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Abstract

This paper exploits the existence of the trans-Tasman travel agreement and the availability of comparable census data in Australia and New Zealand to examine the extent to which individuals respond to different labour market conditions in the two countries (and their subregions), as well as measures of local amenities and cost of living when deciding where to live. Our findings suggest that the trans-Tasman travel agreement did contribute to a mutual exchange of migrants with many similarities regarding the size and human capital endowment of migration flows in both directions. However, considerable differences between the two countries remain with regard to internal, trans-Tasman and other international migration.

JEL-Classification: F22, F55, R23

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1 Introduction

In February 1973, New Zealand and Australia signed the trans-Tasman travel arrangement which since that date has allowed citizens of both countries to move freely across borders and to live, work and study in each other's nation indefinitely (Bedford et al., 2006). Both countries operate migration systems that focus on attracting high-skilled workers and New Zealand even grants permanent immigrants to Australia the right to live, work and study in New Zealand. Others become eligible to move across Tasman by acquiring local citizenship and there has often been a general sentiment that immigrants use New Zealand as a backdoor to gain entry to Australia (New Zealand Press Association, 2008).

Pioneering work by Robinson and Tomes (1982) and Borjas (1987) modelled migration decisions based on the idea that individuals move to places that offer the highest returns to their skills. Unfortunately, it is difficult to empirically test these models, because immigration policies restrict the free flow of individuals between countries and comparable data are typically lacking for both home and destination countries. This paper exploits the existence of the trans-Tasman travel agreement and the availability of comparable Census data in both countries to examine the extent to which individuals respond to different labour market conditions in Australia and New Zealand (and subregions of both), as well as measures of local amenities and cost of living when deciding where to live.

Specifically, we use comparable data from the 1996, 2001 and 2006 New Zealand and Australian Censuses to examine the locational choice decisions of Australian- and New Zealand-born populations, as well as for immigrants to each country. The work consists of two components. First, we examine the characteristics of the New Zealand-born, Australian-born and immigrants residing in both countries for more than five years, as well those that have arrived in the five years previous the respective Census. We examine how human capital (i.e. education and work experience) differs for these particular groups and whether this has changed over the ten-year period (1996-2006) being examined. Second, we estimate regression models that examine how various local

characteristics influence where New Zealanders, Australians and immigrants choose to live both between Australia and New Zealand and within the two countries. In particular, we look at the importance of local labour market opportunities for individuals with different levels of human capital, local amenities, local cost of living – particularly house prices.

Overall, our findings suggest that the trans-Tasman travel agreement did contribute to a mutual exchange of migrants with many similarities regarding the size and human capital endowment of migration flows in both directions. However, considerable differences between the two countries remain with regard to internal, trans-Tasman and other international migration. In particular, within- and between-country mobility rates of the two countries are quite different. Our results are consistent with the lack of convergence in incomes across the Tasman as it appears that both trans-Tasman and international migrants are in many cases drawn to New Zealand because of high employment rates. Similarly, although differences in local income levels are found to be an important driver of regional mobility, other factors such as local employment rates, total population size and skill group population size also impact on internal mobility and hence discourage within country convergence in local incomes.

2 Data

2.1 Census Data in Australia and New Zealand

The 1% Basic Census Sample Files (CSFs) of the 1996, 2001 and 2006 Censuses of Population and Housing constitute the major Australian data source used in this paper. The Australian Census is carried out in the first week of August in each of these years. The CSFs are Confidentialised Unit Record Files (CURFs) of Census variables that include small random samples of private households and associated persons, and persons in non-private dwellings.[1] For New Zealand, we have access to unit record

[1]Although most Census variables are part of the Census Sample Files, some classifications were aggregated to less detailed levels to protect confidentiality. For 2001 and 2006, extended CURFs which sample 5-10% of the population are accessible via remote access, but unfortunately the restrictions

data on the entire usually resident New Zealand population from the 1996, 2001 and 2006 Census. The New Zealand Census is carried out in the first week of March in each of these years. We further employ regional home sales price data reported by the Australian Property Monitors (APM) for Australia and similar data collected by Quotable Value New Zealand (QVNZ) for local areas in New Zealand.

We restrict our analysis throughout to individuals aged 25-59 years with non-missing information on current location, country of birth and year of arrival if foreign-born. In the Australian Census, we further drop individuals who report that they still attend school.[2] We focus on prime-age individuals to exclude people who are more likely to decide where to live for non-economic reasons (i.e. students and individuals nearing retirement) and to maintain comparability with our previous work on the project. This results in a sample of 1.60, 1.69 and 1.81 million people living in New Zealand in 1996, 2001 and 2006, respectively and a sample of 8.12, 8.56 and 8.77 million people living in Australia in these same years. Among the individuals living in New Zealand, 20% are foreign-born in 1996, rising to 22% in 2001 and 26% in 2006. Australia-born individuals make up 7% of the foreign-born population in New Zealand in 1996 and 2001, declining to 6% in 2006. The foreign-born population is slightly larger in Australia, declining from 29% of the population in 1996 to 28% in 2001 and 2006. New Zealand-born individuals make up 8% of the foreign-born population in Australia in 1996, increasing to 9% in 2001 and 10% in 2006.

2.2 Defining Geographic Areas

The Australian Census CURF indicates the Statistical Division (SD) that each household usually resides in on Census night as well as five years previously. The SD is the largest general purpose spatial unit used by the Australian Bureau of Statistics (ABS).[3]

around this access make it quite difficult to use this data for this project (because of the steps required to define variables similarly in Australia and New Zealand).

[2]312 individuals in this age group in 1996 and 158 individuals in 2001 reported that they still attend school. This restriction is imposed because it is not possible to assign years of schooling for these individuals.

[3]ABS (2006) provides a detailed description of statistical regions.

SDs are defined as relatively homogeneous regions characterised by identifiable social and economic links between the inhabitants and between the economic units within the region, under the unifying influence of one or more major towns or cities and should, where possible, embrace contiguous whole local government areas. Most importantly for our application, these are designed to generally remain stable over time.

There are currently 61 SDs in Australia, but for confidentiality reasons, the CURF aggregates them to 41 regions in 1996 and to 48 regions in 2001 and 2006. Further aggregating some of these regions allows us to define 39 time-consistent geographic areas.[4] Although these geographic areas are relatively spacious in some cases, it appears reasonable to consider them broadly as local labour markets in metropolitan areas. Each of the 39 geographic areas includes between 130,000 and 580,000 prime-age individuals in 2006 based on our analysis sample, with the average area having 225,000 individuals.

Unfortunately, a similar geographical level is not officially defined for New Zealand. However, the New Zealand Census data contain highly detailed geographical information that allow us to create a geographical definition that is similar to that available in the Australian data. In particular, we start with 16 Regional Councils (RC), which by the Local Government Amendment Act (No. 3) 1988, are designed to conform as far as possible to one or more water catchments, with further consideration given to regional communities of interest, natural resource management, land use planning and environmental matters. Two sets of smaller population RCs are then aggregated to form larger local areas (Gisborne/Hawkes Bay and Tasman/Nelson/Marlborough) and another very small population RC, West Coast, is aggregated with the neighbouring Canterbury RC. We then separate out main urban areas, defined by Statistics New Zealand (SNZ) as very large urban areas centred on a city or major urban centre with a minimum population of 30,000. In particular, this includes four separate urban areas

[4]With the exception of two areas in which assumptions were needed to obtain definitions that are broadly comparable over time. Specifically, we matched Western Sydney/Blacktown-Baulkham Hills in 1996 with Western Sydney in 2001 and 2006; we further matched North and West BSD Balance/Moreton in 1996 and 2001 with North BSD Balance/Ipswich/Gold Coast/Sunshine Coast/West Moreton in 2006.

in Auckland, Hamilton City, Wellington City and Christchurch City.

This results in a geographical classification with 19 areas, each containing between 40,000 and 190,000 prime-age individuals in 2006 based on our analysis sample, with the average area having 95,000 individuals. While these areas contain, on average, less than half the population of the corresponding areas in Australia, casual observation suggests that this reflects the genuine difference in local population density in the two countries. For example, Papps and Newell (2002) use travel to work data from the 1996 New Zealand Census to generate self-contained labour market areas in New Zealand and argue that at least 58 exist.

2.3 Measuring Human Capital

One important task for our analysis is defining human capital in each dataset. Unfortunately, the educational systems are somewhat different in Australia and New Zealand and hence the questions on qualifications and schooling are asked differently in the Australian and New Zealand Census. In New Zealand, the focus is on qualifications earned at both the school and post-school level, while in Australia, final school grade is collected along with post-school qualifications. Moreover, schooling and qualification categories in the Australian Census have changed over time. Specifically, the age at which an individual left school is collected in 1996 instead of final school grade and the classification of post-school qualifications has changed over time.

To obtain a consistent measure of educational attainment in both countries and over time, we use the available schooling and qualification classifications to derive the total number of years of education (including both school and post-school education) for each individual. We then calculate the number of years of potential labour market experience for each individual as their age minus their total years spent in education minus 5 (i.e. the school starting age).[5] This is a necessary approximation for actual labour market experience, which is not collected in either Census.

[5]Age is only observed in 5-year categories in the Australian CURFs. For that reason, we assign an actual age using a random uniform distribution of age within each of the categories.

Specifically, in New Zealand, individuals who have 'No Qualifications' are assumed to have spent 10 years in education if they are NZ-born and between 3 and 11 years in education if they are foreign-born depending on their gender and country of birth,[6] those whose highest qualification is 'Level 1 School' 11 years, those with 'Level 2 School' 12 years, and those with 'Level 3 or 4 School' 13 years. Individuals whose highest qualification is 'Overseas School' are assumed to have spent 6 to 12 years in education depending on their gender and country of birth.[7] Individuals whose highest qualification is 'Level 1, 2 or 3 Post-School Certificate' are assumed to have spent 12 years in education, those with a 'Level 4 Post-School Certificate' 13 years, those with a 'Level 5 Post-School Diploma' 13.5 years, those with a 'Level 6 Post-School Diploma' 14 years, those with a Bachelor Degree 16 years and those with a 'Higher Degree' 17.5 years. Individuals whose highest qualification is 'Not Elsewhere Included' are assumed to have spent 7 to 13 years in education depending on their gender and country of birth.[8]

For Australia, years of schooling in 2001 and 2006 are equal to the highest grade completed, with individuals who finished in year 10 or below assumed to have 9.5 years of schooling.[9] In 1996, individuals are assumed to have spent 6 years in school if they 'never attended school', 8 years if they finished at age 14 and under, 9.5 years if they finished at age 15, 10.5 years if they finished at age 16, 11.5 years if they finished at age 17, and 12 years if they finished at age 18 and older.[10] We further assign additional years of education to post-school qualifications, one additional year for a certificate,

[6]We use the data collected by Barro and Lee (2001) on worldwide educational attainment to estimate the average years of education for individuals of a particular gender and country of birth that have not completed secondary school. The mean estimate across all countries is 7.5 years.

[7]The data collected in Barro and Lee (2001) are used to calculate the average number of years to complete secondary school for individuals of a particular gender and country of birth. The mean estimate across all countries is 10 years.

