How Permanent is Permanent Migration?

Identifying the Determinants of Remigration for Skilled Migrants in New Zealand

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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Migrant retention is important for New Zealand's economy

Migration is important for the New Zealand labour market and economy. Migrants contribute $1.9 billion annually to national gross domestic product and make up a quarter of New Zealand's workforce. In recent years, New Zealand has had the highest rates of both immigration and emigration in the developed world. This means migration is important for New Zealand demographically as well as economically. As New Zealand's population ages, the importance of migration, especially skilled migration, is likely to become even greater.

Attracting and selecting migrants is only part of what is required to get the benefits of migration. Retaining migrants is also important. Studies have found that it takes over 10 years for migrants to reach parity with equivalently skilled native-born New Zealanders, and that their positive fiscal contribution increases the longer they stay.

Given the importance of retaining skilled migrants in New Zealand, this paper seeks to answer several questions: How many skilled migrants who settle in New Zealand leave again? If they decide to leave, when do they go? Are certain migrants more likely to leave than others?

A quarter of skilled migrants remigrate within five years

This study has found that 25 percent of New Zealand's skilled migrants remigrate within five years of taking up residence. A paucity of international data on this topic means there are no exactly comparable figures with which to judge this result. However, amongst what studies do exist, this figure is on the lower end and is roughly comparable to other so-called settlement countries.[1]

The risk a skilled migrant will leave is greatest at two years

Overall, the risk that a skilled migrant will leave is greatest at two years after taking up residence in New Zealand. In the first two years of settlement, the risk a migrant will leave remains relatively steady. After two years, however, their risk spikes and stabilises four months later at a higher level but reducing over time.

This two-year point is significant because migrants can apply for a permanent residence visa after two years of residing in New Zealand (with certain conditions). The permanent residence visa has no travel restrictions, allowing a migrant to return to New Zealand at any time should they choose to remigrate to another country. The spike in the risk of leaving at two years is due to migrants with particular characteristics being more likely to leave at this point. These groups include migrants aged 30 years and younger, single migrants without children, former students, and migrants from Asia (excluding India), especially those from China.

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[1] The OECD describes the settlement countries as Australia, Canada, New Zealand and the United States.

The most important characteristics are country of origin, previous visa type, and whether a migrant has children

A proportional hazards model was used to consider the effect of each migrant characteristic on remigration while accounting for the other characteristics in the model. The characteristics most strongly associated with retention were found to be country of origin, the type of visa a migrant had before gaining residence combined with the time they spent in New Zealand on that visa, and whether they had children.

Other statistically significant variables included whether a migrant applied for residency in New Zealand or from abroad, qualification level, age, industry of employment, self-employment status, and whether they had a partner.

Gender, region of settlement, and industry of first employment had small or insignificant effects on the likelihood of remigration, once other characteristics were controlled for.

Effects on retention before and after the two-year point

Younger migrants were more likely to leave after two years

Some characteristics were found to have quite different effects on retention before and after the two-year point. Migrants of all ages were similarly likely to leave during the first two years of residence. After two years, however, younger groups were more likely to leave and older groups were less likely to leave.

Type and duration of previous visa show no effect after two years

In the first two years of residence, having almost any kind of previous visa, for any length of time, decreased the likelihood of remigration. Migrants with a previous work visa for a year or less were the only group who did not show this effect. Migrants on a student visa for any length of time and those on work visas for three years or more were the least likely to leave in the first two years. After two years of residence, however, remigration rates did not differ by the type and duration of a migrant's previous visa.

Migrants from the United States, Canada, and China were more likely to leave

Compared with migrants from the United Kingdom (UK) and Ireland, migrants from the United States, Canada, and China were more likely to leave at any time, while those from Pacific Island countries, South Africa, and the Philippines were less likely to leave at any time.

Migrants from the United States, Canada, and China were found to be even more likely to leave after two years (three times more likely in the case of China). Only migrants from India had the same likelihood of leaving as those from the UK and Ireland at all times. Migrants from other Asian countries and Europe had the same likelihood of leaving as those from the UK and Ireland in the first two years, but were more likely to leave after that point.

Migrants with a partner, children, or who applied onshore were less likely to leave

Migrants who had a partner or children when they took up residence had a lower chance of remigration than those who didn't, as did those who applied onshore in New Zealand rather than from abroad.

Migrants claiming points for higher qualifications were more likely to leave

Migrants claiming points for having a masters degree or doctorate were more likely to remigrate than those who did not claim points for qualifications.

Immigration policy changes could improve retention

Given New Zealand's reliance on skilled migration, attracting, selecting and retaining the migrants who will make the largest economic contribution should be a goal of immigration policy. This paper has found that certain groups of migrants are more likely to remigrate than others. While the choice to remigrate is complex and difficult to influence, changes to immigration policy could better target skilled migrants who are most likely to stay.

Change the points offered to favour slightly older migrants

The points offered for age favour the youngest applicants. Since these migrants are more likely to remigrate, changing the points offered for age to favour slightly older migrants could better select those who are more likely to make a long-term commitment to New Zealand.

Include an age requirement for permanent residence

Retention of younger migrants could also be improved by changing the eligibility requirements for a permanent residence visa. An age requirement, in addition to the two-year waiting period, could reduce the loss of migrants overall and better fulfil the intention of the permanent residence visa policy to offer the right of return to those migrants with an enduring commitment to settlement in New Zealand. This change would need to be weighed against the risk it might reduce the incentive for international students to study in New Zealand or increase the chance they leave before two years.

Future research

This study identifies a number of potential avenues for future research. The extent to which the opportunity to gain a permanent residence visa influences a migrant's choice to study in New Zealand rather than in other countries has not been tested and could be the subject of future research. Further research is also needed to better understand the reasons behind the comparatively poor retention of former international students more generally. Future studies could also look more closely at the number of New Zealand residents living overseas, and the implications this could have for New Zealand. Finally, once more data is available, researchers will be able to examine the remigration patterns of

migrants after 10 or 15 years in New Zealand and see what effect, if any, the opportunity to take up citizenship at five years has on their retention.

1   INTRODUCTION

Migration has played an integral role in the development of New Zealand and has been especially important for its labour force and economy. The 2006 census found that nearly a quarter of New Zealand's population is foreign-born (the OECD average is 10 percent). Foreign-born people also make up 25 percent of the working-age population. Many of these migrants are relatively recent arrivals with the foreign-born making up around 60 percent of the new additions to the working-age population between 2001 and 2006 (Nana and Sanderson, 2008).

Migrants create economic value for the country. A study in 2009 estimated that migrants contribute $1.9 billion annually to New Zealand's gross domestic product (Nana, Sanderson and Hodgson, 2009). They also replace native-born New Zealanders moving abroad. In recent years, New Zealand has had the distinction of having the highest immigration and highest emigration rates among developed countries (Poot, 2009). Without these migrants, New Zealand would struggle to find skilled workers to meet industry demand and maintain its current population (Department of Labour, 2009). Migrants have also become more important in terms of tax revenue. The net fiscal impact of migrants (the amount of tax they paid less the entitlements they claimed) grew 80 percent between 2002 and 2006 (Slack, Wu and Nana, 2007).

