the country of origin that have arrived in New Zealand over various periods of time).

We find robust evidence that applications to migrate to New Zealand per head of origin population are positively related to corruption in the origin country; if the origin country shares a common language with New Zealand; and the stock of previous migrants from the country already in New Zealand. Interestingly, explicit factors in a cost-benefit analysis of migration, such as relative GDP per worker and returns to education (a proxy for mean income opportunities) and travel cost burden are not statistically significant. Further, we find no relationship between bilateral applications per capita and the first and second moments of the income distribution of the origin country (as predicted by Borjas, 1987) nor with the proportion of the young in the population and years of education. We do find that nations with a higher proportion of tertiary educated people are less likely to be the source of applications to New Zealand. This implies that New Zealand does not appear to be able to "free ride" off other nation's investments in human capital. To the extent that the significant determinants of applications affect the arguments in a cost-benefit function, then our results are consistent with rationality of the potential migrant.

JEL classification: J01, J61

Correspondence to:
Arlene L. Garces-Ozanne
Department of Economics
University of Otago
PO Box 56, Dunedin
New Zealand
Phone: (64) 3 4798651
Fax: (64) 3 4798174
Email: aozanne@business.otago.ac.nz

I. Introduction: Who migrates and why?

Go West young man![1] According to estimates of the Population Division of the United Nations, there were about 175 million people living outside their country of birth or citizenship at the beginning of the 21st century. Of these 175 million migrants, approximately 32% live in Europe, 28% in Asia and 23% in North America[2]. While this accounts for less than 3% of the world's population, looked at from another angle, if all international migrants lived in the same place, this would be the world's fifth most populous country (International Organization for Migration, 2003).

People migrate for various reasons, but conventional views on migration suggest that persistent disparities in economic and social conditions between the sending and receiving countries have been at the core of most migration flows in the latter half of the 20th century. One dimension of migration is premised on the notion that the individual makes the decision to migrate if a cost-benefit analysis results in a positive net return to migration for the individual. This is the focus of the neoclassical microeconomic theory of international migration (cf. human capital theory and investment under uncertainty[3]). Based on this theory, improved human capital characteristics (e.g., higher educational qualifications, a longer period over which higher returns can be enjoyed, knowledge of the national language of the receiving country, etc.) increase the potential benefits of migration, and individual, social or technological factors that lower migration costs (e.g., temporary support for new migrants, improvements in international transport that lead to cheaper air or sea fares) lead to higher rates of migration.

Numerous theoretical and empirical models have been proposed in an attempt to explain why and how international migration occurs,[4] and there are perhaps as many seeking to explain not only why migration occurs in the first place, but why migration continues to persist. For example, according to the network theory, the presence of migrant networks in the host country lowers the (real and perceived) costs and risk associated with migration. The institutional theory on the other hand, identifies the importance of the development of private institutions and voluntary organisations to support and sustain the movement of migrants. International migration can also be sustained by a process that has been referred to in the literature as cumulative causation (Massey, 1990). Based on this theory of cumulative

causation, each act of migration alters the social context within which subsequent migration decisions are made, thus creating "feedbacks" that make additional movement more likely.

However, we have yet to find a single, well-developed model that best explains international migration. One reason for this is perhaps due to the many different types and systems of international migration, e.g., forced or voluntary; temporary or permanent; settler, migrant worker, highly skilled, student, asylum-seeker, etc. Another problem is that these different dimensions of international migration are often not mutually exclusive. Developing a new, single and all-encompassing theory of international migration is beyond the scope of this study. Instead, this study will focus on the *economic migrant.*[5]

This study draws from and will contribute to a wide range of comparative scholarship on international economic migration, drawing evidence from the New Zealand experience. In New Zealand (and Australia), most of the immigrants come from the South Pacific island nations (SPINs),[6] Asia and Europe, and some from Africa and the Americas. Since the 1990s, however, politicians and social activists in New Zealand (and Australia) have become more vocal about their concerns regarding the flow of migrants into the country. In particular, concerns were raised about increased competition for jobs, house price inflation and the "Asian invasion". Although there have been a number of studies that analyse the impact of international migration in New Zealand,[7] there exists little empirical evidence regarding the *causes* of the influx of economic migrants into New Zealand.

As mentioned previously, we focus on a specific type of international migrant as different factors are likely to influence the migration decisions of different types of migrants. In many studies, the (log) level of real GDP per worker is typically used to proxy the average income, the origin country's overall level of development and, implicitly, to approximate the average rate of return to skills in the origin country's population. However, potential economic migrant applicants (who are more likely to meet the criteria to actually migrate to New Zealand) are those with better than average skills; this group comprises a relatively small portion of the entire origin nations population. A better proxy for the pool of skilled labour from origin country *i* would be the proportion of the population over 25 years old who have attained tertiary education. This measure of the quality of education above the threshold for entry is superior to using the average years of education. Further, in order to capture the

returns to that skilled labour (tertiary-qualified labour) in the origin country, we use Hall and Jones (1999) measure of the returns to human capital.

This study also makes use of new and better measures for the different costs of migration. For example, to estimate the financial burden of relocating to another country, instead of the often-used great circle air distance, we identify travel zones based on the proximity to New Zealand and 'hubs', i.e., the most common overseas ports of embarkation of migrants (more details later). The presence of migrant networks in the host country tends to reduce the costs and risks associated with migration and hence increases the probability of moving (based on the network theory and cumulative causation theory). For this reason, we also include in our model the stock of migrants in the host country (New Zealand).[8] To the authors' best knowledge, this study provides the first comprehensive quantitative analysis of the causes of economic migration, with particular reference to economic migrant applications to New Zealand.