[8]Again, this is done using the Barro-Lee data, but now assuming that individuals have the average number of years of tertiary education in a particular country on top of completed secondary school. The mean estimate across all countries is 10.5 years.

[9]This assignment is based upon the actual distribution of highest grade completed for individuals who finished in year 10 or below in the Household, Income and Labour Dynamics in Australia (HILDA) Survey. See Stillman and Velamuri (2010) for further information on HILDA.

[10]Again, this assignment is based upon the actual distribution of highest grade completed by age finished schooling for individuals in HILDA, which collects information on both measures.

two additional years for an associate or undergraduate diploma, three additional years for a bachelor degree, four additional years for a graduate diploma and five additional years for a postgraduate or higher degree.[11]

While this approach is somewhat ad-hoc, it is consistent with the way in which the New Zealand and Australian education systems operates, even though the nature of assessment has changed over time (e.g. the shift to a National Certificate of Educational Achievement (NCEA) in Years 11, 12 and 13 at secondary schools in New Zealand). The advantage of using this approach as opposed to focusing on a comparison between qualifications is that a "completed years of education" measure permits a straightforward quantification of differences in human capital between different groups of individuals.

2.4 Measuring Labour Market Outcomes

In addition to demographic characteristics and human capital, we are interested in the economic status of individuals with respect to employment and wages. Ideally, we would like to measure labor market outcomes using employment rates and wage rates. While employment rates are observed in both Census data, we only observe total incomes instead of wages.[12] In our regression analysis, we use the observed individual total incomes and information on labor supply to best approximate 'average' labor

[11]In 1996, vocational qualifications are further split into basic and skilled with basic qualifications assumed to take 0.5 years and skilled ones 1 year. Individuals missing information on school, but with valid post-school qualifications are assigned total years of education based on the actual distribution of highest grade completed by post-school qualification for individuals in HILDA. The figures are 11 years for a certificate, 13.5 for a diploma, 15 for a bachelor's degree, 16 for a graduate diploma, and 17 for a postgraduate degree. In 1996, basic certificates are assigned 9.5 years and advanced certificates 11.5 years. Individuals missing both valid school and post-school data are assigned the average years of total education for an individual of the same gender and country of birth in a particular census year, which is valid if this information is missing at random. Qualifications are imputed in the New Zealand data by SNZ using a similar assumption.

[12]Individuals report the category of their weekly income in the Australian Census and the category of their annual income in the New Zealand Census. Since we do not observe a continuous income measure in either Census, we use midpoints of the categories to construct a continuous measure of individual weekly income. For the New Zealand census, we use information on the actual distribution of income within each bracket based on the Household Economic Survey (HES) to assign midpoints. This is more important than in the Australian data because annual income is being collected. We then divide annual income by 52.14 to convert to weekly income.

incomes for different groups. In particular, we calculate median incomes for different groups of full-time wage/salary employees.[13] This has three advantages over focusing on mean incomes for all workers. First, many part-time workers receive income from other sources, such as benefits, and work a wider variety of hours than full-time workers. Second, total incomes for employers and the self-employed typically include income that has been derived from capital investments rather than from supplying labour. Third, since few full-time wage/salary employees receive other income, say from investments, median total income for this group is a good approximate to median labour earnings.

We then use the CPI provided by the ABS as the weighted average of eight capital cities and the national CPI provided by SNZ to convert nominal values to real December 2006 dollars.[14] We further convert New Zealand incomes into real Australian dollar using the purchasing power parity exchange rate (PPP) provided by Penn World Tables 7.0 for 1995, 2000 and 2005. The applicable rates are 0.8686, 0.8763, and 0.8933, respectively. PPP exchange rates reflect differing costs of living so are more appropriate for examining migration decisions than actual spot financial exchange rates. This choice of exchange rate also has no impact on our regression results, since we model the relative population changes for different groups who all experience the same exchange rate.

[13]Full-time is defined as working at least 25 hours per week. Ideally, we would have liked to use a slightly higher cut-off but hours worked is provided as a categorical variable in the Australian CURF.

[14]Both the Australian and the New Zealand Censuses survey an individual's usual income over the previous year. However, New Zealand conducts the Census at the beginning of March, while the Australian Census is conducted at the beginning of August. For that reason, we employ the CPI of quarter three of the previous year as a midpoint for the New Zealand Census and the CPI of quarter four of the previous year as a midpoint for the Australian Census. Our house price data for Australian data refer to January-November of each year, hence we use the quarter two CPI to convert these data. The New Zealand house price data cover the prior July to the current June, hence we use the quarter four CPI of the previous year to convert these data. The choice of alternative CPI measures, such as the CPI of a different quarter or the annual average CPI, does not affect our empirical results qualitatively.

3 The Characteristics of Individuals Residing in New Zealand and Australia

3.1 Summary Statistics

As a starting point of our analysis, we compare the most important socioeconomic and demographic characteristics across the two countries and over time. The summary statistics presented in Table 1 show many similarities and only a few differences in average characteristics between individuals living in Australia and New Zealand. In both countries, the average age of the 25-59 year-old population has increased slightly from about 40 years in 1996 to about 42 years in 2006. The proportion of the population that is female is also quite similar, as well as household composition. In both countries, the proportion of couples with children has declined by 3-4 percentage points over the period 1996-2006. Marriage rates are higher in New Zealand, but this reflects the fact that de-facto marriages are included in the New Zealand data, while only legal marriages are identified in the Australian CURF.

Average years of education are somewhat higher in New Zealand, although educational differences between the two countries have declined over time. In all likelihood this reflects the differences in the educational systems of the two countries and in the way that the data on educational attainment is collected in the two Censuses, as well as actual differences in educational attainment. Our main regression analysis stratifies the population into skill groups based on years of education (and potential experience) in a way that tries to minimise the impact of these definitional differences. Turning to labour market outcomes, employment rates are around 4 percentage points higher in New Zealand than in Australia in all three Census years even though employment rates have increased by about 4 percentage points in both countries over the ten-year period being examined. On the other hand, average real incomes are considerably lower in New Zealand than Australia throughout the time period.[15] When New Zealand dollars

[15]Note, that these are mean real total income across the entire population. We present these here for sake of comparability with previous work using Census data, but, as discussed above, focus on

are converted to Australian dollars using the PPP exchange rate in each Census year, real incomes in New Zealand were 15% lower than in Australia in 1996, increasing to 17% lower in 2001 and 2006. Average real incomes increased between 1996 and 2006 in both countries, growing by 17% in New Zealand and by 24% in Australia, with an increasing relative PPP exchange rate in favour of New Zealand making up the difference in income growth.

Table 1 also reports the country/region of birth distributions which reveal that about 28% of the Australian population is foreign-born. While the share of foreigners residing in Australia remained relatively constant over the ten-year period, the share of the foreign-born population in New Zealand increased from about 20% in 1996 to almost 26% in 2006. In 2006, 2.7% of Australia's population was born in New Zealand, while 1.5% of New Zealand's population was born in Australia. The numbers in Table 1 also reveal that the share of Australia's population residing overseas five years previously increased from 4.0% in 1996 to 5.5% in 2006, while the corresponding share of New Zealand's population surged from 7.8% to 11.0% over the same period.[16] These numbers highlight the increasing relevance of the international mobility of Australians and New Zealanders.

Table 2 presents similar information as Table 1, but averaged over the 39 locations in Australia and 19 locations in New Zealand in each year, as opposed to averaged over individuals. In general, the location averages are similar to the overall sample means. One exception is that the average proportion of the population that is foreign-born is lower when averaged across locations, which indicates that foreign-born populations are concentrated in particular locations.[17] This table also presents information on local house prices. A substantial increase in local house prices is observed in both countries.

median real income for full-time wage/salary employees in our regression analysis.

[16]Individuals in both censuses are asked for their address five years previously. This is coded in a way that allows us to match to the 39 locations in Australia and 19 locations in New Zealand for internal migrants. Individuals can also provide an overseas address. In the New Zealand census, the data include information on the country lived in five years previously for those overseas. Unfortunately, the Australian census data does not provide any additional information for individuals that are overseas.

[17]In other words, the proportions presented in Table 2 are not representative for the respective populations because we do not weight these proportions with the population size of the location.

Specifically, real average local house prices increased by 157% in Australia and by 78% in New Zealand over the period 1996-2006. Housing affordability also declined in both countries, with mean house prices relative to mean annual income increasing in New Zealand from 6.0 in 1996 to 8.9 in 2006 and in Australia from 4.3 in 1996 to 8.9 in 2006.

3.2 Human Capital of International Migrants

Wage distributions in different countries may help explain why individuals decide to migrate to another country. In particular, high-skilled workers may earn higher wages abroad if the wage distribution in the host country is relatively more dispersed than in their home country. The skill distribution of migrant workers is in turn highly relevant for the receiving country because it may have an impact on the labour market and the economy as a whole. As a result, the skill distribution of immigrants has received a great deal of attention in the economic migration literature (Borjas, 1987; Chiquiar and Hanson, 2005; Moraga, 2011; Kaestner and Malamud, 2010).

To gain a better understanding of the distribution of skills among native- and foreign-born populations, we describe the education and labour market experience of six different native- and foreign-born groups in Australia and New Zealand. The first column of the upper panel of Table 3 includes educational attainment and potential labour market experience of New Zealand-born persons who also lived in New Zealand five years previously.[18] The third column of the lower panel includes the corresponding numbers for Australian-born persons who lived in Australia five years previously. In both cases, the average characteristics of these groups are quite similar to the averages for the whole population presented in Table 1.

A comparison of the first and third columns of the lower panel reveal that established New Zealand-born migrants in Australia are similarly educated and have a

[18]Here, and in all other analysis, which uses information on an individual's location five years previously, we assume that individuals with missing data are currently at the same location as five years ago. The resulting mobility patterns are consistent with those implied when synthetic cohorts are linked across consecutive censuses. Our main regression analysis focuses on changes in local populations over time as opposed to using this information.

similar amount of (potential) work experience as the average Australian-born who also resided in Australia five years previously. In 1996, these New Zealand-born migrants were slightly more likely to be male than the average Australian-born person, but in later years there is little difference in the gender balance of the two populations. Instead, comparing the second and the third column of the lower panel reveals that recent New Zealand-born arrivals to Australia have around 0.5 years more education than the settled Australian-born and have 4-5 years less work experience. While there were more male than female migrants from New Zealand in Australia in 1996, just as many female as male New Zealanders lived in Australia in 2006.

Comparing the first two columns of the upper panel reveals that New Zealand-born individuals who have returned from living overseas during the last five years have around 1.0 years more education than settled New Zealand-born, but 6-7 years less work experience. This is consistent with the finding in Gibson and McKenzie (2011), who examine the migration patterns of a subset of high-skilled individuals in a number of Pacific countries including New Zealand, and find that of the two-thirds of high-skilled New Zealanders who migrate abroad by the age of 28, one-half return migrate within 12 years. A similar pattern is observed when examining the Australian-born who have returned to live in Australia, although one striking difference is that return migrants are predominately (54-57%) female in Australia, while in New Zealand they are equally from each gender.