The importance of immigrants for New Zealand's labour market and economy is likely to increase in the future. This importance is mostly driven by demographic change from an ageing population. As the "baby-boom" generation enters retirement age, senior citizens (people aged over 65) will become an increasing proportion of the population, outnumbering children (people aged under 15) by 2023 (Khawaja and Boddington, 2010).[2] As this group retires and begins to claim entitlements, there will be fewer workers to support them. The number of working-aged people (15–64 years) per person over the age of 65, known as the old-age dependency ratio, is forecast to change from 5 : 1 currently to 3 : 1 in 2032 (NZIER, 2012). This will ultimately put increased pressure on superannuation and the health care system since retired people are eligible for a variety of entitlements and generally suffer higher morbidity.

Migration can relieve some of these pressures in two ways. Migrants tend to be younger and of working age, thereby lowering the age of the working-age population overall and increasing its size. Migrants also have a positive net fiscal benefit that is larger than that of the New Zealand-born. This means migrants pay more in taxes than the cost of the government services they use compared with native New Zealanders. To achieve these benefits, New Zealand must not only attract high-quality migrants, but must also secure their settlement over the longer term.

Recent studies have highlighted the importance of migrant retention for New Zealand. Stillman and Maré (2009) found that migrants have significantly worse labour market outcomes than those of comparably skilled New Zealanders

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[2] In 2006, children outnumbered seniors by 2 to 1.

when they first arrive,[3] but those who stay can achieve outcomes on a par with the comparable native-born after staying 10–15 years. Another study found that migrants' total net fiscal impact to New Zealand increases the longer migrants stay: "the net fiscal benefit per head was $2,680 for recent migrants, $3,470 for intermediate migrants, and $4,280 for earlier migrants while the comparable figure for the New Zealand born population was $915 per head" (Slack, Wu and Nana, 2007, p 11). This means that for New Zealand to fully realise the fiscal and economic benefits of migration, it must retain, as well as select, high-quality migrants.

Given the importance of migrant retention to New Zealand, research is needed to better understand the determinants of remigration, particularly of migrants with the high levels of skills the New Zealand economy needs. This paper builds on previous studies and uses a survival analysis approach to identify the types of skilled migrants more or less likely to leave New Zealand.[4]

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[3] Compared with equally skilled native New Zealanders, migrants' employment rates were 20 percent lower, their incomes were $10,000–$15,000 lower, and their occupational rank was 5 percent to 8 percent lower.

[4] For the purposes of this report, skilled migrants are defined as principal applicants accepted through the Skilled Migrant Category (SMC), part of the Business/Skilled Stream of the New Zealand Immigration Programme.

2   PREVIOUS LITERATURE

For most of the last century, migration has often been classified as being of two types: temporary or permanent. Temporary migrants are meant to come for a particular purpose (study or seasonal work for example) and once that purpose has been fulfilled, they are expected to move back "home" to their country of origin. Permanent migrants, on the other hand, are meant to make a long-term shift of their home from one country to another. The actual experience of migrants tends to be less clear-cut. Temporary migrants tend to become permanent migrants with enough time in their host country (German *Gastarbeiter*, or guest-workers, are the most well-known example) and some permanent migrants rethink their settlement choice and return to their home country (return migration) or move on to another country (on-migration).

In recent times, permanent migration has become less permanent, especially for skilled migrants. Several studies have documented how this group has become more mobile (for example, Castles and Miller, 1998). The material cost of moving is less than it used to be, internet access makes it easier to maintain social ties, and restrictions on movement have been relaxed. All this has meant that migrants in recent times, especially those with skills in demand, do not need to be as permanently attached to one place or another.

While this mobility might be viewed poorly, some scholars have argued that circular migration (moving to a place and returning later on) might be a win-win-win situation (Newland, Agunias and Terrazas, 2008). Receiving countries get the skills of the migrant for a time, the migrant is enriched (financially and otherwise) by their experiences abroad, and the sending country eventually receives the benefit of those experiences when the migrant returns.

2.1   Remigration rates

International remigration figures

There has been an interest in many countries to try to understand circular migration and to measure immigrant retention and remigration. This task has proved difficult and only a limited number of studies measure the remigration of migrants or its determinants. The main reason is poor data quality and availability.

While some countries collect information on migrant movements directly through population registries, border cards or landing surveys, these sources tend to be more complete for arrivals than departures and may not include immigration status or other demographic and social characteristics. Often data on migrant flows must be calculated indirectly using census data since censuses usually collect data on country of birth and time in the host country. This allows outflows between census periods to be estimated. The downside of such indirect measures is that collection periods can be far apart (five years in the case of the New Zealand census), and temporary migrants cannot be distinguished from permanent ones, let alone those selected through particular immigration policies.

The upshot is that most immigrant remigration figures are not internationally comparable and are best viewed in the context in which they are created. With

that caveat, Table 1 shows the remigration rates from various international studies, including figures the OECD calculated, in part, to increase the comparability of immigrant retention statistics (OECD, 2008). The OECD report concluded that depending on the destination and time period being considered, international studies found that between 20 percent and 60 percent of migrants had emigrated within five years of taking up residence in their host country.

Table 1: International remigration rates

Country	Entry period	Remigration rate (%)	Period	Reported in
Ireland	1993–1998	60	After 5 years	OECD (2008)
Belgium	1993–1999	50	After 5 years	OECD (2008)
United Kingdom	1992–1998	40	After 5 years	OECD (2008)
Norway	1996–1999	40	After 5 years	OECD (2008)
Netherlands	1994–1998	28	After 5 years	OECD (2008)
United States	1999	19	After 5 years	OECD (2008)
Denmark	1983	55	After 5 years	Jensen and Pedersen (2007)
Netherlands	1997	35	After 5 years	Bijwaard (2004)
New Zealand	1998	23	After 5 years	Shorland (2006)
Norway	1967–2003	50	After 5 years	Bratsberg, Raaum and Sorlie (2007)
Canada	1996	24	After 5 years*	Aydemir and Robinson (2008
Canada	1996	35	After 5 years*	Aydemir and Robinson (2008
United States	1970–1980	17.5	5 years or less	Borjas and Bratsberg (1996)
United States	1970–1980	21.5	6–10 years	Borjas and Bratsberg (1996)
Sweden	1992	50	Within 10 years	Beenstock (1996)
Australia	1991	20–30	Within 23 years**	Beggs and Chapman (1991)

Notes:* Working-age men only. ** English speakers only.

Source: See the References for the bibliographic details of the reports referred to in the table.

New Zealand remigration figures

Several studies have attempted to measure remigration in New Zealand. Winkelmann and Winkelmann (1998) found that 28 percent of recently arrived immigrant men who were aged 25–44 in 1981 had left New Zealand by the 1986 census. The 10-year remigration rate for these men was 43 percent and the 15-year remigration rate was 45 percent. The remigration rate for women was less than that for men. Female remigration rates varied from 26 percent after five years to 39 percent after 15 years.

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Shorland (2006) built on this work using more recent census data to identify movement patterns in and out of New Zealand. She found a steady loss of migrants over time with around 23 percent of migrants having long-term absences (defined as leaving the country for six months or more) within five years after taking up residence. Since Shorland's report, figures on migrants with long-term absences by financial year have been published annually in the Ministry of Business, Innovation and Employment's migration trends and outlook report (for example, MBIE, 2013).

Nana and Sanderson (2008) also used census data, finding a 42 percent remigration rate in 2001 for migrants who arrived between 1991 and 1996 and a lower rate of 24 percent in 2006 for the migrants who arrived between 2001 and 2006. They suggested the source of this result could be the combination of relatively buoyant economic conditions between 2001 and 2006 and changes to improve the matching of migrant skills to employment introduced in 2003/04.