The next section of this paper provides a brief historical background of migration in New Zealand, including a look at the incentives behind early colonisation and major policy changes since the 1970s. We also briefly review in this section, selected empirical literature on international migration. We present our empirical model and describe the data we use in Section III. Section IV presents and discusses the main empirical results, and finally, section V concludes and presents suggestions for further research.

II. Literature Review and Migration in New Zealand

Australia, Canada, New Zealand and the United States are recognised as the "classic" or "traditional" countries of immigration (TCIs); four countries that built themselves *through* immigration. These nations, which also enjoyed transmission of European technologies, were labelled 'Neo-Europes' by historian Crosby (1986). More recently, migration into these countries account for between 1.1 and 1.3 million legal permanent immigrant entries per year, increasing by as much as another half a million, if illegal entries are considered (IOM, 2003).

II.1 History of Migration to New Zealand

The founding population of Pakeha New Zealand was part of a massive 19th Century European Diaspora involving around 50 million people (Gould, 1991). After being initially attracted by whales, seals, kauri and gold, relative abundance of fertile land and temperate climate were the driving factor in the propaganda used to attract European migrants during the 19th century in a form of non-coercive 'slavery' driven by economic and territorial motives. Economic incentives were marshalled to develop a selective approach to settlement. Central government tendered out the process of recruiting suitable candidates who were "sober, industrious, of good moral character, of sound mind, good health" (Dalley and McLean, 2005) to over 100 immigration agents including the New Zealand Company (to whom they paid 10 shillings commission per adult migrant).

The trend of proactive immigration policies, with the government subsidising the costs of immigration, especially for white Europeans, coming mainly from the United Kingdom and Ireland, continued intermittently up until the early 1970s. Economic migration was seen mainly as part of labour market policy to help ease skill shortages in specific sectors of the economy. At the same time, quick assimilation into the community was deemed very important; hence immigration policy favoured the white Europeans. New Zealand had a "traditional source country preference" as the basis for its immigration policy (Bedford, 2003), and Asians and black Africans were refused entry into New Zealand. There were also immigrant flows from some neighbouring South Pacific island countries, mainly to allow the Pacific islanders to fill gaps in the unskilled labour market, but skilled workers remained predominantly from the traditional source "white" countries.

During the first half of the 1970s, high levels of immigration led to a major policy change in 1974 that required the British and Irish to apply for permits like everyone else. Through the 1980s, the Labour government's policy was to select immigrants according to a defined set of criteria based on an occupational priority list that addressed the needs of the economy. The traditional source country preference was also abolished in order to remove racial discrimination.

When the National Party came to power in 1990, the National Government announced that the standard of living in the country could only be maintained by having high levels of

immigration. Immigration policy has now been recognised as an important instrument for promoting overall growth of the economy and not just a means for filling specific labour market shortages. The occupational priority list was replaced with a points system, similar to those applied in Australia and Canada, aimed at regulating the number and quality of immigrants. Under this points system,[9] migrant applicants are awarded points for qualifications, work experience, age, English ability and financial resources, with the expectation that applicants achieving a set number of points are those that are most likely to be the most productive and of most use to the New Zealand economy. Since then, the points system and the categories under which potential migrants can apply have been more refined, but the main aims remain: to allow entry to those who would make the highest contribution to New Zealand's employment and income growth, and, to maximise the gain in productive human capital (Bedford, 2003).

II.2 Review of Selected Literature on Migration

Most of the empirical studies in the international migration literature focus on a single country destination. For example, Borjas (1987) primarily shows that differences in the earnings of immigrants in the host country (in his study, the United States) are attributable to variations in political and economic conditions in the countries of origin at the time of migration. In the same manner, it can also be shown that these same factors that determine earnings of migrants also determine the emigration rate (following Roy's (1951) framework in the study of the impact of self-selection in occupational choice on income distribution). The main propositions in Borjas' selection model are:

A. An increase in the mean income opportunities (in the destination country) increases migration. We take 'opportunity' to incorporate (i) mean income earned; (ii) probability of finding employment and (iii) probability of being allowed to remain in the country.
B. An increase in the cost of migration reduces it.
C. Inequality in the source and host country is non-monotonically related to the size of migration flows. The impact is estimated to be positive if there is positive selection and negative if there is negative selection.[10]

Clark *et al*. (2002) use data on income, education, demographic composition (e.g., the stock of foreign born population in the US and those of English speaking origin) and inequality from a balanced panel of 81 origin countries across 28 years (1971 to 1998) in analysing migration to the United States. They find that the influence of income, education and demography on migration is all consistent with theory and that the non-linear effects of inequality on migration lend support to Roy's (Borjas') self-selection model. The stock of previous immigrants also came out as a significant determinant of immigration, along with different variables representing different dimensions of immigration policy (e.g., quota limits and other migration legislation).

Mayda (2005) on the other hand, digresses from the one destination country studies and examines migration flows into fourteen OECD countries by country of origin, between 1980 and 1995.[11] Her framework to study migration applicants is related to gravity models of trade which analyse bilateral trade flows. Mayda uses a wide range of commonly-used regressors in migration studies including various economic, geographical, cultural and demographic determinants suggested by theory and arrives at results that are generally consistent with the theoretical predictions of standard international migration models. For instance, she finds that the origin country's relative inequality in linear form has a positive effect on migration flows, and a negative effect in quadratic form, again supporting the Roy and Borjas self-selection model.