Similar comparisons between settled Australian-born migrants in New Zealand and settled New Zealand-born individuals can be made by examining the first and third columns in the upper panel. Again, we observe that settled trans-Tasman migrants have similar amounts of education and work experience as settled locally-born individuals. Also similar to the results from New Zealand, when we instead focus on recent Australian-born arrivals to New Zealand, we find that they are more educated (by 0.9-1.1 years) and less experienced (by 6-7 years) than the settled New Zealand-born. However, compared to trans-Tasman migrants from New Zealand to Australia those moving from Australia to New Zealand, both recently and further in the past, are more

likely to be female.

Finally, we may compare native-born persons to foreign-born persons from countries other than Australia and New Zealand (the final two columns of the table). The numbers in the fifth column reveal that foreign-born persons who lived in Australia or New Zealand five years previous are similarly educated, but more experienced (and older) than the settled New Zealand and Australian-born in the same country. In contrast, foreign-born persons who did not live in their host country five years previous look much more like their native-born counterparts who lived overseas five years previous. Specifically, their education is well above average, while their labour market experience (and age) is far below the average native-born person.

The population figures in this table also reveal interesting differences in mobility patterns. Among the New Zealand-born living in New Zealand on Census night, 3-4% report living overseas five years previously – this is calculated by dividing the proportion of the total population in New Zealand in a particular year who are New Zealand-born individuals and report living overseas five years previously (e.g. 3.0% in 1996) by the proportion of the total population in New Zealand in a particular year who are New Zealand-born (e.g. 79.9% in 1996). In comparison, only 1% of the Australian-born in Australia report being overseas five years previously. Another difference is that New Zealand-born living in Australia are more likely to have been living there five years previously (78-87%) than the Australian-born living in New Zealand (74-79%). A final striking difference is that, while 24, 26 and 31% of non-Australian-born migrants in New Zealand in 1996, 2001, and 2006, respectively, did not live there five years previously, the corresponding figures for migrants in Australia are 11, 12 and 16%, respectively. In other words, New Zealand's migrant population has twice as many recent migrants relative to earlier migrants than Australia's.

3.3 Human Capital of Internal Migrants

In addition to international migration, we also examine location choices of (so-called) internal migrants within Australia and New Zealand. Table 4 contains the same infor-

mation as Table 3, but now Australian-born, New Zealand-born and other foreign-born individuals in Australia and New Zealand are split into those who lived in the same location five years previous (based on the geographical aggregations discussed above with 39 locations in Australia and 19 locations in New Zealand) and those who lived in a different location in the same country five years previously. Individuals who lived overseas five years previously are excluded from this table.

These results show that internal migrants are in general better educated and less experienced (and younger) than those who stay in the same location as five years previous. Interestingly, the characteristics of internal migrants within either country are quite similar regardless to country of birth, with the exceptions that foreign-born internal migrants in New Zealand and Australia are, on average, more experienced than New Zealand and Australian-born internal migrants in the same country (but to the same extent that foreign-born stayers are more experienced than other stayers) and that foreign-born internal migrants in Australia are, on average, more educated than New Zealand- and Australian-born internal migrants.

This table also provides suggestive evidence that we have defined geographical locations of a 'similar' scale in both countries as 17% of the New Zealand-born population in New Zealand are internal migrants in each Census year, while the corresponding figure for the Australian-born in Australia is 19, 18, and 17% for 1996, 2001 and 2006, respectively. Internal mobility rates of New Zealand- and foreign-born populations in New Zealand are about the same: 17% for the foreign-born population in all years and 17% for the Australian-born population in 1996 raising to 18% in 2001 and 19% in 2006. The foreign-born population in Australia also has similar internal mobility rates of 17, 16 and 15% in 1996, 2001, 2006, respectively. The New Zealand-born population in Australia is the only exception here, with much higher internal mobility rates of 25, 21 and 21%, respectively, in the three years.

3.4 Educational Distribution of Different Mobility Groups

In Table 5, we examine the educational distribution of international and internal migrants in Australia and New Zealand compared to that of individuals who reside in the same location five years previously. The results demonstrate that more educated individuals are more likely to move both internally and internationally. For example, among the Australian-born population residing in Australia in 2006, 16% of individuals living in the same location as five years previous have 15 or more years of education, while the corresponding figure for internal migrants is 26% and for international migrants 49%. In fact, while nearly half of the Australian-born population who has returned from living overseas in 2006 has 15 or more years of education, a similar proportion among Australian-born stayers have less than 12 years of education.

We find similar results for all population groups, with generally the strongest educational differences between movers and stayers found for the Australian-born in Australia and immigrant groups in both countries. Differences in the educational distribution of stayers and movers (internal and international migrants) are generally less stark for the New Zealand-born, especially for those living in Australia. In fact, the proportion of the population of New Zealand-born who are living in Australia who have 15 or more years of education is generally less compared to the same group of New Zealand-born living in New Zealand. For example, in 2006, among the New Zealand-born living in Australia only 13%, 17% and 18% of the stayers, internal migrants and international migrants, respectively, have 15 or more years of education, while the comparable figures for the New Zealand-born living in New Zealand are 14%, 22% and 34%.

4 The Locational Choices of New Zealanders, Australians and International Migrants

4.1 Modelling Trans-Tasman Location Decisions

In this section, we examine how various local characteristics influence the choice of New Zealanders, Australians and immigrants on where to live both between Australia and New Zealand and within the two countries. In particular, we look at the importance of local labour market opportunities for individuals with different levels of human capital, local amenities, local cost of living (measured by house prices) and what country an individual was born in.

We begin by dividing the population in New Zealand and Australia in each Census into 20 skill groups based on years of education and potential experience. This approach is commonly used in the literature that examines the impact of immigration on outcomes for non-immigrants (for example, Borjas (2003)) and allows us to examine the location decisions of similarly skilled individuals based in New Zealand and Australia in one integrated model.

We classify people into five education groups; (1) 10 years or less (no qualifications in New Zealand and incomplete school in Australia), (2) more than 10 but less than 12 years (lower school qualification in New Zealand and incomplete school in Australia, and basic vocational qualifications in both countries), (3) exactly 12 years (higher school qualifications in New Zealand and completed school in Australia), (4) more than 12 and less than 15 years (some combination of school qualifications and vocational qualifications in both countries), and (5) 15 or more years of education (bachelor degrees and higher in both countries).[19]

Similarly, individuals are allocated to four potential experience groups; (1) less than 15 years, (2) at least 15 but less than 25 years, (3) at least 25 but less than 35 years,

[19]Because of the complex method of assigning years of education, these descriptions just cover the majority of individuals. For example, if someone has a bachelor degree, but did not complete school in Australia or does not have a higher school qualification in New Zealand they will be assigned to the fourth education group as opposed to the fifth.

and (4) 35 years or more of experience. These groups were chosen to be broad enough to allow us to examine intracountry location decisions, but narrow enough that it is a reasonable assumption that individuals within the same skill group have similar labour market opportunities in different locations.

The outcome we examine in our regression models is the change in the (log) population of individuals from a particular country of birth (New Zealand, Australia or other) and skill group between any two consecutive Censuses in a particular location. Initially, we examine population change at the national level. This is equivalent to examining the net trans-Tasman migration flows for different country of birth skill groups if all movements of people were between Australia and New Zealand. However, examining changes in population as opposed to flows allows us to account for the fact that individuals also migrate away from New Zealand and Australia and hence leave our sample. We can also easily extend this same model to examine population change at the local level, which is exactly what we do in section 5.6.

Our country level regression model controls for two measures of labour market opportunities in New Zealand and Australia; (1) the (log) employment rate of non-immigrants in a particular skill group in each country and Census year, and (2) the (log) median real income of non-immigrant full-time wage and salary employees measured in Australian dollars in a particular skill group in each country and Census year.[20] We measure labour market opportunities in each country based on outcomes for the non-immigrant population because this abstracts from issues of immigrant selection and assimilation.

We also create a third measure of the desirability of living in each country, the (log) population of a particular skill group in each country. A larger size population with the same skills could serve to attract individuals because they desire to live in the same location as similarly skilled people or it could negatively affect whether individuals want to move to areas if they view places with a greater population in the same skill

[20]Our regression estimates are insensitive to the choice of exchange rates because we examine relative differences across different skill groups and the exchange rate does not vary by skill group. For the same reason, we cannot examine the role that house prices or other amenities have in location decisions when we are examining this at the national level.

group as being more competitive along particular dimensions.

These three measures make up the main explanatory variables in our country level regression model.[21] We also control for the (log) total population of a particular skill group from a particular country of birth group in each country. The coefficient of this variable picks up convergence in group-specific population sizes. If the population sizes of our subgroups converge to each other, then the coefficient will be negative, indicating that subgroups with larger initial populations exhibit lower growth. By controlling for initial group-specific population sizes, our model has the form of a standard convergence model used in the economic growth literature (see, e.g. Romer (2006)).

To properly reflect the information that individuals have when making location decisions and to exclude the possibility that migration flows lead to changes in labour market opportunities, all explanatory variables are measured at the beginning of the period for which we are examining changes in population. In other words, if the outcome is the change in the population of the New Zealand-born in a particular skill group between 2001 and 2006, then our explanatory variables are measured in 2001. More generally, since we will pool both intercensual periods (i.e. 1996-2001 and 2001-2006) in our regression analysis, the outcome is measured as the change in population between time t and t-5 (where t is 2001 or 2006), while the explanatory variables are measured at time t-5 (i.e. 1996 and 2001). Both the dependent and explanatory variables are measured in natural logs because, when a linear ordinary least squares regression model is used to estimate the relationship between them, the resulting coefficients have the desirable property that they can be interpreted as elasticities, i.e. the impact of a % change in a particular variable on a % change in the outcome.

While we examine changes in skill group population for different country of birth groups in New Zealand and Australia in the same regression model, we allow the relationship between all covariates and the outcome to differ by country. In other words, our regression model examines the relationship between labour market opportunities in

[21] As discussed in more detail in section 5.5, we include the following additional covariates in the regression model examining intracountry location decisions: i) local house prices; ii) local immigrant population, and iii) local total population.

New Zealand and population change among New Zealand-born, Australian-born and other immigrants in New Zealand, as well as the relationship between labour market opportunities in Australia and population change among different country of birth groups in Australia. We also include as control variables in the regression, country of birth fixed effects interacted with whether the country is New Zealand; allowing for different mobility rates for each country of birth group in each country; and an indicator variable for the census year interacted with the country of birth fixed effects and whether the country is New Zealand; allowing for different aggregate mobility rates over time for each country of birth group in each country.[22]

4.2 Net Population Growth in Australia and New Zealand by Skill Group

Before presenting our regression results, we first examine how the variables used in the regression model vary across groups and over time. Table 6 shows the percent change (converted from changes in logs) in skill group-specific Australian-, New Zealand- and foreign-born populations in Australia and New Zealand over the periods 1996 to 2001 and 2001 to 2006, respectively. As discussed in the prior section, the figures presented here are the outcome variable in our country-level regression model. The upper panel of Table 6 reports population changes from 1996 to 2001, while the lower panel shows population changes from 2001 to 2006.