McLeod, Henderson and Bryant (2010) conducted the first study to use administrative data from Immigration New Zealand to calculate the retention rates of skilled migrants with a special focus on a migrant's qualification level. Qualification level is determined in the application process since a migrant can claim points for a basic qualification (any tertiary qualification up to bachelors with honours) or an advanced qualification (masters and doctorates). They found that four years after taking up residence, 30 percent of skilled migrants with an advanced qualification had experienced a long-term absence while only 20 percent of migrants with no qualifications or basic qualifications had had one.

In 2012, the Ministry of Business, Innovation and Employment produced a report that looked at the mobility patterns of migrants and native New Zealanders using administrative data from Immigration New Zealand matched with arrival and departure information collected by Statistics New Zealand (MBIE, 2012). This report found that 28 percent of the migrants who took up residence between 1 January 1998 and 31 December 2011 had left the country for six months or more. Of those who left, 25 percent had returned to New Zealand while 75 percent had not.

2.2   Determinants of remigration

International findings

In addition to trying to measure immigrant remigration, international scholars have sought to identify which migrants are more likely to leave in an effort to tease out the determinants of remigration for their country. A review of these reports reveals some common trends.[5]

- Most migrants who leave tend to do so within the first few years of taking up residence. Generally, the longer a migrant stays in their host country, the lower their "hazard" of leaving (Nekby, 2006; Bratsberg, Raaum and Sorlie, 2007; Reagan and Olsen, 2000; and Van Hook et al, 2006).

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[5] OECD (2008) presents a good discussion of remigration studies and current trends.

- Age is an important factor. Most studies found that younger people are more likely to leave, but others found that older migrants are more likely to leave once they reach retirement age (Jensen and Pedersen, 2007).

- A migrant's level of education is positively related to their likelihood of leaving (Nekby, 2006; Aydemir and Robinson, 2008; Dustmann and Weiss, 2007; Ruddick, 2008; Reagan and Olsen, 2000). High skilled migrants are more likely to leave, although in some studies a "u-shaped" relationship was found with the most and least skilled migrants more likely to leave (OECD, 2008).

- A migrant's immigration category and their corresponding legal entitlements affect retention. Business and skilled migrants are more likely to leave than family reunification or humanitarian migrants (Aydemir and Robinson, 2008; Bijwaard, 2007; Shorland, 2006).

- The geographic location of family members matters. Migrants whose families are not located in the host country are more likely to leave (Constant and Zimmerman, 2003, 2007; De Coulon and Wolff, 2006).

- Retention rates by entry cohort vary by country of origin. Migrants from more developed countries are more likely to remigrate whereas migrants from developing countries are less so (OECD, 2008; Nekby, 2006; Bratsberg, Raaum and Sorlie, 2007).

New Zealand findings

Before this report, the only study investigating the determinants of remigration in New Zealand was that by McLeod, Henderson and Bryant (2010).[6] The authors found that more highly qualified migrants were more likely than other migrants to leave at any point after taking up residence. Migrants with basic or no qualifications had very similar likelihoods of leaving in the first two years after arrival, but those with basic qualifications were more likely to leave thereafter.

In addition to years of education, McLeod, Henderson and Bryant (2010) found that skilled migrants from North America, continental Europe, Asia and South Africa were more likely to leave than were the reference group (migrants from UK/Ireland) while those from Pacific Island countries were less likely to leave. Those who applied from offshore were also more likely to leave. Gender, age, number of children and reason for coming to New Zealand were included in the model, but were not found to have significant results.

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[6] Although Nana and Sanderson (2008) speculated that remigration decreased in times of economic buoyancy.

3 DATA SOURCES

3.1 Integrated Data Infrastructure

Data for this report was taken from a database known as the Integrated Data Infrastructure (IDI). The IDI is a collection of administrative data sets held and managed by Statistics New Zealand, New Zealand's official statistics agency. The core of this collection is the Linked Employer-Employee Dataset (LEED), which links longitudinal employer data from Statistics New Zealand's Business Frame to longitudinal employee data collected by Inland Revenue. An information-sharing agreement has allowed data from other government agencies to be added to LEED,[7] thereby linking for the first time person-level migration, benefits and student loans data.

After completing the first prototype in December 2011, Statistics New Zealand has continued to add other survey and administrative data sets to the IDI. It aims to complete the final version by June 2015.[8]

Given the sensitive nature of the data held in the IDI, access to the data is permitted only to authorised researchers onsite at Statistics New Zealand's data laboratory in Wellington. More information on the structure and development of the IDI, as well as the projects using its data is available from the Statistics New Zealand website.[9]

3.2 Skilled migrant application data

Since the IDI contains information on all the migrants who have lodged applications with Immigration New Zealand since 1998, researchers can view the characteristics of individuals accepted through different immigration streams and their related subcategories. This paper focuses on the determinants of retention for skilled migrants. In New Zealand, skilled migrants are selected for permanent residence through a substream of the New Zealand Immigration Programme called the Skilled Migrant Category (SMC).[10]

SMC migrants make up around half of the migrants granted permanent residence each year (18,843 or 47 percent in 2011/12), although half of these are spouses and dependants who apply as secondary applicants connected to a principal applicant.

The success of an application is primarily determined by the characteristics of the principal applicant measured using a points system. Principal applicants earn

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[7] Other agencies include the Ministry of Business, Innovation and Employment, Ministry of Education and Ministry of Social Development.

[8] More information on the IDI, including its source databases and a privacy assessment, can be found on the Statistics New Zealand website at *Integrated Data Infrastructure*, www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx

[9] See *How Researchers are using the Integrated Data Infrastructure* on the Statistics New Zealand website, at www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure/researchers-using-prototype-idi.aspx

[10] For a description of New Zealand's Immigration Programme and its various streams and categories, see MBIE (2013, pp 99–104).

points for factors such as their current skilled employment in New Zealand, qualifications, work experience and age. Immigration New Zealand collects and retains this information from the application process. Secondary applicants generally do not earn points (although partners can earn points for their qualifications and current skilled employment), so little information is collected from them. Given this context, New Zealand skilled migrants, for the purpose of this investigation, are defined as Skilled Migrant Category (SMC) principal applicants who take up residence in New Zealand.

Table 2 lists the information included in the analysis and the forms in which it was used in the project's modelling. Information on the characteristics of migrants was limited by the type of information collected at the point of application and the data available in the IDI.

Table 2: Selected migrant information

Information	Notes
Date residence was taken up	For offshore migrants, this is the date of arrival. For onshore migrants this is the date of acceptance.
Onshore or offshore application	
Country of origin	Nationality derived from passport
Gender	
Age	At the time residence was taken up
Partnership	If a migrant applied with a partner as a secondary applicant
Number of children	If a migrant applied with children as secondary applicants
Previous visa type	Includes type of visa and length of time in New Zealand before converting to permanent residence
Qualification points	Migrants earn points if they have a recognised qualification in two categories: "Basic qualifications" include trades qualifications, diplomas, bachelors degrees, and bachelors degrees with honours. "Advanced qualifications" include masters degrees and doctorates.
Industry of first employment	Recorded at three months after taking up residence
Self-employment	Whether a migrant was self-employed in the tax year in which they took up residence
Region of employment	Unknown if unemployed at three months

Source: Ministry of Business, Innovation and Employment.