This study examines the fundamental determinants of applications under the skilled migrant category into New Zealand, using data from 56 countries of origin averaged over the period 1997 to 2001, assuming that the propositions of the Borjas model for 'actual' migration have similar effects on the decision to apply to migrate.[12] The theoretical framework for our analysis, including a detailed description of data used in our empirical model is discussed in the next section. The specifications extend those of previous studies by including a wider range of variables which reflect the broader set of information available to the potential migrant, arguments which may affect the costs and benefits.

III. A Model of Economic Migration: The New Zealand Case

The theoretical specifications from Borjas (1987) inform a range of regressors in the empirical specification below which contains economic and non-economic factors that

potentially affect the emigration rate of economic migrants from a set of different countries of origin into New Zealand. We estimate a regression based on variants of the general functional form (*Table I* defines the variables used in the estimation):

$$\ln AVEAPPPOP = \beta_1 + \beta_2 \ln RGDP_i + \beta_3 COMMLANG_i + \beta_4 \ln YOUNGPOP_i$$
$$+ \beta_5 \ln ORIGYRSEDUC_i + \beta_6 \ln ORIGCORRUPT_i + \beta_7 \ln TOTALOVERSEASBORN_i$$
$$+ \beta_8 \ln ORIGGINI_i + \beta_9 \ln ORIGGINISQ_i + \beta_{10} \ln TRAVELCOST_{ii} + \beta_{11} \ln TERTATTAIN_i$$
$$+ \beta_{12} \ln RETURNS_i + \beta_{13} ZONE2_i + \beta_{14} ZONE3_i + \beta_{15} ZONE4_i + \beta_{16} HUBS5_i + \omega_i \quad (1)$$

As the data is treated as a cross-section (some variables are averaged over the specific period), the characteristics of New Zealand are constant so that the variation in variables, whether taken as differences between the origin country and New Zealand, or the level of the origin alone will be the same.

There are advantages and disadvantages of using cross-sectional data. The main problem is that we cannot control for fixed effects (Mayda, 2005). Any country-specific fixed effects will be included in the cross-country error terms.[13] The main benefits of using regressors that pre-date the applicant flow measure are that we do not need to be concerned with endogeneity with contemporaneous regressors (as we would have in a panel). Given that there is a lag between application and actual emigration and that only a portion (e.g., 20% in 2001/2002, NZIS, 2002) of these applicants are successful in their applications, we do not expect reverse causality to any of the regressors to be an issue. This would be an issue with a panel data approach (see Mayda, 2005). Further, the persistence of differences in economic and non-economic factors justifies a cross-section analysis. It seems that a panel data approach would primarily rely on 'between' country variation as opposed to 'within' or temporal variation. Indeed, Mayda (2005) estimates her regressions for each year in her sample individually, thereby omitting country-specific fixed effects, and finds that the coefficients are still qualitatively consistent with the panel data results, though less precisely estimated.

ln*AVEAPPPOP* represents the number of residency applications to New Zealand under the 1995 General Skills migrant category over the period 1997 to 2001, as a percent of total population in the country of origin *j* over the same period, so bilateral applications are

normalised by the origin country's population. Data for this variable are calculated from the New Zealand Immigration Service's statistics on residence applications, and the latest Penn World Tables 6.1 (Heston, *et al*., 2002). The total number of residency applications under the 1995 General Skills migrant category is used as a dependent variable instead of the number of accepted economic migrants from different countries as in other empirical studies (e.g., Mayda 2005).

In this study, only people who bothered to apply under the skilled migrant residency category are included in our sample. This brings about a sample selection issue as applications are mostly made by people who think they stand a chance of being accepted (i.e., of meeting the selection criteria set by the New Zealand Immigration Service in the skilled migrant category). Hence, there may be more low-skill workers who would want to come to New Zealand, but they do not bother applying. Because of this, we assume that people in our sample will mainly come from the right-hand tail of the origin country's income distribution (proxy for skills) and the implications of the Borjas (1987) selection model (which looks at both tails) are not relevant for the skilled migrant category. In many studies that use data on actual migration (e.g., Mayda (2005) and Clark *et al*., (2002) to cite a few), this consequent censoring of the sample is not acknowledged at all. We believe that the degree of censoring in our sample that uses data on applications is less of an issue than with *actual* migration (which is a function of the host country's migration policies) data.[14]

ln*RGDP* is the natural logarithm of PPP-adjusted GDP per worker (constant 1996 international dollars), averaged over the years 1990 and 2000, taken from the latest Penn World Tables 6.1. We take the average real GDP per worker over this period because the decision to migrate is not made overnight and requires careful consideration, which could take several years (taking out cyclical effects). This variable is intended to capture the average income opportunity for the potential migrant in his/her country of origin. We note that differences in relative GDP per worker is not a direct measure of differences in income opportunities, since GDP per worker depends on rates of return to capital and labour and on per worker endowments of each factor. In other words, a higher GDP per worker in New Zealand does not necessarily mean better income opportunities on average for a worker from the origin country, since it could be due to a higher capital-labour ratio or to a more skilled labour force in New Zealand.