On balance, the numbers in Table 6 reveal a positive relationship between net population growth and skills in Australia and New Zealand for different country of birth groups. For example, while the number of New Zealand-born persons in New Zealand in the highest skill group (35+ years of potential labour market experience and 15+ years of education) grew by 62.7% between 1996 and 2001, the corresponding population of

[22]We also considered including country of birth by skill group fixed effects in the regression model. Once these are included all inference is based on the relationship between the change in labour market opportunities in 1996 and 2001 and the change in population change between 1996 and 2001 and 2001 and 2006. Such a model appears to be poorly identified as most results are insignificant. Given that we are looking at the relationship between current mobility and past labour market performance, we do not believe that including skill group fixed effects reduced concerns about bias in our model.

the lowest skill group (below 15 years of potential labour market experience and below 11 years of education) declined by 42.5%. Although the net population growth rates in Table 6 vary considerably across different country of birth groups, they reveal that both higher levels of potential labour market experience and higher levels of education are positively associated with population growth in Australia and New Zealand.

It is also notable that, while between 1996 and 2001, the population of high skilled New Zealand-born in Australia grew much more rapidly that the population of high skilled New Zealand-born in New Zealand, this was not true between 2001 and 2006. However, the population of medium-high skilled New Zealand-born (e.g. individuals with post-school qualifications) did grow more rapidly in Australia than in New Zealand in the later period.

4.3 Labour Market Outcomes for Different Skill Groups

We next examine how the main explanatory variables vary across different skill groups and time. Recall that these are the log employment rate of non-immigrants in a particular skill group in each country and the log median real income of non-immigrant full-time wage and salary employees measured in Australian dollars in a particular skill group in each country. These are presented in Table 7 for Australia and New Zealand in 1996 and 2001.

These figures indicate that employment rates and income levels are positively related to both potential labour market experience and educational attainment. We further observe considerable differences in labour market outcomes between Australia and New Zealand across the skill distribution. For example, the employment rate of the least experienced and least educated New Zealand-born in New Zealand in 1996 was 12% lower than that of similar Australian-born in Australia, while for the most experienced, but least educated New Zealand-born in New Zealand in 1996 the employment rate was 12% higher than that of similar Australian-born in Australia. Overall, employment rates among the non-immigrant population are generally higher in New Zealand than in Australia, particularly for individuals with more than 10 but not more

than 12 years of education and those with 35 or more years of work experience (i.e. older workers). The differences are particularly striking for the older worker group where employment rates are nearly 20% higher for some groups.

On the other hand, median real incomes for non-immigrant full-time wage/salary employees are lower in New Zealand than in Australia for all skill groups in both time periods. The average gap over the 20 skill-groups is 32% in 1996 and 34% in 2001.[23] The size of the gap does vary though a good deal across skill-groups, for example, the least educated New Zealand-born in New Zealand earn 24-37% in 1996 less than the least educated Australian-born in Australia, while this gap is 35-55% in 1996 among the medium-high educated.

4.4 Regression Estimates of the Drivers of Trans-Tasman Location Decisions

We now present the results in Table 8 from estimating the country-level regression model. Recalling the discussion in section 4.1, this model regresses the change in the log population of skill group i and country of birth group j in country k between time t and t-5 on (1) the log employment rate for non-immigrants in skill group i in country k at time t-5, (2) the log median real income for non-immigrant full-time wage/salary employees in skill group i in country k at time t-5, (3) the log population of skill group i in country k at time t-5, and (4) the log population of skill group i and country of birth group j in country k at time t-5, where i is one of the 20 skill groups depending on an individual's years of education and potential experience, j is New Zealand-born, Australian-born, or Other Foreign-born, k is Australia or New Zealand, and t is 2001 or 2006.

This regression is estimated on data which is pooled across the 20 skill groups, 3 country of birth groups, 2 countries and the two intercensual periods. We allow

[23]Note, the income gap is significantly higher using this measure than when we examined mean income for all individuals in Table 1. This may reflect a wide variety of reasons. While this measure is not necessarily perfect, we believe that it is likely to be informative to the relative strength of the labour market for different skill groups in each country.

the relationship between all covariates and the outcome to differ by country and also include as control variables in the regression, country of birth fixed effects interacted with whether the country is New Zealand; allowing for different mobility rates for each country of birth group in each country; and an indicator variable for the Census year interacted with the country of birth fixed effects and whether the country is New Zealand; allowing for different aggregate mobility rates over time for each country of birth group in each country.

Because our three main explanatory variables do not vary by country of birth group, standard errors are calculated which are robust to arbitrary correlation of the error term within skill groups and countries (these are in parentheses below each estimated coefficient). Similarly, because the explanatory variables are averages calculated for particular skill groups in each country and year, the regression model is variance weighted by the population represented by each observation in the same year in which the explanatory variables are measured. Hence, the regression results can be interpreted as applying to the 'average' individual residing in either New Zealand or Australia in 1996 or 2001, as opposed to the average skill group.

Turning to the results, we find that population growth among the non-immigrant population in both Australia and New Zealand, and among the New Zealand-born in Australia is significantly related to employment rates in the two countries. For the New Zealand-born in a particular skill group, a 1% increase in the employment rate among New Zealand-born in that skill group at the beginning of a period leads to a 0.69% higher population growth of that skill group in New Zealand.[24] For the Australian-born in Australia, a similar elasticity of 0.62% is found. The elasticity is larger for the New Zealand-born in Australia (1.16%), but only significant at the 10% level. Employment rates appear to have little impact on population growth among immigrants in either country.

On the other hand, we find that median real income is positively related to popu-

[24]In order to interpret this finding as a causal relationship we must assume that there are no time-varying factors that are correlated with labour market outcomes for particular skill groups in a particular year as well as with future mobility rates for that skill group. We believe that this is a reasonable assumption, but it is not one that can be directly tested.

lation growth for the Australian-born in New Zealand and Other Foreign-born in both countries. For these three groups, a 1% increase in median income leads to a 0.45-0.78% increase in population, with the largest elasticity found for the Australian-born in New Zealand and the smallest for Other Foreign-born in Australia, but the precision of our estimates cannot rule out similar effect sizes for all three groups.

Increased skill group population does not affect population growth for the New Zealand-born in either New Zealand or Australia, but we observe a convergence effect for both these groups. This indicates that skill groups with relatively large populations of New Zealand-born experience relatively less population growth in both Australia and New Zealand. We further find that the Australian-born population in Australia increases more for skill groups with larger populations after netting out convergence effects. This indicates that Australia is more attractive for Australians who are in larger skill groups. However, the convergence effect (-2.085) is a similar size as the skill population effect (1.858), indicating that overall initial population sizes for different skill groups among the Australian-born do not affect the growth of the Australian-born population in Australia.

Similar inferences are drawn when examining population growth of Other Foreign-born groups in Australia, although the coefficients of our two population measures have opposite signs. Specifically, an increase in the initial skill group population by 1% reduces the population growth of the Other Foreign-born in Australia by 0.68% (after netting out the convergence effect), suggesting that a larger skill group population reduces the attractiveness of living in Australia. However, the convergence effect (0.478) partly offsets this effect, indicating that the overall initial population size effect is rather small.

4.5 The Impact of Labour Market Opportunities on the Mobility of the New Zealand-born

In this section, we evaluate what the regression estimates from the country-level model tell us about the impact of labour market opportunities on the mobility of the New

Zealand-born. Specifically, we first examine how the population change of the New Zealand-born in New Zealand and Australia predicted by the regression model compares to what is actually observed in the data. These results help demonstrate the quality of the fit of our regression model and highlight the skill groups for which the population has changed more or less than predicted by the model.

We then examine how the predicted population change of the New Zealand-born in New Zealand and Australia change when we vary local labour market opportunities. In particular, we consider two counterfactual situations, one where employment rates are 5% higher for each skill group in both countries (similar to the average difference in employment rates between Australia and New Zealand) and one where median incomes for full-time wage/salary employees are 30% higher for each skill group in both countries (similar to the average difference in median income between Australia and New Zealand). Because the regression model is estimated independently for each country and the coefficients do not vary by skill groups, the predicted changes presented here can be examined independently. In other words, the reported finding for say highly skilled New Zealand-born in New Zealand can be interpreted as the impact of median income for this group increasing by 30% holding all else equal.

Table 9 presents the results from these two exercises. To simplify the interpretation of the results, we aggregate the 20 skill groups used in the regression models to 6 groups in this table. The full set of skill groups is still used to derive the model estimates used in this simulation exercise, but the simulations themselves are done for these more aggregated groups. Panel A shows the total number of New Zealand-born aged 25-59 living in New Zealand in each of the 6 aggregate skill groups in 1996 and 2001. Panel B then shows how the population of each of these skill groups has changed over the periods 1996-2001 and 2001-2006, respectively. These are the same figures as presented in Table 6 in percentage changes.

These figures reveal that, between 1996 and 2001, the fastest growing skill group was older medium-educated workers followed by younger highly-educated workers and older highly-educated workers. On the other hand, there was a large decline in the size

of the young less-educated skill group, a small decline in the size of the young medium-educated skill group and a small increase in the size of the older less-educated skill group. There was a similar pattern of population change between 2001 and 2006, except that now the young medium-educated skill group had a large decline in population size, the older less-educated skill group had a small decline in size, and both highly-educated groups increased in size by large amounts.

The population of different skill groups mainly change size over time for one of two reasons; either because individuals age out of the skill group or out of our sample and the educational attainment of new individuals who age in to the skill group or sample differs (e.g. young workers who enter the sample are more educated than older workers who leave it), or because net migration rates differ for the different skill groups. Unfortunately, because Census data only capture individuals currently in the country, we cannot evaluate the relative importance of compositional effects versus migration effects. However, we can examine how the populations of different skill groups of New Zealand-born living in Australia have changed over time and use this to evaluate the likely importance of net migration for explaining population change among the New Zealand-born in New Zealand.

Panels F and G present the same information as panels A and B, but for the New Zealand-born in Australia. Examining changes between 1996 and 2001, we find suggestive evidence that older less-educated New Zealand-born were, on average, returning to live in New Zealand (because population change among this group in Australia is negative while it is positive in New Zealand), while there was significant out-migration of medium- and highly-educated New Zealand-born from New Zealand to Australia (for the young medium-educated, population change was negative in New Zealand and positive in Australia, while for the other groups the proportional change in population was much larger in Australia than in New Zealand). Between 2001 and 2006, there no longer appeared to be return migration of older less-educated New Zealand-born from Australia, but there was also a large reduction in net outflows of highly-educated New Zealand-born. On the other hand, younger medium-educated New Zealand-born

appear to have continued to migrate to Australia at high rates.

Panels C and H next present the population change for each skill group of New Zealand-born in New Zealand and Australia, respectively, that is predicted by the estimated regression model. Comparing these figures to those in Panels B and G allows us to evaluate the fit of our regression model and highlights skill groups for which the model does not do a good job of predicting population change. Overall, the model appears to fit the data quite well for population change in New Zealand, especially for both younger individuals and the highly educated. It systematically predicts much less (or more negative) population growth among the older less- and medium-educated skill groups than what actually occurred in either time period. Turning to the New Zealand-born in Australia, the model also does an excellent job fitting the data. For example, for population growth between 1996 and 2001, the only prediction that is highly inaccurate is a large underprediction of the population growth for the older medium-educated skill group (which the model also underpredicts in New Zealand). For 2001 to 2006, the model also underpredicts population growth for this group, as well as for the younger medium-educated skill group, while it overpredicted population growth for the older highly-educated skill group.