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3.3   Study population

To isolate the study population, a data set was created from the IDI containing SMC principal applicants who took up residence in New Zealand between 30 March 2004 and 31 March 2011 (a final total of 72,876 observations). Although skilled migrant data in the IDI is available from before 2004, these migrants were accepted though a different selection policy (called the General Skills Category). The earlier category, although similar to the SMC, has significant differences, so comparison with SMC migrants is problematic.

The data on the study population includes information collected from migrants when they applied for residence, including demographic details and other characteristics related to the points they claimed. The IDI link to LEED data means information on a migrant's employment status, a migrant's industry of employment and whether a migrant was self-employed is also captured.

A preliminary descriptive analysis revealed there were a small number of migrants (1,335 out of 74,064 observations) who began a long-term absence (left New Zealand for six months or more) within 30 days of taking up residence. While it is possible these people made a genuine attempt to settle in New Zealand, it seems likely that they may have been in New Zealand at that time for other reasons. They could be onshore applicants who returned to their country of origin to arrange their resettlement or offshore applicants coming to arrange their affairs or to get preliminary impressions before moving in earnest. Apart from making the interpretation of the results more difficult, including this group in the analysis would also complicate the modelling, since the characteristics associated with departing within the first 30 days are not consistent with the factors associated with departing at a later date.

To understand this group better would require separate modelling and is beyond the scope of this project. Therefore, migrants with long-term absences that started in the first 30 days after taking up residence were excluded from the study population. If these migrants returned at a later date and stayed for longer than 30 days, their second arrival date was used as the start date for taking up residence, as this was considered to be their first genuine attempt at settlement. Of the 1,335 migrants that fit into this category, 147 returned and were included, resulting in a final study population of 72,876.

Descriptive characteristics

Most of the migrants in the study population were approved onshore (82 percent), reflecting an ongoing trend towards two-step migration in New Zealand. The vast majority had also spent some time in New Zealand on a previous visa (93 percent).

Twenty-eight percent of the population previously held a student visa (or a student and a work visa) while over half of the population (56 percent) had held just a work visa.

The migrants in the population are relatively young, with 43 percent aged 30 or younger. They are mostly male (65 percent) and without children (65 percent), but a majority have partners (57 percent).

Unsurprisingly, two-thirds of the migrants in the population settled in and around the major city centres, with the Auckland region accounting for 44 percent of the population.

The study population characteristics are described fully in Appendix A, Table A1.

4   METHODS

Two statistical tools were used to analyse the remigration rates of the study population. First, survival and hazard functions of the entire study population and of the population broken down by its individual characteristics were plotted to study their remigration patterns over time. A Cox proportional hazards model was then used to test the effect of individual migrant characteristics on retention while accounting for the effect of other characteristics.

4.1   Survival functions

A survival function is a statistical tool for estimating the probability that an event will occur by a particular point in time, usually after a given starting point. Survival functions are often used in medical research to estimate the survival of patients after receiving different treatments. For example, the value of a survival function for a group of patients six days after a surgery is the estimated probability that a patient will still be alive at six days following the surgery.

For this study, survival curves (which track survival function estimates graphically over time) have been used to estimate the probability that a migrant will not have begun a long-term absence from New Zealand (defined as being out of the country for six months or more) on a particular day. For example, the survival rate at one year (365 days) shows the probability of a migrant making it to day 365 without a long-term absence. Naturally, at day 0 the probability of still being in New Zealand is 100 percent, so all the survival curves in this report begin at one and decline over time as migrants leave.[11]

The power of survival functions is limited by the size of the population and the number of years of data available, because the number of migrants included in the calculation diminishes as they depart. All of the survival curves in this report display the survival rate out to five years (1,825 days) since the results become unstable thereafter, especially for smaller subgroups of migrants.

4.2   Hazard functions

The flipside to survival functions are hazard functions. Thus far, I have referred to survival rates as the probability a migrant will not have experienced a long-term absence by a certain point in time. While it is tempting then to view hazard rates as the probability a migrant will have left by a given day after arrival, that interpretation would be, strictly speaking, incorrect. As the name implies, a hazard rate is a rate over a unit of time (such as speed, 50 kilometres per hour). Therefore, the hazard curves in this paper show the number of long-term absences a migrant is expected to have, per day, at each day after arrival given they have made it to that day without a long-term absence. This statistic is not useful as an absolute measure of risk but is useful as a relative measure of a migrant's risk of leaving. For example, if the hazard rate on day 1 was 0.05 and

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[11] The survival curves in this study are zero until 30 days, since migrants leaving before 30 days were removed from the population (see section 3.3 for a discussion of why this was done).

the rate on day 2 was 0.1, the hazard of leaving on day 2 would be twice that of day 1.

4.3 Cox proportional hazards model

While survival and hazard curves are useful for viewing migrant remigration over time, they do not allow for an analysis of the effect of a given variable on the likelihood of departure while taking into account the effect of other variables. To do this, a Cox proportional hazards model (Cox, 1972) was used to test the effect of selected variables on skilled migrant remigration. The proportional hazards model in its most basic form can be written as:

$$h_i(t) = \lambda_0(t)\exp(\beta_1 x_{i1} + \dots + \beta_k x_{ik}) \tag{1.1}$$

Where the hazard for individual *i* at time *t* is the product of function $\lambda_0(t)$ and a non-linear function of a set of *k* covariates. $\lambda_0(t)$ represents the baseline hazard function, or the hazard for individual *i* if all the covariates were 0.

The proportional hazards model is so named because the hazard for any particular individual is a fixed proportion of the hazard for any other individual (Allison, 2010). If this ratio were to be calculated for two individuals, $\lambda_0(t)$ would cancel out of the equation, making the ratio of the hazards proportional over time.

The Cox model has two virtues that make it particularly useful for survival analysis. The first is that it does not require the modeller to fit the data to a particular baseline hazard function, as was the case in previous survival models. The model is also useful because coefficients can be estimated using maximum partial likelihood. Allison (2010) explains that equation 1.1 can be factored into two parts: one part that depends on the combination of the baseline hazard function *and* the vector of coefficients, and another that depends solely on the vector of coefficients. Partial likelihood essentially discards the first part and treats the second part as though it were an ordinary likelihood function, which creates estimates of the coefficients such that they maximise the partial likelihood.

4.4 Hazard ratios

The coefficients of the Cox model can be exponentiated to produce "hazard ratios". These ratios are the most intuitive way of interpreting the results and are used throughout this report. For dummy variables with values 1 and 0, the hazard ratio can be interpreted as the ratio of the estimated hazard for observations with a value of 1 to the estimated hazard for observations with a value of 0 (Allison, 2010). For example, if the hazard ratio for the variable "partner" were 0.85, this would mean that migrants with partners had only 85 percent of the hazard that single migrants had (or their hazard was 15 percent less).

For categorical variables, hazard ratios are the ratio of the estimated hazard of one subgroup to a reference group chosen by the modeller. While the relationship between subgroups does not change if a different reference group is chosen, it will affect whether a subgroup is statistically different from that

reference. For example, if one subgroup had a much lower hazard than the other subgroups and it were chosen as the reference group, it is likely the other subgroups would be statistically different from the reference. If a different reference were chosen, it might be that only the group with the lower hazard would be statistically different from the reference.

5   EMPIRICAL RESULTS

A descriptive analysis of the survival and hazard curves was done for both the total study population and its subgroups. This revealed important differences in the likelihood of skilled migrants leaving over time and provides context for the modelling results that follow. A Cox proportional hazards model was then used to test the effect of individual migrant characteristics on retention while accounting for the effect of their other characteristics.