A better proxy for the relative returns to the subset of the population of the origin country who are more likely to be internationally mobile due to being more educated is captured by ln*RETURNS,* Hall and Jones (1999) human capital variable that measures the (weighted) average returns to different types of schooling. This is based on Psacharopoulos' (1994) survey of returns-to-schooling estimates and Mincerian regressions.[15]

The overlapping generation's literature leads us to look at the demographics of the origin population. In this context, the overlapping generation's theory has two (or more) periods whereby improved human capital characteristics attained in the first period in the origin country (e.g., higher educational qualifications, knowledge of the national language of the receiving country) increase the potential benefits of migration, which takes place at the start of the second period. We use the share of young people (aged between 20 to 29 years) in the origin population (ln*YOUNGPOP*) (taken from the statistical database of the United States Census Bureau, Population Division, International Programs Center) as a proxy of the pool of agents who, having accumulated skills subsequently are looking to reap a higher return on their investment. Migration is a forward-looking decision. As such it is useful to think of the gains to migration in present value terms. Thus the wage earned in the origin and destination countries can be thought of as discounted income streams for the individual. The net gain will be greater the younger is the potential migrant in the origin country. It follows that the origin country age structure matters; the larger the share of young adults the greater will be the migration rate for a given wage incentive, net of costs. Furthermore, the overlapping generation's model of endogenous longevity and human capital presented in Finlay (2005) requires sufficient investment in (health) and education in the first period so that the individual can actually reap the return to the investment in education. Therefore, as more years of education (ln*ORIGYRSEDUC*) increases the probability of capturing the returns to a given level of human capital investment we include it as a regressor (data are taken from Barro and Lee, 2001). We include this variable assuming that individuals make decisions on whether or not to migrate not only based on current income opportunities (net of migration costs), but also on earnings in the future. Based on this, a potential migrant will have a bigger incentive to migrate, the younger he/she is since the present discounted value of net benefits will be higher the longer his/her working life in the host country (Clark *et al*., 2002).

However, the problem with using ln*ORIGYRSEDUC*, is that many developed countries require a certain threshold of education so we use instead a proxy for the proportion of those

with higher levels of education. To this end, we include the regressor, ln*TERTATTAIN*, defined as the proportion of the origin population over the age of 25 who have attained tertiary education qualifications.

Does institutional structure of the origin country affect the relative return to human capital? To test this, we also include a proxy for institutional structure in our specification. *ORIGCORRUPT* is the ratio of the Corruption Perceptions Index (CPI) between the country of origin and the host country, taken from Transparency International. The index defines corruption as the abuse of public office for private gain, and measures the degree to which corruption is perceived to exist among a country's public officials and politicians. Higher values indicate more corrupt practices.

We use the stock of migrants from each country as a proxy for network effects (ln*TOTALOVERSEASBORN*). We expect that there is some form of critical mass in the host country that influences the decision to apply to migrate. The success of those migrants that have gone before, interpersonal linkages between (migrant) populations in origin and destination areas providing information on relocation costs, employment prospects, success in assimilation in the host country, all factor in the applicant's cost-benefit decision about migration. We also have the foreign stock of migrants who arrived from each origin country within the last year, between 1 and 4 years, 5-9 years and greater than 10 years. Each of these measures is highly correlated with the total stock measure (taken as the sum of these values).

Another set of propositions from the Borjas (1987) model is related to the second moment of the income distributions in the origin and destination country. At low values of $\frac{\sigma_o}{\sigma_{NZ}}$ (a case of positive selection[16]) an increase in the ratio will lead to an increase in the emigration rate, whilst at high values of $\frac{\sigma_o}{\sigma_{NZ}}$ (a case of negative selection[17]) an increase in the ratio will lead to a decrease in the emigration rate. In order to test this prediction, we introduce the origin country's relative inequality in linear and quadratic form (ln*ORIGGINI*, ln*ORIGGINISQ*, respectively). *A priori*, we expect a positive sign on the level coefficient and a negative sign on the second order term following Borjas (1987) and theoretical model presented in Clark *et al*. (2002).

There are various aspects of the cost of migration. Previous studies use geographical distance/great circle air distance (e.g., Mayda, 2005) which do not acknowledge (i) the actual financial cost of travel (which is a function of the nature of the competition between airlines in the origin country)[18] and (ii) the relative burden (purchasing power) of that cost on the potential migrant. We improve on this in two ways: first by including the estimated cost of travel to New Zealand from the origin country (ln*TRAVELCOST*), and second, by identifying travel zones (*ZONE#)* based on the proximity to New Zealand and hubs (*HUBS5*), i.e., the five most common overseas ports of embarkation of permanent and long-term migrants to New Zealand.

ZONE1 is a dummy variable equal to one if the origin country is within the Australian and South Pacific region, the region closest (in geographic distance) to New Zealand; and zero otherwise. *ZONE2* is a dummy variable equal to one if the origin country is within East Asia and North America, and zero, otherwise. *ZONE3* is a dummy variable equal to one if the origin country is within the United Kingdom and Europe, and zero, otherwise. *ZONE4* is a dummy variable equal to one if the origin country is not elsewhere identified. Travel costs from countries within *ZONE1* are expected to be relatively cheaper than travel costs from other countries within other zones.

HUBS5 is a dummy variable equal to one if the country of origin is among the top five most frequent ports of embarkation of permanent and long-term migrants to New Zealand, and zero, otherwise.