We next turn to examining how the predicted population change of the New Zealand-born in New Zealand and Australia change when we vary local labour market opportunities. Comparing the results in panel D and I to those in panel C and H shows the impact of a 5% increase in the employment rate of a particular skill group on population growth for this group in New Zealand and Australia, respectively. For example, the upper-left cell in panel D indicates that the regression estimates imply that the population of young low-educated New Zealand-born in New Zealand would have declined between 1996 and 2001 by 22,000 individuals instead of by 31,000 individuals if the employment rate was 5% higher for this group. Similarly, this same change in the employment rate would have led to 10,000 more older low-educated, 13,000 more young medium-educated and 8,000 more older medium-educated New Zealand-born residing in New Zealand in 2001. On the other hand, higher employment rates have

little impact on population change among highly-educated New Zealand-born between 1996 and 2001. The results are quite similar if we instead look at the impact of higher employment rates on population change in New Zealand between 2001 and 2006.[25]

Based on our model estimates, changes in employment rates in Australia have a much smaller impact on population changes among the New Zealand-born in Australia. Increasing employment rates by 5%, which is similar to the overall mean difference in employment rates between Australia and New Zealand, would lead to a 1,000-3,000 increase in the population of each skill group of New Zealand-born in Australia besides the older highly-educated group (where it has an even smaller impact), with the largest changes for the less-educated groups. Taken together with the previous results, our regression model indicated that while higher employment rates in New Zealand would attract more New Zealand-born individuals, higher employment rates in Australia would have little effect on trans-Tasman migration (or the migration of New Zealand-born to Australia from other locations).

Finally, we examine how the predicted population change of the New Zealand-born in New Zealand (by comparing panel E to C) and Australia (by comparing panel J to H) change when median incomes for full-time wage/salary employees are 30% higher for each skill group in both countries. Based on our model estimates, changes in median incomes have large impacts on population change among the New Zealand-born in New Zealand. For example, the population of the young less-educated older medium-educated skill groups would increase by 20,000-24,000, while the increase would be 27,000-28,000 for the older less-educated skill group and 33,000-35,000 for the young medium-educated group. Even for the highly-educated where the predicted impacts are smaller, the population would increase by 12,000-14,000 among the younger group and 4,000-6,000 among the older group.

An important caveat to these results is that the regression coefficient on income in this model is not significantly different from zero hence these estimates all have very

[25]It is important to note that our model does not tell us from where these extra New Zealand-born individuals would appear. Return migration, either from Australia or elsewhere, is the most likely source.

large confidence intervals around them. However, as will be seen in the next section, a similar effect size that is estimated much more precisely is found when we examine interregional mobility in New Zealand. Perhaps surprisingly, as with employment rates, changes in median incomes for full-time wage/salary employees in Australia have a very little impact on population change among the New Zealand-born in Australia. In fact, the model indicates that higher incomes in Australia would lead the population of New Zealand-born to decline, especially among the less-educated.

4.6 Regression Estimates of the Drivers of Internal Location Decisions

In this final section, we examine the relationship between the quality of labour market opportunities in 39 locations in Australia and 19 locations in New Zealand for different individuals and the likelihood that they will choose to reside in each of these locations. The outcome in the regression model and all of the explanatory variables are defined in a similar manner as in the previous section, but at the location rather than the country-level. Again, we allow the relationship between the covariates and the outcome to vary by whether we are examining population change in New Zealand or in Australia.

Examining regional mobility allows us to include three additional measures of the attractiveness of particular locations. First, we calculate the log mean real house price in each location at time t-5 (in Australian dollars). Although higher regional house prices could discourage local population growth, they could also reflect certain amenities that increase the attractiveness of a location and in turn encourage local population growth. Second, we calculate the log population in each location that is foreign-born (excluding trans-Tasman migrants). It is uncertain whether a greater local foreign-born population is seen as a positive or a negative attribute of a particular location. Third, we include the log total population in each location at time t-5 as an additional measure of the attractiveness of the location. These three variables could not be included in our previous analysis because they do not vary across skill groups and hence only vary over time at the country level which cannot not be identified in a

model allowing for different aggregate mobility rates over time.

Similar to the previous section, we include the attractiveness of the skill group- and location-specific (log) population size and control for convergence in group-specific (log) population sizes. After controlling for convergence, the log total population of a particular skill group in each country – one of our measures of the desirability of living in different locations in New Zealand and Australia – picks up the attractiveness of skill-specific population sizes, net of convergence effects. Similarly, the total population variable picks up the direct impact of larger populations on the desirability of different locations, while the immigrant population variable picks up the direct impact of having a larger share of immigrants in the local population on the desirability of different locations.

This regression is now estimated on data which is pooled across 58 locations, 20 skill groups, 3 country of birth groups and the two intercensual periods.[26] Hence, we also include among the control variables; i) country of birth fixed effects interacted with whether a location is in New Zealand allowing for different mobility rates for each country of birth group in each country, ii) an indicator variable for the Census year interacted with the country of birth fixed effects interacted with whether a location is in New Zealand allowing for different aggregate mobility rates over time for each country of birth group in each country, and iii) location fixed effects allowing for different population growth in each location. Importantly, location fixed effects control for all unmeasured differences across locations that are fixed over time, such as whether a location has good access to the outdoors.

Because the local house price and local foreign-born population variables do not vary by country of birth or skill group, standard errors are calculated which are robust to arbitrary correlation of the error term within locations (these are in parentheses under each estimated coefficient). Again, because the explanatory variables are averages

[26] 721 out of the 6,960 possible observations are dropped because there was no population in the particular cell in either year of a consecutive pair and hence the population growth rate could not be calculated. Because our estimates are variance weighted by the population of each cell and hence are representative for the average individual in either New Zealand or Australia, excluding these cells should have little impact on our results.

calculated for particular skill groups and locations in particular years, the regression model is variance weighted by the population represented by each observation in the same year in which the explanatory variables are measured. Hence, the regression results are still interpreted as applying to the 'average' individual residing in either New Zealand or Australia in 1996 or 2001.

Table 10 presents the results from this regression model. We find a number of interesting results. First, local employment rates are only related to local population growth in New Zealand. Specifically, population growth is higher for particular skill groups in locations where employment rates are also relatively high for those skill groups and this is true for the New Zealand-, Australian- and Other Foreign-born. The magnitude of the effect for the New Zealand is quite similar to that found in the country-level analysis, but that did not reveal a similar effect for the Australian- and Other Foreign-born. The estimates indicate that a 1% increase in the employment rate (for the New Zealand-born) for a particular skill group in a location in New Zealand leads to a 0.63% increase in the population growth for the New Zealand-born in that skill group in that location. The corresponding effects for the Australian- and Other Foreign-born groups in New Zealand are 0.57% and 0.38%, respectively.

Second, we now find a positive relationship between local median real income and local population growth for the same skill group for all three country of birth groups in both countries. In New Zealand, a 1% increase in the median real income (for the New Zealand-born) for a particular skill group in a location leads to a 0.40%, 0.68% and 0.58% increase in population growth for New Zealand-, Australian, and Other Foreign-born, respectively. The effect sizes for the New Zealand- and Other Foreign-born in Australia are similar to those found for these populations in New Zealand. On the other hand, population growth among the Australian-born in different locations in Australia is least responsive to differences in median income across locations, with an elasticity of 0.24%.

Third, we find that house prices have little impact on location choice decisions in either Australia or New Zealand. This is consistent with spatial sorting theory that

shows that differences in house prices (and other amenities) need to be compensated for by other factors, such as higher wages, in equilibrium. We do find that Australian-born persons in Australia move away from regions with large immigrant populations. Specifically, a 1% increase in the immigrant population in a region reduces the Australian-born population by 0.33%. Given that less than one-third of the population in Australia is foreign-born, the displacement effect induced by immigration appears to be quite large, although further research is needed to understand the mechanisms through which this occurs.

Fourth, after controlling for skill group-, country of birth group-, and region-specific convergence, we find that people in New Zealand tend to move away from highly populated regions. The estimated coefficients indicate that a 1% increase in the initial total population of a region results in a population decline in that region by 0.60% among the Australian-born, 0.65% among the New Zealand-born and 0.84% among the Other Foreign-born. The estimates of the skill group-specific population sizes further suggest that the New Zealand-born are likely to move to regions in New Zealand that have larger populations of their own skill group. A 1% increase in the number of persons of the same skill group increases the growth in the New Zealand-born population by 0.23%. The corresponding effect for the Australian-born in Australia is even stronger (0.82%), indicating that Australian-born persons are even more likely to move to regions that have a large population of their own skill group. It is important to note, however, that these effects are net effects which are offset entirely by convergence effects.

Interestingly, we observe that Other Foreign-born in Australia and New Zealand move away from regions in which a large number of people with the same skills reside. This may occur because these individuals are more mobile and look for employment opportunities in areas to which local born populations are less likely to move. However, we find a significantly positive convergence effect for Other Foreign-born groups in Australia, which partly offsets the skill group-specific effect. On the other hand, there is population growth divergence among Other Foreign-born in New Zealand, which

reinforces the skill group effect.

Overall, our findings provide strong evidence for a positive relationship between local median real income and local population growth. We also find that higher local employment rates increase local population growth in New Zealand. Moreover, foreign-born persons from countries other than Australia and New Zealand tend to move away from regions in which a large number of people with the same skills reside, while people in New Zealand tend to move away from highly populated regions. Finally, we find no effect of house prices on location choices in either Australia or New Zealand.

5 Conclusions

This paper contributes to the strand of the economic migration literature that examines the determinants of migration decisions. Many economic and non-economic factors may influence individual migration decisions. Bodvarsson and Van den Berg (2009) argue that economic incentives to migrate fall into four categories: (1) push factors (low wages, unemployment, overpopulation, etc.), (2) pull factors (high wages, low taxes, social mobility, etc.), (3) stay factors (family ties, cultural familiarity, certainty, etc.) and (4) stay away factors (language barriers, discrimination, uncertainty, etc.). In addition to these factors, costs of moving (including formal exit and entry barriers) may have a substantial influence on migration decisions.

Against this background, this paper exploits the existence of the trans-Tasman travel agreement, which eliminated migration costs caused by formal exit and entry barriers entirely. We use comparable data from the 1996, 2001 and 2006 New Zealand and Australian Censuses to examine the locational choice decisions of Australian- and New Zealand-born populations, as well as for immigrants to each country. First, we examine the characteristics of the New Zealand-born, Australian-born and immigrants residing in both countries for more than five years, as well those that have arrived in the five years previous the respective Census. We examine how human capital (i.e. education and work experience) differs for these particular groups and whether this

has changed over the ten-year period being examined. Then, we estimate regression models that examine how various local characteristics influence where New Zealanders, Australians and immigrants choose to live both between Australia and New Zealand and within the two countries. In particular, we look at the importance of local labour market opportunities for individuals with different levels of human capital, local amenities, local cost of living (measured by house prices). A number of interesting findings emerge.