5.1   Descriptive analysis

Total study population

The estimated survival and hazard functions for the total study population are shown in Figure 1 and Figure 2. The survival function tracks downward in a more or less linear fashion, with a dip after two years (730 days) and a minor change in slope thereafter. This almost linear shape is in contrast to similar studies abroad, which found a significant number of migrants leaving shortly after arrival, resulting in a more crescent or concave upward shaped survival function[12] (Aydemir and Robinson, 2008).

To give a better feel for the slope of the survival function for the total study population, survival and remigration rates at selected times are displayed in Table 3. Attrition within the first two years stays steady at 5 percent per year, then spikes to 7 percent in year 3, and declines to 5 percent and 3 percent in the years following.

Throughout the rest of this analysis, the terms "survival" and "retention" refer to the percentage of migrants who have not left New Zealand, and the terms "remigration" and "attrition" refer to the percentage of migrants who had a long-term absence from New Zealand.

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[12] Migrants with long-term absences in the first 30 days after taking up residence were removed from the population. However, this group, after discounting those who returned later and stayed for more than 30 days, constituted less than 2 percent of the total population, so would not have produced a comparable concave upward curve even if they had been included.

Figure 1: Survival curve – total study population
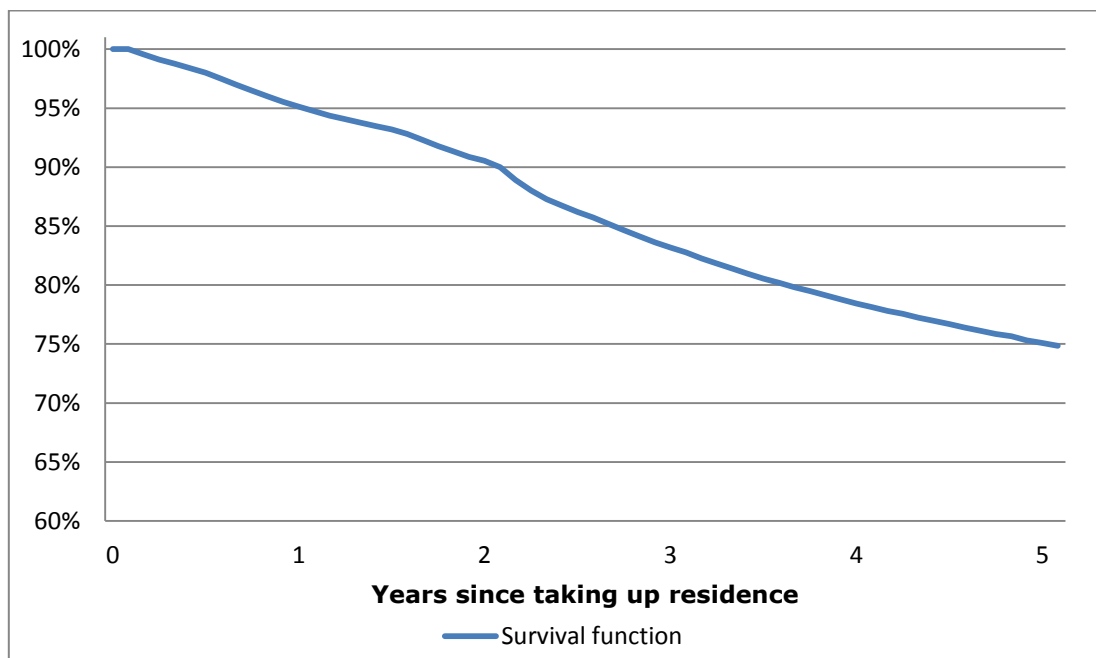
Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Table 3: Skilled migrant retention – total study population

Time after arrival	Survival (% of total)	Remigration (% of total/year)	Remigration (% of total, cumulative)
1 year (365 days)	95	-5	-5
2 years (730 days)	90	-5	-10
3 years (1,095 days)	83	-7	-17
4 years (1,460 days)	78	-5	-22
5 years (1,825 days)	75	-3	-25

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

The remigration rate of the total population five years after arrival is 25 percent, which is similar to the rate found by Shorland (2006). While not insignificant, the number of skilled migrants leaving is lower than most international remigration figures. Table 1 (on page 8) shows the remigration rates of immigrants in other countries where migrant retention has been estimated. It should be noted again that these rates are not directly comparable to the rate in this report since they measure the remigration of all migrant categories and not just skilled migrants. Comparable remigration rates would likely be higher than those shown in Table 1, since skilled migrants are known to be more likely to leave than other migrants such as family migrants and asylum seekers. Given this, New Zealand's skilled migrant retention after five years is relatively high.

The hazard function shown in Figure 2 describes the risk that skilled migrants will begin a long-term absence at each day after they have taken up residence in New Zealand. For the first two years after taking up residence, the hazard rate has a flat trend with an average hazard of 1.5×10^{-4}.[13] As migrants reach two years in New Zealand, their risk of leaving nearly triples, reaching a high of 4.0 at 750 days, 20 days after the two-year point. This spike in the hazard rate corresponds with the point where most migrants become eligible for a permanent residence visa. This visa removes a migrant's travel restrictions, allowing them to leave and return to New Zealand whenever they wish. The spike in the hazard also corresponds to the dip observed in the estimated survival function at two years. After the two-year spike, the hazard rate settles at a higher rate than the pre-spike average, but has a steady downward trend thereafter.

Figure 2: Hazard function – total study population
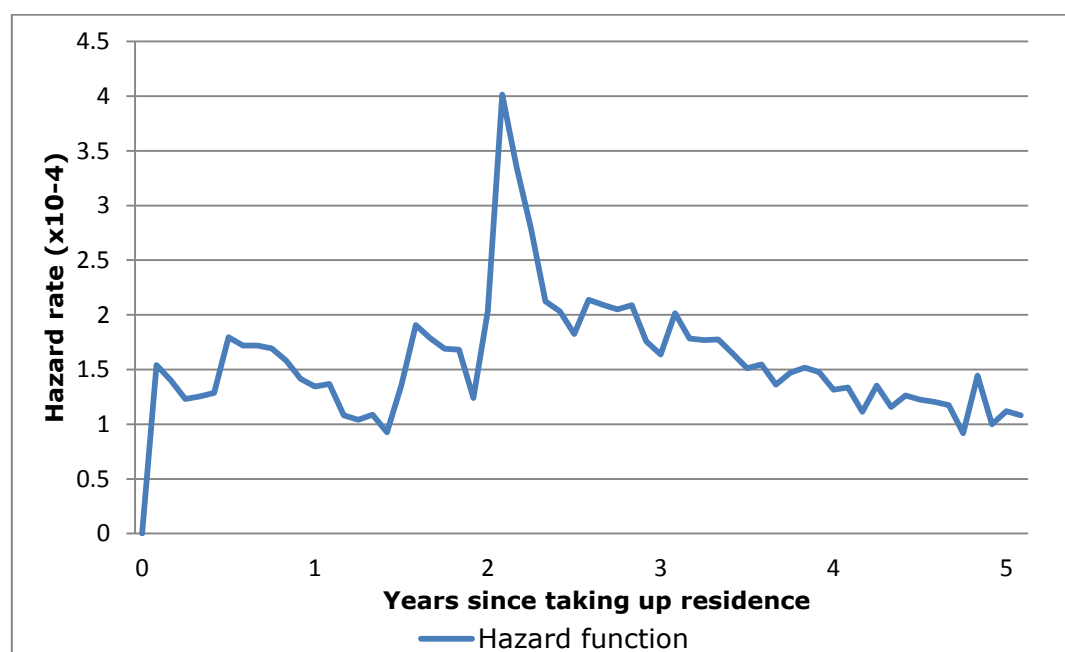
Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Individual characteristics

Hazard and survival functions were also estimated for groups with particular characteristics to see if these groups showed differences in remigration patterns over time. These curves support two overall findings.