The use of travel zones and hubs approximates the relative ease of travel of the migrant applicant to New Zealand. If the applicant lives in a country that is relatively close to New Zealand (as identified by the zones), and there is a hub within the zone that the applicant originally comes from, then it is assumed that it is easier and less costly for this applicant to travel to New Zealand, compared to an applicant who lives in a distant zone, and with no hubs in that zone.

To get a measure of linguistic or cultural distance between the origin and destination countries we follow previous studies (e.g., Mayda, 2005) in defining a common language dummy variable (*COMMLANG*) taking a value of one if the country of origin has the English

language as one of the recognised languages in the country as identified in the Information Please® Database (Infoplease, 2005) and zero, otherwise.[19]

IV. Empirical Results and Discussion

Tables II and *III* present the 56 countries included in the estimations and some summary statistics for the main variables of interest.[20] From *Table III* we see that those countries in the highest quartile of the distribution for the log of applications per head of origin population have, on average, a higher level of corruption, a higher level of common language and stock of previous migrants from the origin country in New Zealand than those in the lower quartiles. We also see the same patterns across the real GDP per worker measure. There are no obviously discernable patterns across quartiles for the other variables reported.

Table IV presents the estimated models of interest. Column (2) of *Table IV* presents the model of core regressors: real GDP per worker, common language, corruption in the origin countries and the stock of migrants in New Zealand born in the origin country. Without the stock of migrants in New Zealand born in the origin country as a regressor the model fails the standard test for heteroscedasticity. Across all specifications we see that common language, corruption in the origin countries and the stock of migrants in New Zealand who were born in the origin country are statistically significant and that origin GDP per worker is statistically insignificant

In columns (3)-(6) of *Table IV*, we add, *seriatim*, some of the set of covariates described in Section V to the set of core regressors.[21] We see that ln*TERTATTAIN* is statistically significant whilst all of the variables ln*YOUNGPOP*, ln*ORIGYRSEDUC*, and the level and square of origin country income inequality (ln*ORIGGINI* and ln*ORIGINISQ*) are not. In columns (7)-(9) we add the least to most preferred cost measures (ln*GREATCIRCDIST,* ln*TRAVELCOST* and the zone dummies). We see that the addition of the least preferred measure of cost (ln*GREATCIRCDIST*) is positive and significant but induces heteroscedasticity. In columns (10) and (11) we see that the zone variables are statistically significant when added to the set of core regressors (now including ln*TERTATTAIN*) and when the full set of candidate variables, our preferred specification, are included. Relative to *ZONE1* (Australia), there are a greater number of applicant per head of origin population from each of *ZONES 2-4*. So most economic migrants come from further away from New

Zealand. This result is an artefact of geography and may explain why travel cost is insignificant and that the great circle distance is positively related to applicants per head.

The point estimate on the proxy for institutions reflects the percentage change in applications per head of origin population associated with a one percentage point increase in the index of corruption in the origin country. Hence the reported estimate of 1.16 (*Table IV*, column (11)) implies that a 1% increase in the corruption index is associated with a 116% cross-country difference in applications per head of origin population. The standardised impacts of institutions (as proxied by corruption) is about half that of the stock of existing migrants from the origin country. The implied percentage change in applications per head of origin population due to a one standard deviation change in the index of corruption is 61.5%. The implied percentage change in the applications per head of origin population for a one standard deviation change in the stock of existing migrants from the origin country is 140.2%. Finally, the implied percentage change in the applications per head of origin population for a one standard deviation change in the proportion of the origin population over the age of 25 attaining tertiary level qualifications is 37.1%. These effects are similar across all of the specifications.

To aid the interpretation of a unit or standard deviation change of these variables and see the potential magnitude of their estimated effects on the decision to apply to migrate to New Zealand we consider two countries which are one standard deviation apart on the ln*TOTALOVERSEASBORN* measure in the sample, such as Brazil and Mexico.[22] This difference in the stock of existing migrants from the origin country is predicted to result in approximately a 140% difference in bilateral applications between the two countries whilst the actual difference in applications is approximately 198% in our sample. Over half of the variation in applications can be attributed to differences in the stock of existing migrants from each country (an artifact of previous migration policy).

Applications per head of origin population are higher by, on average 90 to 160% when they share a common language with New Zealand.[23] The point estimates on the zone dummies indicate that applications per head of origin population of countries in the East Asia and North America, within the United Kingdom and Europe, and 'other' zones are higher than those from Australia. Further, if the origin country is host to at least one of the top 5 points of embarkation then applications per head of origin population are higher by 273%.

V. Conclusion

Immigration is an important issue for New Zealand, a country whose ratio of immigrants/population is one of the highest in the world.[24] This paper investigated the economic and non-economic determinants of migration applicants (in the general skills category) into New Zealand over the period 1997–2001. Our analysis examines the relative attributes of 56 origin countries. We find robust evidence that applications to migrate to New Zealand per head of origin population are positively related to corruption in the origin country, if the origin country shares a common language with New Zealand, and the stock of previous migrants from the origin country already in New Zealand. Whilst we find that our proxy for the pool of skilled/educated labour in the origin country is significant the relative returns to that labour in the origin nation is not. Further, we find no relationship between bilateral applications per capita and the first and second moments of the income distribution of the origin country (as predicted by Borjas (1987))

These findings suggest that agents (economic migrant applicants) are averse to corruption which may negate income opportunities in the origin country and indicate the significance of network effects which may enhance the information and probability of successful migration. It appears that those nationalities that have a stronger presence in New Zealand attract subsequent interest in migration to New Zealand. These suggest that New Zealand's policy which awards more points to applicants with more education may have been successful in subsequently attracting higher quality migrants,[25] which in turn serve as reasonable predictors of subsequent applicants (future migrants) from the same country to New Zealand.