First, we exploit information on residential locations five years previously and find that the share of Australia's population residing overseas five years previously increased from 4.0% in 1996 to 5.5% in 2006, while the corresponding share of New Zealand's population surged from 7.8% to 11% over the same period. These numbers highlight the increasing relevance of the international mobility of Australians and New Zealanders. Our results further indicate that New Zealand-born migrants in Australia are highly mobile within Australia, while Australian-born migrants in New Zealand are generally more mobile internationally than within New Zealand.

Second, we find that average differences in human capital between more established New Zealand-born migrants in Australia and Australian-born persons are rather small. In contrast, more recent New Zealand-born arrivals to Australia are on average slightly better educated but less experienced (and younger) than average Australian-born persons. We observe a mirror image when we compare Australian-born migrants in New Zealand to average New Zealand-born persons, i.e. Australian-born migrants are better educated but less experienced (and younger) than average New Zealand-born persons. Our results further indicate that internal migrants in both countries are generally better educated and less experienced than those who stay in the same location as five years previous. Hence, rather than there being an obvious brain drain of young highly educated New Zealanders to Australia (or vice-versa from Australia to New Zealand), the evidence suggests that young highly educated individuals are generally highly mobile both within and between Australia and New Zealand.

Third, we observe that employment rates among non-immigrants are generally

higher in New Zealand than in Australia. On the other hand, average real incomes are generally lower in New Zealand than in Australia. We further observe a substantial increase in local house prices by 157% in Australia and by 78% in New Zealand over the period 1996-2006. Housing affordability declined in both countries, with mean house prices relative to mean annual income increasing in New Zealand from 6.0 in 1996 to 8.9 in 2006 and in Australia from 4.3 in 1996 to 8.9 in 1996.

Fourth, examining population growth at the national level for different skill groups, we find that employment rates are significantly related to population growth among the non-immigrant population in both Australia and New Zealand, and among the New Zealand-born in Australia. On the other hand, employment rates appear to have little impact on population growth among immigrants in either country. We further find that median real income is positively related to population growth for the Australian-born in New Zealand and the Other Foreign-born in both countries.

Fifth, a simulation exercise using the results from the national-level regression model indicates that while higher employment rates in New Zealand would attract more New Zealand-born individuals, higher employment rates in Australia would have little effect on trans-Tasman migration (or the migration of New Zealand-born to Australia from other locations). This exercise also shows that, even more so than higher employment rates, higher incomes would attract more New Zealand-born individuals to New Zealand. Similar to employment rates, the model indicates that even higher incomes in Australia would have little effect on whether New Zealand-born move there.

Sixth, examining population growth at the regional level for different skill groups, we find that local employment rates are only related to local population growth in New Zealand, although this is true for the New Zealand-born, Australian-born and Other Foreign-born. Local median real incomes on the other hand are positively related to local population growth for all three groups in both Australia and New Zealand. We further find that foreign-born persons from countries other than Australia and New Zealand tend to move away from regions in which a large number of people with the same skills reside, while all individuals in New Zealand tend to move away from highly

populated regions. We find no effect of house prices on location choices in either Australia or New Zealand

Overall, our findings suggest that the trans-Tasman travel agreement did contribute to a mutual exchange of migrants with many similarities regarding the size and human capital endowment of migration flows in both directions. However, considerable differences between the two countries remain with regard to internal, trans-Tasman and other international migration. In particular, within- and between-country mobility rates of the two countries are quite different. Our results are consistent with the lack of convergence in incomes across the Tasman as it appears that both trans-Tasman and international migrants are in many cases drawn to New Zealand because of high employment rates. Similarly, although differences in local income levels are found to be an important driver of regional mobility, other factors such as local employment rates, total population size and skill group population size also impact on internal mobility and hence discourage within country convergence in local incomes.

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Table 1: Descriptive Statistics for Australians and New Zealanders

	New Zealand			Australia		
	1996	2001	2006	1996	2001	2006
Mean Age	40.2	41.1	41.8	40.5	41.2	41.8
Female	51.1%	51.7%	51.9%	50.4%	50.8%	51.0%
Mean Years of Education	12.01	12.25	12.61	11.10	11.79	12.15
Never Married	15.1%	16.9%	17.0%	19.8%	22.7%	25.6%
Widowed/Div/Sep	10.4%	10.9%	10.3%	14.3%	15.4%	15.0%
Married	74.5%	72.2%	72.6%	65.9%	61.9%	59.4%
Couple without Children	23.1%	23.6%	24.0%	19.9%	21.0%	21.8%
Couple with Children	49.0%	44.9%	46.0%	53.5%	50.7%	49.3%
One Parent Family	9.2%	10.0%	9.9%	8.1%	9.1%	9.1%
Other Family Types	18.7%	21.6%	20.2%	18.5%	19.2%	19.8%
Employment Rate	75.7%	77.5%	80.4%	71.4%	73.2%	76.5%
Mean Real Weekly Income (local $s)	621	666	726	633	707	783
Mean Real Weekly Income (AUDs)	539	584	649	633	707	783
Lived Overseas Five Years Ago	7.8%	7.9%	11.0%	4.0%	4.3%	5.5%
Region of Birth = Australia	1.4%	1.4%	1.5%	71.0%	72.4%	71.7%
New Zealand	79.9%	78.3%	74.2%	2.3%	2.6%	2.7%
UK/Ireland	7.7%	7.0%	7.0%	8.7%	7.3%	6.4%
Pacific Islands	3.6%	4.0%	4.4%	0.6%	0.8%	0.9%
China	0.8%	1.2%	2.1%	0.9%	1.0%	1.3%
South Asia	0.7%	1.0%	1.9%	1.1%	1.4%	1.9%
NE Asia	1.1%	1.4%	1.7%	0.8%	1.0%	1.2%
SE Asia	0.8%	1.0%	1.4%	3.3%	3.8%	4.1%
Americas	0.8%	0.8%	1.1%	1.2%	1.1%	1.3%
Italy/Greece	0.1%	0.1%	0.1%	2.4%	1.6%	1.1%
Europe and Former Soviet Union	1.7%	1.7%	1.9%	5.4%	4.4%	4.2%
Middle East and North Africa	0.6%	0.9%	1.1%	1.5%	1.6%	1.8%
Sub-Saharan Africa	0.6%	1.2%	1.8%	0.9%	1.1%	1.4%
Number of Individuals	1,596,612	1,687,485	1,806,960	8,123,800	8,562,700	8,771,500

Note: Income is in either December 2006 local dollars or Australia dollars converted based on the PPP exchange rate in the year prior to the census year. In both cases it is converted from an annual measure for New Zealand. Married includes de-facto relationships in New Zealand.

Table 2: Descriptive Statistics for Locations in Australia and New Zealand

	New Zealand			Australia		
	1996	2001	2006	1996	2001	2006
Unweighted Means Across 39 Locations in Australia and 19 Locations in New Zealand in each Year						
Potential Experience	23.4	24.1	24.5	24.5	24.5	24.7
	(1.0)	(1.1)	(1.3)	(1.0)	(1.3)	(1.5)
Years of Education	12.0	12.2	12.5	11.1	11.8	12.1
	(0.4)	(0.4)	(0.5)	(0.5)	(0.6)	(0.6)
Employment Rate	0.759	0.779	0.808	0.713	0.732	0.766
	(0.031)	(0.029)	(0.026)	(0.043)	(0.043)	(0.041)
Real Individual Weekly Income	533	575	638	627	700	776
	(71)	(76)	(80)	(89)	(100)	(113)
Born in Local Country	0.817	0.807	0.773	0.747	0.729	0.713
	(0.095)	(0.106)	(0.122)	(0.099)	(0.101)	(0.104)
Born in Trans-Tasman Country	0.014	0.014	0.015	0.016	0.018	0.019
	(0.003)	(0.003)	(0.003)	(0.010)	(0.012)	(0.012)
Born in Other Foreign Country	0.169	0.179	0.212	0.237	0.253	0.269
	(0.093)	(0.105)	(0.122)	(0.097)	(0.099)	(0.101)
Geometric Mean of Real Local House Price	166,191	185,872	294,989	141,147	211,324	362,235
	(61104)	(65640)	(94352)	(75340)	(143708)	(184495)

Note: Income and house prices are in December 2006 Australia dollars converted based on the PPP exchange rate in the year prior to the census year. Standard deviations are in parentheses.

Table 3: Human Capital of Different Migrant Groups

		New Zealand-born in Australia /NZ 5 Years Previous	New Zealand-born Overseas 5 Years Previous	Australian-born in Australia/NZ 5 Years Previous	Australian-born Overseas 5 Years Previous	Other Foreign-born in Australia/NZ 5 Years Previous	Other Foreign-born Overseas 5 Years Previous
New Zealand							
1996	% Female	51.1%	50.4%	56.0%	52.0%	50.5%	52.3%
	Year of Education	12.0	12.8	12.3	12.9	11.6	12.8
	Potential Experience	23.2	16.6	25.0	17.5	26.1	19.2
	% of Population	76.9%	3.0%	1.1%	0.3%	14.2%	4.5%
2001	% Female	51.5%	52.0%	55.9%	53.3%	51.9%	53.4%
	Year of Education	12.2	13.2	12.5	13.2	12.1	12.8
	Potential Experience	23.8	17.7	24.9	17.8	26.2	19.8
	% of Population	76.0%	2.3%	1.1%	0.3%	15.0%	5.3%
2006	% Female	51.6%	51.0%	55.6%	53.2%	52.7%	52.1%
	Year of Education	12.5	13.6	12.9	13.7	12.6	13.4
	Potential Experience	24.7	17.6	24.5	17.6	25.9	19.1
	% of Population	71.0%	3.1%	1.1%	0.4%	16.8%	7.5%
Australia							
1996	% Female	48.4%	46.2%	50.5%	53.9%	49.8%	54.6%
	Year of Education	11.0	11.4	11.0	12.7	11.1	12.2
	Potential Experience	24.2	18.9	23.8	17.6	27.0	19.6
	% of Population	2.0%	0.3%	70.3%	0.7%	23.7%	3.0%
2001	% Female	50.1%	49.2%	50.7%	54.3%	51.1%	50.9%
	Year of Education	11.7	12.2	11.6	13.4	12.0	13.4
	Potential Experience	24.9	19.8	23.9	17.4	27.2	18.1
	% of Population	2.0%	0.6%	71.7%	0.8%	22.0%	3.0%
2006	% Female	49.7%	50.3%	50.8%	57.0%	51.4%	51.5%
	Year of Education	12.0	12.4	11.9	13.8	12.5	13.8
	Potential Experience	25.1	19.9	24.5	16.9	26.9	17.0
	% of Population	2.3%	0.4%	70.7%	1.0%	21.5%	4.1%

Note: See the paper for further information.