The first finding is that most of the spike observed at two years for the total study population is caused by an exceptionally high hazard at this point for groups of migrants having particular characteristics. These groups include migrants aged 30 and younger, single migrants, previous students, and migrants from Asia (excluding India), especially from China. The hazard functions illustrating these effects are in Appendix C, Figures C1–C4.

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[13] Remember that the hazard rate is a relative, rather than an absolute, measure of the risk of remigration. See section 4 for a full explanation of the rate's calculation and interpretation.

The second finding is that some migrant subgroups have different survival patterns before and after the two-year spike. The migrant characteristics most associated with this change include age, time spent in New Zealand prior to residence, previous visa type, onshore application, and country of origin (examples are shown in Figure 3 and Figure 4).

The retention rates of migrants broken down by age, industry of first employment and country of origin became more divergent after two years of residence in New Zealand. This shift was most stark for migrants divided by country of origin. The difference between the remigration rate of migrants from the countries with the highest and the lowest retention at two years (Philippines, 97 percent, and US/Canada, 79 percent) was 18 percentage points. By five years after taking up residence, this same difference (between Pacific Island countries, 90 percent, and US/Canada, 55 percent) had almost doubled to 35 percentage points. Whether a migrant applied onshore or offshore showed the opposite pattern. The difference between migrants who applied onshore compared with those who applied offshore was seven percentage points two years after taking up residence. By five years, this gap had shrunk to only two percentage points (see Figure 3).

Figure 3: Survival curves – offshore and onshore applicants
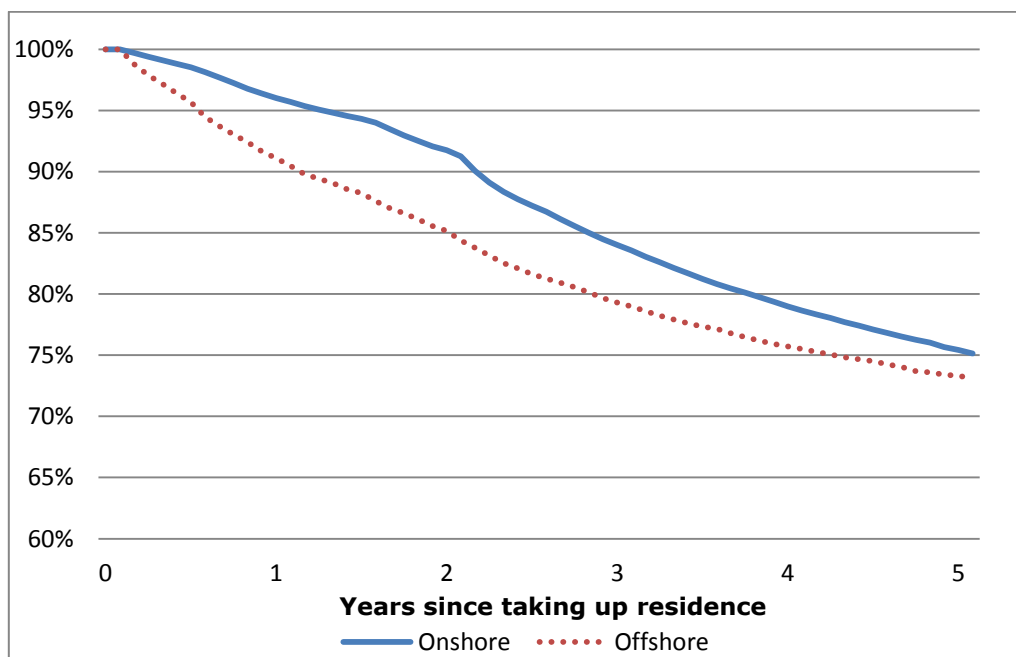
Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Figure 4: Survival curves – age groups
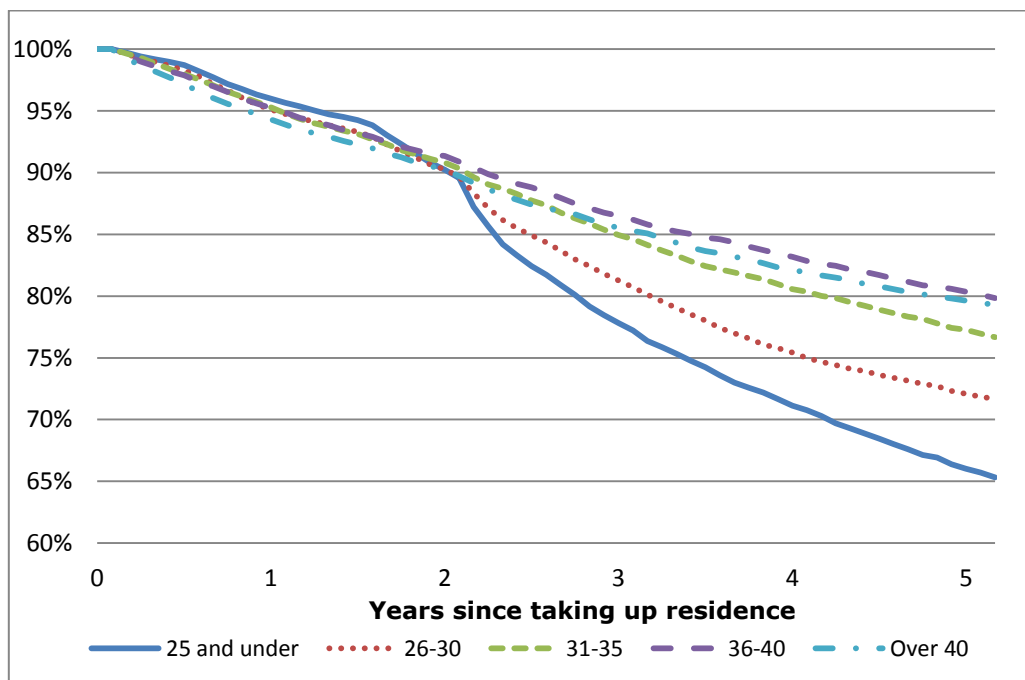
Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Two related migrant characteristics were combined to better see their effects on retention over time together. The survival curves for groups of migrants who had different types of previous visas and groups who had spent different amounts of time in New Zealand before gaining residence illustrate why this was useful.

Figure 5 and Figure 6 show that former students and migrants with the longest time in New Zealand before gaining residence had noticeable dips in retention after two years. Combining these characteristics showed that the retention patterns of migrants who had been in New Zealand on a previous visa before earning residence differed depending on the previous visa type. Of migrants with only a previous work visa, those with the longest previous time had the highest retention rates. Of previous students, however, those with the longest time in New Zealand before gaining residence had the lowest retention rates after the two-year point (see Figure 7).