Interestingly, explicit factors in a cost-benefit analysis of migration, such as relative GDP per worker and returns to education (a proxy for mean income opportunities) and travel cost burden are not statistically significant. That nations with a higher proportion of tertiary educated people are less likely to be the source of applications to New Zealand implies that New Zealand does not appear to be able to "free ride" off other nation's investments in human capital. To the extent that the significant determinants of applications affect the arguments in a cost-benefit function, then our results are consistent with rationality of the potential migrant.

Table I: Variables Used in the Estimation

Code	Definition	Source
ln*AVEAPPOP*	The total number of residency applications under the 1995 General Skills migrant category over the period 1997 to 2001.	New Zealand Immigration Service's statistics on residence applications, and the latest Penn World Tables 6.1 (Heston, et al., 2002).
ln*RGDP*	PPP-adjusted GDP per worker (in constant 1996 international dollars), averaged over the years 1990 and 2000.	Penn World Tables 6.1
ln*COMMLANG*	Dummy variable taking a value of one if the country of origin has the English language as one of the recognised languages in the country and zero, otherwise.	Information Please® Database (Infoplease, 2005)
ln*YOUNGPOP*	The share of young people (aged between 20 to 29 years) in the origin population.	United States Census Bureau, Population Division, International programs Centre
ln*ORIGYRSEDUC*	The average years of education of the origin population	Barro and Lee (2001)
ln*ORIGCORRUPT*	The ratio of the Corruption Perceptions Index (CPI) between the country of origin and the host country.	Transparency International
ln*TOTALOVERSEASBORN*	The total stock of migrants from each origin country.	Statistics New Zealand
ln*TERTATTAIN*	The proportion of the population over the age of 25 years who have attained tertiary level qualifications	Bloom and Rivera-Batiz (1999)
ln*RETURNS*	Human capital variable that measures the (weighted) average returns to different types of schooling, based on Mincerian regressions and Psacharopoulos' (1994) micro study on returns to education.	Hall and Jones (1999)
ln*ORIGGINI* and ln*ORIGGINISQ*	The origin country's relative inequality in linear and quadratic form	United Nations Human Development Report 2004
ln*TRAVELCOST*	The estimated cost of travel to New Zealand from the origin country as a proportion of origin country's GDP.	Commissioned data from a competitive New Zealand travel agency and Penn World Tables 6.1
ZONE#	Dummy variable based on the origin country's proximity to New Zealand, taking a value of one if the origin country is within a specified zone, and zero, otherwise. *ZONE1* is the Australian and South Pacific region, *ZONE2* is the East Asian and North American region, *ZONE3* is the United Kingdom and European region and *ZONE4* is for other regions not previously identified	
HUBS5	Dummy variable taking a value of one if the country of origin is among the top five most frequent ports of embarkation of permanent and long-term migrants to New Zealand, and zero, otherwise.	*HUBS5* identified from Statistics New Zealand

Table II: Countries Included in the Estimation

ARGENTINA	ECUADOR	KOREA	SOUTH AFRICA
AUSTRALIA	EGYPT	MALAYSIA	SPAIN
BANGLADESH	FINLAND	MEXICO	SWEDEN
BELGIUM	FRANCE	NETHERLANDS	SWITZERLAND
BOLIVIA	GERMANY	NICARAGUA	THAILAND
BOTSWANA	GREECE	NORWAY	TRINIDAD AND TOBAGO
BRAZIL	HUNGARY	PAKISTAN	TUNISIA
CANADA	INDIA	PANAMA	TURKEY
CHILE	INDONESIA	PARAGUAY	UNITED KINGDOM
CHINA,P.R.: MAINLAND	IRELAND	PERU	UNITED STATES
CHINA,P.R.:HONG KONG	ISRAEL	PHILIPPINES	URUGUAY
COLOMBIA	ITALY	POLAND	VENEZUELA, REP. BOL.
COSTA RICA	JAMAICA	PORTUGAL	ZAMBIA
DENMARK	JAPAN	SINGAPORE	ZIMBABWE

Table III: Sample Descriptive Statistics

	Sample Mean	*By Quartile of Natural Logarithm of Applications per head of Origin Population*			
		(1)	(2)	(3)	(4)
ln*AVEAPPPOP*	-13.48 (2.07)	-16.01	-14.31	-12.95	-10.64
ln*RGDPW90-00*	9.91 (0.78)	9.69	9.74	10.05	10.14
COMMLANG	0.52 (0.50)	0.43	0.43	0.43	0.79
ln*ORIGCORRUPT*	1.54 (0.53)	0.33	0.10	0.16	1.79
ln*TOTALOVERSEASBORN*	6.82 (2.19)	4.83	5.90	7.56	8.97
ln*YOUNGPOP*	0.16 (0.02)	0.17	0.16	0.15	0.16
ln*ORIGGINI*	3.67 (0.27)	3.84	3.75	3.41	3.68
ln*ORIGYRSEDUC*	1.95 (0.36)	1.83	1.81	2.04	2.12
ln*TRAVELCOST*	9.40 2.89	9.63	9.18	9.82	8.99
ln*GREATCIRCDIST*	9.47 (0.36)	9.32	9.53	9.56	9.46
ln*TERTATTAIN*	2.28 (0.79)	2.39	1.90	2.44	2.40
ln*RETURNS*	0.74 (0.25)	0.65	0.62	0.88	0.81

NOTES: Standard deviations are in parentheses. Descriptions of labelled variables are listed in Table I. Quartiles of natural logarithm of applications per head of origin population are (1) less than or equal to -15.17; (2) greater than -15.17 and less than or equal to -13.55; (3) greater than -13.55 and less than or equal to -12.35; (4) greater than -12.35.