Table 4: Human Capital of Different Groups of Internal Movers

		New Zealand-born in Same Location in Australia/NZ as 5 Years Previous	New Zealand-born in Different Location in Australia/NZ as 5 Years Previous	Australian-born in Same Location in Australia/NZ as 5 Years Previous	Australian-born in Different Location in Australia/NZ as 5 Years Previous	Other Foreign-born in Same Location in Australia/NZ as 5 Years Previous	Other Foreign-born in Different Location in Australia/NZ as 5 Years Previous
New Zealand							
1996	% Female	51.2%	50.8%	56.8%	52.1%	50.9%	48.7%
	Year of Education	11.9	12.3	12.2	12.6	11.5	12.0
	Potential Experience	23.9	19.5	25.9	20.5	26.9	22.3
	% of Internal Migrants	69.2%	14.2%	1.0%	0.2%	12.8%	2.6%
2001	% Female	51.4%	51.6%	56.2%	54.4%	52.2%	50.1%
	Year of Education	12.1	12.6	12.4	12.9	12.0	12.5
	Potential Experience	24.7	20.0	25.9	20.2	27.0	22.6
	% of Internal Migrants	68.2%	14.3%	1.0%	0.2%	13.5%	2.7%
2006	% Female	51.6%	52.0%	56.0%	53.5%	53.0%	51.1%
	Year of Education	12.4	12.8	12.8	13.2	12.5	13.1
	Potential Experience	25.5	20.9	25.4	20.6	26.5	22.5
	% of Internal Migrants	66.1%	13.7%	1.0%	0.2%	15.7%	3.2%
Australia							
1996	% Female	49.4%	45.5%	50.6%	50.0%	50.3%	47.7%
	Year of Education	11.0	11.1	10.9	11.5	11.0	11.7
	Potential Experience	25.1	21.5	24.8	19.8	27.8	23.0
	% of Internal Migrants	1.5%	0.5%	57.1%	13.2%	19.8%	4.0%
2001	% Female	49.9%	50.9%	50.8%	50.6%	51.5%	49.0%
	Year of Education	11.6	11.8	11.5	12.1	11.9	12.5
	Potential Experience	25.7	22.1	24.9	19.9	27.9	23.5
	% of Internal Migrants	1.6%	0.4%	58.4%	13.2%	18.4%	3.6%
2006	% Female	50.8%	45.5%	50.8%	51.0%	51.7%	49.7%
	Year of Education	11.9	12.2	11.8	12.5	12.4	13.1
	Potential Experience	25.8	22.7	25.4	20.2	27.7	22.9
	% of Internal Migrants	1.8%	0.5%	58.5%	12.2%	18.1%	3.4%

Note: This table is restricted to individuals who gave a domestic address for their location five years previous. See the paper for further information.

Table 5: Educational Distribution of Different Mobility Groups

			New Zealand			Australia		
		Years of Education	In Same Location 5 Years Previous	In Different Location in NZ 5 Years Previous	Overseas 5 Years Previous	In Same Location 5 Years Previous	In Different Location in OZ 5 Years Previous	Overseas 5 Years Previous
1996	NZ-born	< 12	48.4%	40.2%	28.8%	70.9%	69.4%	64.5%
		12	12.0%	14.3%	17.1%	8.1%	7.3%	7.2%
		>12 & <15	31.8%	32.5%	36.3%	16.6%	17.2%	18.3%
		15+	7.8%	13.1%	17.7%	4.4%	6.1%	10.0%
	OZ-born	< 12	54.2%	44.4%	49.1%	71.0%	60.9%	38.5%
		12	8.8%	10.8%	6.8%	6.6%	8.1%	8.7%
		>12 & <15	25.4%	26.4%	19.4%	15.9%	20.6%	32.0%
		15+	11.6%	18.4%	24.7%	6.5%	10.4%	20.9%
	Immigrant	< 12	56.6%	48.9%	44.1%	61.8%	51.7%	37.8%
		12	9.0%	10.1%	6.3%	13.4%	13.6%	16.8%
		>12 & <15	21.8%	22.9%	16.5%	16.2%	20.7%	25.6%
		15+	12.6%	18.0%	33.0%	8.6%	13.9%	19.8%
2001	NZ-born	< 12	44.1%	36.7%	25.9%	51.1%	49.6%	39.9%
		12	15.6%	17.3%	19.0%	23.5%	23.2%	27.3%
		>12 & <15	30.3%	29.6%	31.2%	15.3%	14.6%	14.9%
		15+	10.0%	16.4%	23.9%	10.1%	12.7%	18.0%
	OZ-born	< 12	48.9%	38.7%	42.8%	56.7%	43.4%	19.7%
		12	11.1%	13.3%	6.9%	17.5%	20.6%	20.9%
		>12 & <15	24.5%	25.5%	18.1%	11.9%	14.0%	19.4%
		15+	15.5%	22.5%	32.2%	13.9%	22.1%	40.1%
	Immigrant	< 12	53.4%	45.0%	46.8%	45.7%	33.2%	16.7%
		12	10.1%	10.7%	5.7%	21.6%	22.1%	23.5%
		>12 & <15	19.2%	20.0%	14.8%	15.4%	18.5%	20.9%
		15+	17.3%	24.3%	32.7%	17.2%	26.2%	38.8%
2006	NZ-born	< 12	39.2%	31.7%	19.2%	41.9%	38.6%	28.5%
		12	15.2%	16.0%	15.0%	25.7%	23.6%	28.3%
		>12 & <15	31.4%	30.8%	32.0%	19.9%	20.5%	24.9%
		15+	14.2%	21.6%	33.7%	12.5%	17.3%	18.3%
	OZ-born	< 12	39.3%	31.0%	32.2%	49.3%	35.8%	13.2%
		12	9.6%	12.0%	5.6%	18.3%	19.8%	18.2%
		>12 & <15	29.2%	29.1%	23.4%	16.0%	18.5%	20.2%
		15+	21.9%	28.0%	38.8%	16.4%	25.8%	48.5%
	Immigrant	< 12	43.9%	35.7%	35.2%	35.1%	24.0%	13.2%
		12	8.9%	8.9%	5.6%	21.6%	20.1%	19.8%
		>12 & <15	22.1%	23.0%	20.4%	19.6%	20.6%	19.7%
		15+	25.1%	32.4%	38.8%	23.6%	35.3%	47.3%

Note: See the paper for further information. OZ is the abbreviation for Australia. Immigrant is shorthand for other foreign-born.

Table 6: Net Population Growth in Australia and New Zealand by Skill-Group

Years of Education	10 or Less	>10 and <12	12	>12 and <15	15 or More	10 or Less	>10 and <12	12	>12 and <15	15 or More
	Percent Change in Population from 1996 to 2001									
	Change in the New Zealand-born Population in New Zealand					Change in the New Zealand-born Population in Australia				
0-14.9 Year Pot Exp	-42.5%	-4.2%	8.6%	-11.1%	24.3%	-50.0%	12.1%	172.9%	-25.8%	158.5%
15-24.9 Years Pot Exp	-22.3%	18.0%	25.9%	-10.4%	25.6%	-28.8%	9.2%	183.0%	-2.5%	124.3%
25-34.9 Years Pot Exp	-21.5%	40.7%	72.7%	8.1%	51.1%	-35.3%	-0.7%	426.5%	37.0%	211.1%
35+ Years Pot Exp	-4.2%	74.2%	63.6%	17.0%	62.7%	-19.4%	21.9%	788.9%	114.3%	350.0%
	Change in the Australian-born Population in New Zealand					Change in the Australian-born Population in Australia				
0-14.9 Year Pot Exp	-49.7%	-2.3%	34.0%	3.0%	34.0%	-38.7%	-40.3%	166.1%	-24.1%	124.5%
15-24.9 Years Pot Exp	-36.6%	0.8%	39.6%	-12.3%	18.2%	-26.8%	-8.8%	153.9%	-34.0%	97.1%
25-34.9 Years Pot Exp	-38.5%	-4.1%	41.3%	-1.4%	53.8%	-20.1%	19.1%	220.6%	-13.7%	170.5%
35+ Years Pot Exp	-29.6%	56.8%	110.4%	-8.3%	175.0%	-17.3%	48.1%	374.6%	27.4%	281.6%
	Change in the Other Immigrant Population in New Zealand					Change in the Other Immigrant Population in Australia				
0-14.9 Year Pot Exp	-20.7%	16.8%	-6.8%	-0.9%	21.4%	-50.9%	-69.5%	13.9%	-33.7%	99.2%
15-24.9 Years Pot Exp	-10.3%	42.8%	23.4%	7.7%	48.8%	-38.6%	-35.5%	45.8%	-17.5%	81.1%
25-34.9 Years Pot Exp	-14.1%	34.5%	22.8%	-3.1%	60.5%	-30.9%	-26.4%	69.9%	-0.5%	95.9%
35+ Years Pot Exp	-10.2%	60.1%	37.4%	8.6%	77.4%	-29.2%	16.0%	134.5%	42.0%	162.5%
	Percent Change in Population from 2001 to 2006									
	Change in the New Zealand-born Population in New Zealand					Change in the New Zealand-born Population in Australia				
0-14.9 Year Pot Exp	-15.2%	-34.0%	-21.6%	-7.4%	38.0%	-35.2%	-33.3%	17.6%	48.6%	14.2%
15-24.9 Years Pot Exp	-24.2%	-22.2%	-11.5%	1.1%	34.5%	-22.6%	-29.2%	39.3%	5.9%	55.4%
25-34.9 Years Pot Exp	-4.7%	-2.8%	18.9%	13.8%	55.6%	-8.6%	5.3%	8.9%	39.0%	17.9%
35+ Years Pot Exp	-4.9%	18.8%	30.7%	18.8%	105.4%	-2.4%	24.7%	48.7%	40.0%	-7.4%
	Change in the Australian-born Population in New Zealand					Change in the Australian-born Population in Australia				
0-14.9 Year Pot Exp	36.5%	-12.2%	-15.0%	16.6%	54.3%	-31.5%	-24.7%	-13.8%	18.8%	18.4%
15-24.9 Years Pot Exp	-9.7%	-8.6%	1.0%	47.4%	53.6%	-32.2%	-14.2%	13.2%	31.5%	11.4%
25-34.9 Years Pot Exp	-5.2%	-23.0%	-12.8%	43.2%	43.8%	-13.0%	5.3%	23.6%	21.0%	20.7%
35+ Years Pot Exp	-2.8%	-11.4%	-15.6%	59.5%	90.9%	-7.5%	13.9%	53.8%	48.1%	68.6%
	Change in the Other Immigrant Population in New Zealand					Change in the Other Immigrant Population in Australia				
0-14.9 Year Pot Exp	27.9%	-2.6%	4.1%	48.5%	81.0%	-17.3%	-17.9%	2.1%	22.7%	57.1%
15-24.9 Years Pot Exp	-8.0%	-2.5%	3.0%	51.1%	67.8%	-36.2%	-34.7%	-6.1%	18.2%	37.3%
25-34.9 Years Pot Exp	15.4%	7.6%	23.4%	57.2%	69.6%	-24.0%	-9.8%	5.4%	21.8%	28.4%
35+ Years Pot Exp	7.1%	-10.7%	18.6%	62.0%	117.7%	-18.6%	-13.1%	19.1%	32.2%	80.3%

Note: Population change is calculated in natural logarithms and then converted to percentage differences.