Figure 5: Survival curves – time spent in New Zealand before residence
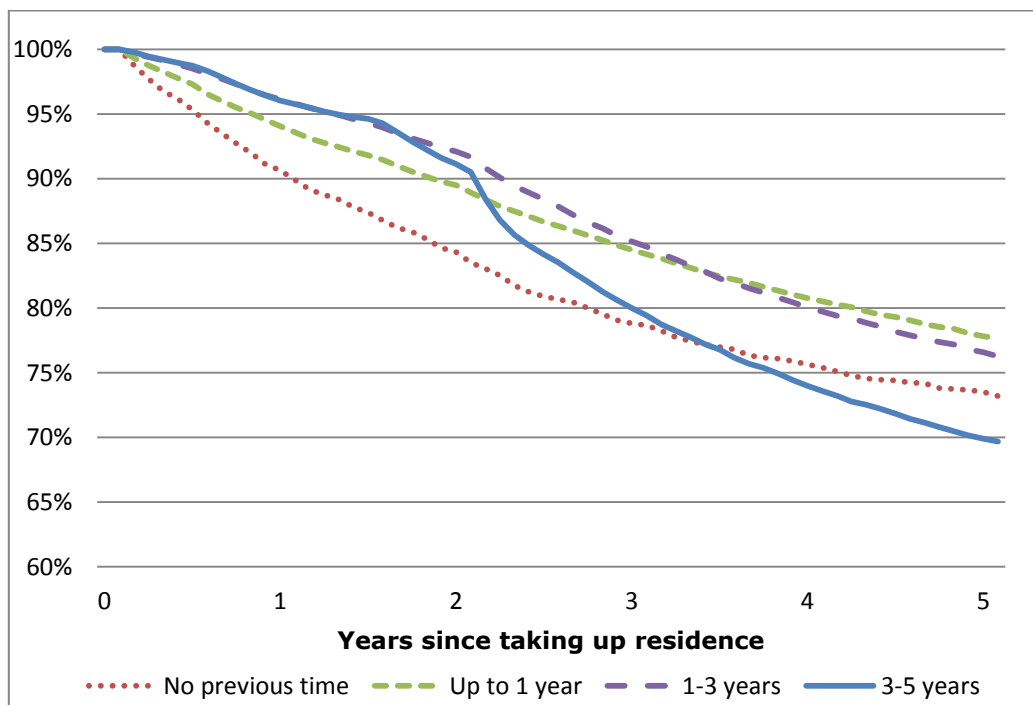
Note: Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Figure 6: Survival curves – previous visa type
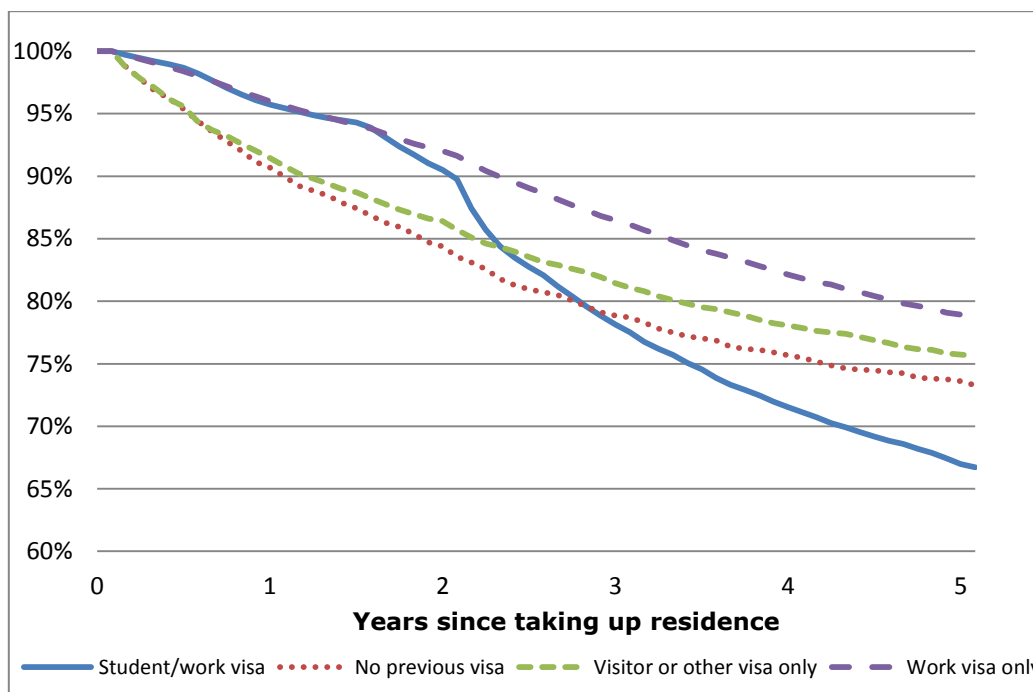
Note: The "student/work" group includes migrants who had only a previous student visa and those who had both a previous student and a previous work visa.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Figure 7: Survival curves – previous visa type and time in New Zealand
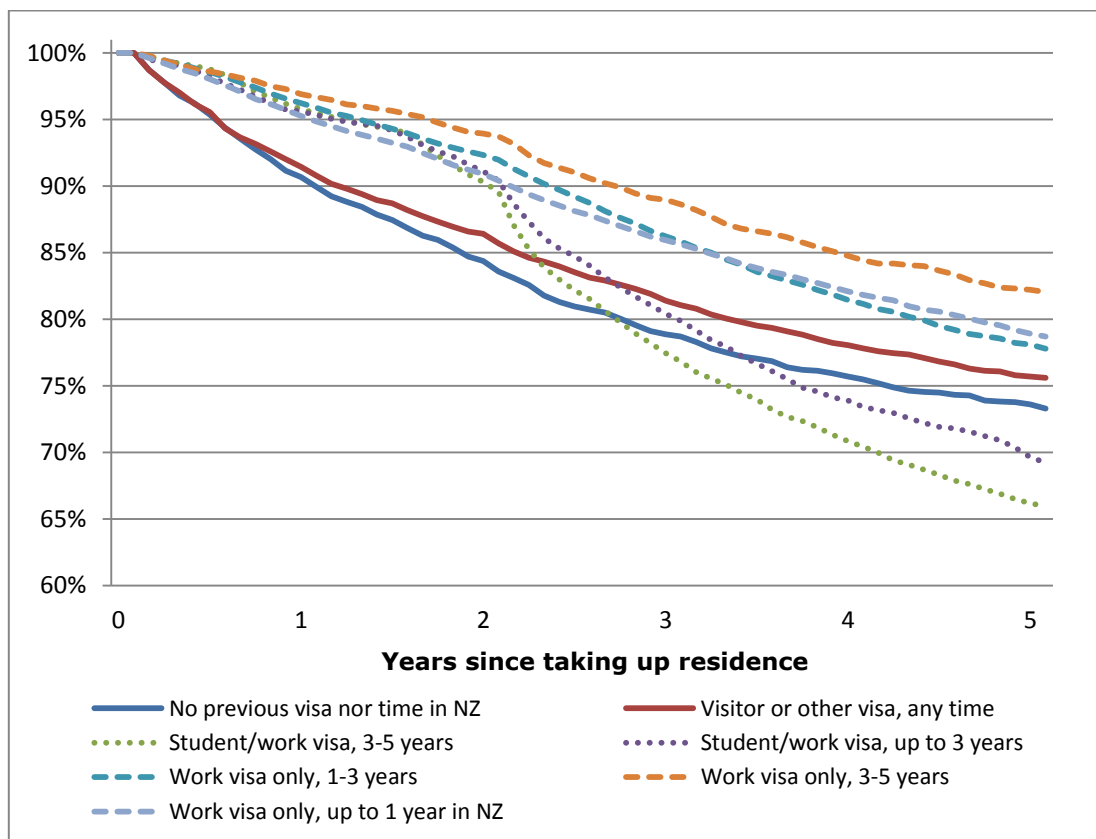
Note Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

5.2   Regression analysis

Modelling approach

A Cox proportional hazards model (Cox, 1972) was used to test the variables thought to influence immigrant retention and measure their effect. A series of models was run first with each variable included as the sole independent variable in the model. This was done to determine the way each variable related to retention before other covariates were included. These models essentially summarise the survival curves, testing differences between subgroups across all time periods.