Table IV: Estimates of Model of Natural Logarithm of Applications per head of Origin Population

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Origin Development											
ln*ORIGGDP*	-0.10 (0.53)	-0.21 (0.41)	0.22 (0.47)	-0.10 (0.44)	-0.09 (0.43)	0.21 (0.49)	0.18 (0.48)	0.04 (0.44)	0.33 (0.47)	0.18 (0.38)	0.06 (0.43)
Institutions											
ln*ORIGCORRUPT*	1.76* (0.77)	1.10† (0.60)	1.00† (0.59)	1.33† (0.68)	1.31* (0.64)	0.98† (0.62)	0.92* (0.61)	0.82 (0.56)	1.08* (0.59)	1.13* (0.47)	1.16** (0.55)
Networks											
COMMLANG	1.45** (0.50)	0.78† (0.40)	0.72† (0.40)	0.75† (0.41)	0.70† (0.41)	0.73† (0.42)	0.79* (0.41)	0.95** (0.38)	0.75* (0.40)	0.95* (0.33)	0.93* (0.35)
ln*TOTALOVERSEASBORN*	--	0.57** (0.09)	0.57** (0.10)	0.59** (0.10)	0.60** (0.10)	0.57** (0.10)	0.58* (0.10)	0.62** (0.09)	0.58** (0.09)	0.61** (0.09)	0.64** (0.10)
Human Capital											
ln*TERTATTAIN*	--	--	-0.57† (0.32)	--	--	--	-0.55† (0.32)	-0.45† (0.23)	-0.55† (0.32)	-0.43† (0.25)	-0.47† (0.26)
ln*ORIGYRSEDUC*	--	--	--	-0.71 (0.94)	--	--	--	--	--	--	-0.33 (1.19)
ln*RETURNS*	--	--	--	--	-1.21 (1.19)	--	--	--	--	--	0.04 (1.63)
Demographics											
ln*YOUNGPOP*	--	--	--	--	--	-0.30 (2.25)	--	--	--	--	1.03 (2.20)
Income Distribution											
ln*ORIGGINI*	--	--	--	--	--	--	-20.27 (20.10)	--	--	--	-25.71 (16.49)
ln*ORIGGINISQ*	--	--	--	--	--	--	2.71 (2.74)	--	--	--	2.95 (2.24)
Cost											
ln*GREATCIRCDIST*	--	--	--	--	--	--	--	1.55* (0.54)	--	--	--
ln*TRAVELCOST*	--	--	--	--	--	--	--	--	0.09 (0.07)	--	--
ZONE2	--	--	--	--	--	--	--	--	--	6.79* (1.16)	7.51** (1.25)
ZONE3	--	--	--	--	--	--	--	--	--	6.63* (1.17)	7.81** (1.40)
ZONE4	--	--	--	--	--	--	--	--	--	6.51* (1.26)	7.52** (1.47)
HUBS5	--	--	--	--	--	--	--	--	--	--	1.30† (0.78)
R-squared	0.26	0.57	0.60	0.57	0.58	0.60	0.61	0.65	0.61	0.77	0.79
Adj R-squared	0.22	0.54	0.56	0.53	0.54	0.55	0.55	0.61	0.56	0.73	0.71
Parameter Constancy Recursive	NC	C	C	C	C	C	C	NC	C	C	C
Heteroscedasticity *White het*	[0.042]*	[0.304]	[0.562]	[0.514]	[0.511]	[0.563]	[0.689]	[0.000]**	[0.746]	[0.374]	[0.690]

NOTES: Constant term not reported. Standard errors are in parentheses. †, * and ** denote statistical significance at the 10%, 5% and 1% levels respectively. The empirical results are based on data for 56 countries. The unity restriction implied by having the natural logarithm of applications per head of population is accepted. Replacing ln*TOTALOVERSEASBORN* with actual arrivals from the origin country in New Zealand in the last year, between 1 and 4 years, 5 to 9 years and 10 or more years, in turn yielded qualitatively similar results. Natural logs were taken for all continuous variables that took positive values over the full sample. Results for recursive graphical analysis of coefficient estimates are summarised as indicating parameter non-constancy (NC) or constancy (C). *White het* is White's (1980) test for heteroscedasticity which regresses the square of the residuals on the level and square of the regressors. Interaction terms between ln*YOUNGPOP* and ln*TERTATTAIN,* and ln*TERTATTAIN* and ln*RETURNS* are statistically insignificant and do not change the qualitative results.