Table 7: Labour Market Outcomes for Different Skill-Groups in New Zealand and Australia

Years of Education	10 or Less	>10 and <12	12	>12 and <15	15 or More	10 or Less	>10 and <12	12	>12 and <15	15 or More
				Labour Market Outcomes in 1996						
	Employment Rate for the New Zealand-born in New Zealand					Employment Rate for the Australian-born in Australia				
0-14.9 Year Pot Exp	56.0%	74.1%	78.6%	81.8%	88.5%	62.6%	77.4%	73.0%	86.7%	88.6%
15-24.9 Years Pot Exp	62.7%	77.1%	79.6%	84.1%	91.6%	63.3%	77.0%	75.3%	87.2%	90.0%
25-34.9 Years Pot Exp	73.2%	85.7%	86.2%	86.2%	92.6%	68.8%	79.9%	80.2%	86.5%	89.5%
35+ Years Pot Exp	64.4%	74.9%	75.1%	74.4%	85.4%	56.7%	67.0%	67.4%	75.4%	78.7%
	Median Income for New Zealand-born FT Workers in New Zealand					Median Income for Australian-born FT Workers in Australia				
0-14.9 Year Pot Exp	464	545	632	645	826	635	720	723	873	1,040
15-24.9 Years Pot Exp	528	610	654	721	1,052	653	790	837	1,044	1,272
25-34.9 Years Pot Exp	535	622	679	721	1,068	655	814	947	1,064	1,422
35+ Years Pot Exp	540	619	687	706	1,104	668	804	876	1,095	1,437
				Labour Market Outcomes in 2001						
	Employment Rate for the New Zealand-born in New Zealand					Employment Rate for the Australian-born in Australia				
0-14.9 Year Pot Exp	54.8%	73.1%	77.7%	79.4%	87.4%	55.1%	71.4%	77.3%	84.4%	89.4%
15-24.9 Years Pot Exp	64.4%	78.5%	80.3%	83.0%	90.5%	61.6%	76.0%	79.0%	85.8%	89.6%
25-34.9 Years Pot Exp	73.8%	86.0%	86.3%	86.1%	92.6%	67.5%	80.2%	82.6%	87.6%	91.4%
35+ Years Pot Exp	70.9%	80.8%	81.2%	77.4%	85.4%	57.5%	70.2%	71.9%	72.5%	75.7%
	Median Income for New Zealand-born FT Workers in New Zealand					Median Income for Australian-born FT Workers in Australia				
0-14.9 Year Pot Exp	473	579	603	663	810	667	768	761	838	1,165
15-24.9 Years Pot Exp	535	608	716	750	1,062	704	816	900	1,039	1,440
25-34.9 Years Pot Exp	553	615	710	732	1,118	684	845	949	1,134	1,463
35+ Years Pot Exp	563	627	720	708	1,110	704	833	880	1,147	1,405

Note: Income is for full-time employees (wage/salary workers) and is in December 2006 Australia dollars converted based on the PPP exchange rate in the year prior to the census year.

Table 8: Regression Estimates of the Relationship between Changes in Population and Labour Market Outcomes in Australia and New Zealand for Different Country of Birth and Skill Groups

Dependent Variable: Change in Log Population of Skill Group (i) and CoB Group (j) in Country (k) between Census (t) & (t-5)						
Country of Birth	New Zealand-born		Australian-born		Other Foreign-born	
Living in	in NZ	in OZ	in NZ	in OZ	in NZ	in OZ
Log Employment Rate for Native-born in Skill Group (i) in Country (k) at time (t-5)	0.693*	1.159+	0.213	0.616*	0.154	0.025
	(0.341)	(0.645)	(0.584)	(0.298)	(0.211)	(0.271)
Log Median Real Income for Native-born in Skill Group (i) in Country (k) at time (t-5)	0.301	-0.213	0.783*	-0.420	0.635**	0.452*
	(0.203)	(0.445)	(0.333)	(0.307)	(0.117)	(0.203)
Log Population of Skill Group (i) in Country (k) at time (t-5)	0.302	0.233	-0.110	1.858**	-0.0769+	-0.682**
	(0.249)	(0.191)	(0.070)	(0.408)	(0.038)	(0.083)
Log Total Population of Skill Group (i) and CoB Group (j) in Country (k) at time (t-5)	-0.446+	-0.658**	-0.034	-2.085**	-0.004	0.478**
	(0.222)	(0.138)	(0.065)	(0.413)	(0.047)	(0.085)
R-Squared	0.704					
Sample Size: 20 Skill Groups (i) * 3 CoB Groups (j) * 2 Countries (k) * 2 Periods	240					

Note: ** p<0.01, * p<0.05, + p<0.1. Standard errors robust to arbitrary correlation of error term within skill-groups and country are in parentheses. The regression also includes country of birth fixed effects interacted with whether the country is New Zealand allowing for different mobility rates for each country of birth group in each country, and an indicator variable for the census year interacted with the country of birth fixed effects and whether the country is New Zealand allowing for different aggregate mobility rates over time for each country of birth group in each country. The regression is variance weighted by the population represented by each observation in the same year in which the explanatory variables are measured.

Table 9: Actual and Predicted Net Population Growth Among the New Zealand by Aggregate Skill-Group

Years of Education	<12	12-14.9	15 or More	<12	12-14.9	15 or More
A) New Zealand-born Population in New Zealand						
		In 1996			In 2001	
0-24.9 Year Pot Exp	279,993	370,416	90,522	240,981	364,920	113,019
25+ Years Pot Exp	310,722	199,056	25,242	318,171	245,676	38,559
B) Actual Change in the New Zealand-born Population in New Zealand						
		Between 1996 and 2001			Between 2001 and 2006	
0-24.9 Year Pot Exp	-39,012	-5,496	22,497	-57,639	-27,831	41,280
25+ Years Pot Exp	7,449	46,620	13,317	-3,906	42,798	24,297
C) Predicted Change in the New Zealand-born Population in New Zealand - Baseline						
		Between 1996 and 2001			Between 2001 and 2006	
0-14.9 Year Pot Exp	-31,177	1,376	39,073	-30,391	-14,749	34,052
25+ Years Pot Exp	-20,100	19,605	18,515	-22,462	6,733	22,189
D) Predicted Change in the New Zealand-born Population in New Zealand - 5% Higher Employment Rate						
		Between 1996 and 2001			Between 2001 and 2006	
0-14.9 Year Pot Exp	-22,411	14,474	43,639	-22,972	-2,412	39,234
25+ Years Pot Exp	-9,861	27,309	20,056	-12,044	15,626	24,329
E) Predicted Change in the New Zealand-born Population in New Zealand - 30% Higher Median Income						
		Between 1996 and 2001			Between 2001 and 2006	
0-14.9 Year Pot Exp	-7,702	36,454	51,300	-10,522	18,289	47,928
25+ Years Pot Exp	7,320	40,236	22,643	5,438	30,547	27,921
F) New Zealand-born Population in Australia						
		In 1996			In 2001	
0-14.9 Year Pot Exp	65,100	31,900	7,800	54,800	47,100	18,900
25+ Years Pot Exp	63,300	13,700	2,400	52,900	40,400	8,300
G) Actual Change in the New Zealand-born Population in Australia						
		Between 1996 and 2001			Between 2001 and 2006	
0-24.9 Year Pot Exp	-10,300	15,200	11,100	-15,500	12,400	6,100
25+ Years Pot Exp	-10,400	26,700	5,900	1,300	11,200	800
H) Predicted Change in the New Zealand-born Population in Australia - Baseline						
		Between 1996 and 2001			Between 2001 and 2006	
0-14.9 Year Pot Exp	-12,144	12,111	8,802	-10,611	5,807	8,146
25+ Years Pot Exp	-8,771	11,407	5,119	-57	739	6,927
I) Predicted Change in the New Zealand-born Population in Australia - 5% Higher Employment Rate						
		Between 1996 and 2001			Between 2001 and 2006	
0-14.9 Year Pot Exp	-8,984	14,737	9,793	-7,974	8,964	9,760
25+ Years Pot Exp	-5,516	12,905	5,568	3,097	3,194	7,836
J) Predicted Change in the New Zealand-born Population in Australia - 30% Higher Median Income						
		Between 1996 and 2001			Between 2001 and 2006	
0-14.9 Year Pot Exp	-15,421	9,388	7,775	-13,345	2,533	6,473
25+ Years Pot Exp	-12,144	9,853	4,654	-3,326	-1,806	5,985

Note: Predicted changes in population are based on the estimated coefficients presented in Table 8.

Table 10: Regression Estimates of the Relationship between Changes in Population and Labour Market Outcomes in Regions of Australia and New Zealand for Different Country of Birth and Skill Groups

Dependend Variable: Change in Log Population of Skill Group (i) and CoB Group (j) in Region (k) between Census (t) & (t-5)						
Country of Birth	New Zealand-born		Australian-born		Other Foreign-born	
Living in	in NZ	in OZ	in NZ	in OZ	in NZ	in OZ
Log Employment Rate for Native-born in Skill Group (i) in Region (k) at time (t-5)	0.627**	-0.029	0.574**	0.140+	0.381**	0.055
	(0.046)	(0.205)	(0.160)	(0.071)	(0.083)	(0.082)
Log Median Real Income for Native-born in Skill Group (i) in Region (k) at time (t-5)	0.398**	0.331+	0.680**	0.244**	0.576**	0.631**
	(0.072)	(0.193)	(0.121)	(0.078)	(0.070)	(0.088)
Log Mean Real House Price in Region (k) at time (t-5)	0.033	-0.012	0.195+	-0.022	0.086	-0.006
	(0.029)	(0.112)	(0.104)	(0.074)	(0.097)	(0.080)
Log Immigrant Population in Region (k) at time (t-5)	-0.054	-0.031	-0.123	-0.328**	0.128	-0.062
	(0.161)	(0.181)	(0.162)	(0.109)	(0.136)	(0.133)
Log Total Population in Region (k) at time (t-5)	-0.651*	-0.428	-0.604+	-0.175	-0.843**	-0.308
	(0.300)	(0.462)	(0.305)	(0.303)	(0.284)	(0.304)
Log Population of Skill Group (i) in Region (k) at time (t-5)	0.230**	0.089	-0.022	0.816**	-0.0548**	-0.314**
	(0.067)	(0.086)	(0.024)	(0.109)	(0.018)	(0.045)
Log Total Population of Skill Group (i) and CoB Group (j) in Region (k) at time (t-5)	-0.351**	-0.391**	-0.0596*	-1.025**	-0.0265**	0.103*
	(0.070)	(0.077)	(0.024)	(0.110)	(0.008)	(0.043)
R-Squared	0.390					
Full Sample Size: 20 Skill Groups (i) * 3 CoB Groups (j) * 58 Regions (k) * 2 Periods	6,239 (out of 6,960)					

Note: ** p<0.01, * p<0.05, + p<0.1. Standard errors robust to arbitrary correlation of error term within locations are in parentheses. The regression also includes country of birth fixed effects interacted with whether the location is in New Zealand allowing for different mobility rates for each country of birth group in each country, an indicator variable for the census year interacted with the country of birth fixed effects and whether a location is in New Zealand allowing for different aggregate mobility rates over time for each country of birth group in each country, and location fixed effects allowing for different population growth in each location. The regression is variance weighted by the population represented by each observation in the same year in which the explanatory variables are measured.