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[1] A favourite saying of the nineteenth-century journalist Horace Greeley, referring to opportunities on the frontier. Another writer, John Soule, apparently originated it.
[2] United Nations Population Division, 2002.
[3] See for instance Sjaastad (1962), Roy (1951), Todaro (1969) and Borjas (1987).
[4] See for instance Massey *et al*. (1993) and Russell (2000) for a good summary of the major theories on international migration.
[5] The International Organisation for Migration (IOM) defines an economic migrant as a person who leaves his/her habitual place of residence to settle outside his/her country of origin in order to improve his/her quality of life.
[6] Potential migrants from the SPINS were excluded from the sample used in this study due to lack of data for many of the explanatory variables. Also, current New Zealand immigration policy allows Samoan citizens to apply for residence under the Samoan Quota Scheme, and citizens of Kiribati, Tuvalu, Fiji and Tonga (including their partners and dependent children) can also apply to settle in New Zealand under the Pacific Access Category (see Immigration New Zealand, http://www.statistics.govt.nz). As this study focuses on economic migrant application, excluding the SPINS from the sample should not affect the results significantly. We take migrant applications under the General Skills category as a proxy for the number of economic migrant applicants. In some cases this measure will provide an underestimate of the economic migrant (where the real reason is economic but the application falls under another category). This is especially a problem for the SPINS who resettle under the Pacific Access Category but are motivated to resettle for economic reasons.
[7] See for instance Bryant *et al*. (2004) and Glass and Choy (2001).
[8] We try measures of stocks of migrants disaggregated by number of years since arrival into New Zealand.
[9] Here, we are specifically referring to the points system applied to economic migrants: applicants under the General skills stream and not social migrants (applicants under the family sponsored or international humanitarian streams).
[10] Positive selection implies that the high earners in the country of origin choose to migrate and when in New Zealand, they earn more than the average native. Negative selection implies that migrants come from the lower tail of the income distribution in the country of origin and when in New Zealand, they also earn lower than the average native (Borjas, 1997). Borjas describes a third situation, "refugee sorting", where migrants from the lower tail of the income distribution in the country of origin earn a higher than average wage in the adopted country. As we are analysing economic migrants, this situation is not relevant to our study. Finally, Borjas does not consider a fourth possibility where high earners in the country of origin earn less than the average New Zealander after they choose to migrate (because of lack of recognition of skills/qualifications).
[11] Mayda's (2005) analysis does not include New Zealand as destination country.
[12] The top ten 10 countries of origin of successful applications under the General Skills category is the same as the top 10 countries of origin for applications under the General Skills category (NZIS, 2002).

[13] Diagnostic testing of the error term will show us that these effects are not systematic. In our empirical models we use the White (1980) test for heteroscedasticity as this may reveal a range of other mis-specification errors included parameter heterogeneity and non-normality in the residuals, see Chesher (1984) and Zietz (2001).

[14] We do acknowledge however, that results of our empirical estimations need to be interpreted with due consideration to this potential "non-random" sample problem.

[15] The main premise in Mincerian regressions is that an increase in the level of the time fraction spent acquiring human capital will have proportional effects on labour productivity and wages. Hall and Jones' human capital variable is expressed as: $H_i = e^{\phi(E_i)} L_i$

where E_i reflects years of schooling and $\phi(E)$ is a measure of the efficiency of a unit of labour with respect to E years of schooling. Hall and Jones assume $\phi = 13.4\%$ for the first four years of education, 10.1% for the next four years, and 6.8% beyond the eighth year of education based on Psacharopoulos (1994).

[16] Where immigrants come from the upper tail of the income distribution in the origin country and end up in the upper tail of the income distribution in the destination country.

[17] Where immigrants come from the lower tail of the income distribution in the origin country and end up in the lower tail of the income distribution in the destination country. For more details see Borjas (1997) and Mayda (2005).

[18] In many instances, distance is not actually related to the cost of air travel. For example, the great circle distance from Manila, Philippines to Wellington, New Zealand is approximately 8323 kilometres and from Singapore to Wellington, is approximately 8532 kilometres. Air travel from the Philippines to Wellington however, is substantially more expensive (on average, NZ$2000 return) than air travel from Singapore to Wellington (on average, NZ$1300 return).

[19] To provide sharper information on this aspect we also estimated our general equation using the percentage of the population in the origin country who speak English (*ENGFRAC*) and the percentage of the population in the origin country who speak one of the five primary Western European languages including English (*EURFRAC*), and a dummy variable if there had been a common colonial history between the origin country and New Zealand. These variables however were not statistically significant in our estimations.

[20] There are no strong correlations amongst the covariates especially between the core regressors: real GDP per worker, common language, corruption in the origin countries and the stock of migrants in New Zealand born in the origin country.

[21] We prefer this approach over the general-to-specific approach due to the sample size.

[22] These two countries were selected as they are relatively similar on a number of dimensions, i.e., English as a secondary language, distance from New Zealand, income and education levels.

[23] For dummy variables, the estimated percentage impact on the expected level of bilateral applications per head is based on $[\exp(b-0.5V(b))-1]\times 100$, where b is the estimated coefficient and $V(b)$ its estimated variance, (Kennedy, 1981).

[24] In 2000, the percentage of foreign born per capita in New Zealand was 19%, compared to 11% in the United States, 16% in Canada, and 24% in Australia (International Organisation for Migration, 2003).

[25] Based on available data from Statistics New Zealand, overseas-born people were more likely to have educational qualifications than New Zealand-born, particularly degree qualifications (Statistics New Zealand, 1999).