A multivariate model was estimated to show the effect of each variable on retention when moderated by other factors. A second multivariate model was run which included interactions with a time-dependant covariate (called year2). Year2 equals 0 if a migrant has been in New Zealand less than two years and 1 if they have been in New Zealand for two years or more. This was done to test whether the effect of a variable differed depending on whether or not a migrant had earned the right to a permanent residence visa.[14] This is significant because

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[14] Since the descriptive analysis showed differences in migrant groups before and after two years, it was necessary to include year2 to meet the proportional hazards assumption of the Cox model. For a discussion of the proportional hazards assumption, see Allison (2010).

permanent residence visas do not have the travel restrictions of other residence visas, thereby allowing migrants to leave and return to New Zealand as they wish. The year2 interaction essentially divides the effect of the variable into two parts: the effect in the first two years after taking up residence (before permanent residence visa eligibility) and the time after two years (after permanent residence visa eligibility). Each variable was interacted with year2 and insignificant interactions were excluded from the final model.

The results of the univariate model and the first multivariate model are shown in Appendix B, Table B1. The final multivariate model is shown in Appendix B, Table B2. Table B2 shows the model where the variable year2 equals 0 if a migrant has been in New Zealand less than two years and 1 if they have been in New Zealand over two years. Table B3 shows the same model with the values of the year2 variable reversed (year2 equals 1 before two years and 0 after two years). This was done to generate the final results, shown in Table 5 (page 29).

In Table 5, the regression results for variables interacted with year2 describe that variable's effect on retention before two years and after two years using the results from the regressions in Tables B2 and B3. In Tables B2 and B3, the coefficient showing the effect in one period (either before or after two years) is simply the coefficient for the main effect, while the coefficient for the other period must be calculated by summing the main effect coefficient and the interaction coefficient. By running the model twice as shown in Tables B2 and B3, the coefficients of the main effect in both periods are obtained along with their standard errors.

The following sections analyse the effect of each variable on retention using the results from both the univariate model and the final multivariate specification.

Gender, region of first employment and year of residence

None of the variables gender, region of first employment and year of residence was found to be a significant determinant of migrant retention.

Using 2005 as a reference year, only migrants who arrived in 2004 had significantly different retention rates, being 12 percent more likely to have a long-term absence. Only the retention of migrants in the Canterbury and Waikato regions was (narrowly) found to be statistically different from retention in Auckland (7 percent and 8 percent less likely to leave respectively). In the individual model for gender, women were found to be more likely than men to have a long-term absence but this effect disappeared once other variables were added.

Industry of first employment and self-employed

The individual model for industry of first employment found that migrants working in seven of the 20 industry groups considered were more likely to leave, and migrants working in five of the industry groups were less likely to leave than those in the reference industry. In this case, the industry Health Care and Social Assistance: Excluding doctors and nurses was selected as the reference group because its retention rate of 75 percent after five years was closest to that of the total population.

Most of the effect of industry on retention found in the individual model disappeared once other variables were added, suggesting that other factors were driving the initial differences in retention across industries. In the final specification, migrants working in Mining and Financial and Insurance Services were found to be more likely to leave than the reference group (by 99 percent[15] and 15 percent respectively) while migrants working in Agriculture, Forestry and Fishing, Public Administration and Safety, and Manufacturing were less likely to leave (by 21 percent, 17 percent, and 11 percent respectively).

Partnership and number of children

Having a partner at the time of application was found to significantly decrease the likelihood of leaving in both the individual and the multivariate models. Partnership also had a significant interaction with the year2 variable. In the first two years, migrants who had a partner when granted residence were 14 percent less likely to leave, but this effect decreased after two years with partnered migrants being only 6 percent less likely to leave thereafter.

While having a partner is connected with bringing children to the country, children were included separately in the modelling to see if the number of children included in a migrant's application had its own effect on migrant retention. In the initial model design, migrants with children were divided by both the number and age of their children. However, the age groups of the children were not found to be significantly different from each other, so just the number of children was used in the final modelling.

The multivariate model found that migrants with children were less likely to leave over the entire five-year period after taking up residence than those without children. Controlling for other characteristics, migrants with one child were 16 percent less likely to leave than those with no children, those with two were 25 percent less likely to leave, and those with three or more children were 21 percent less likely to leave.

Onshore or offshore application

Migrants who applied onshore were 34 percent less likely to leave than migrants who applied offshore in the first two years after taking up residence, but only 14 percent less likely to leave after two years.

Previous visas and time in New Zealand

The individual model found that migrants with previous work visas were 30 percent to 44 percent less likely to leave with additional time in New Zealand increasing retention. Migrants with visitor's visas were 12 percent less likely to leave, but former students who had already been in New Zealand longer than three years were 10 percent more likely to leave. Students with less than three years previously in New Zealand were not statistically different from those without a previous visa.

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[15] Migrants working in mining represented a very small number (168) within the study population.

The multivariate model showed a difference in remigration patterns for these groups before and after two years. Migrants who had previously held a student visa for any length of time or a work visa for three years or more were least likely to leave in the first two years. Migrants who had not been to New Zealand before or had held a work visa for one year or less were most likely to leave during this period. After two years, however, remigration rates did not differ by the type and duration of a migrant's previous visa.

Age group

Age was found to be a significant factor for migrant retention in both the individual and multivariate models. Using 31–35-year-olds as a reference group, the individual model found that migrants aged 30 and younger were more likely to leave overall (48 percent more likely for migrants aged 25 or younger and 23 percent for 26–30-year-olds) while those aged 36 and over were less likely to leave (13 percent less likely for 36–40-year-olds, and 6 percent for those over 40.

The multivariate model found a slightly smaller age effect on retention once other factors were accounted for, but all this effect happened after two years of residence. None of the age groups were found to be statistically different from each other in the first two years. After two years, migrants aged 30 and younger were much more likely to leave (36 percent more likely for those aged 25 and younger, 16 percent more likely for 26–30-year-olds). Migrants aged over 35, however, were less likely to leave (12 percent less likely for 36–40-year-olds and 11 percent less likely for those over 40.

Country of origin

Country of origin had a strong effect on retention in both the individual and multivariate models. Because of the number of countries considered and the diversity of retention effects found before and after two years, a table of hazard ratios from the multivariate model with and without interactions was constructed (Table 4). The hazard ratios in Table 4 are shown as the percentage difference in the likelihood of remigration when compared with the reference group, which in this case is migrants from the UK/Ireland.[16] Each percentage represents how much more or less likely migrants from a particular country were to leave New Zealand relative to migrants from the UK/Ireland (negative results indicate being less likely to leave). Migrants from UK/Ireland was chosen as the reference group because these migrants make up a large portion of historical migration to New Zealand and have one of the most stable survival curves before and after two years.

Most of the effects found in the univariate model still hold once other factors are taken into account. While the direction of effect is generally the same before and after two years, some countries have large differences in magnitude between the two periods. Chinese migrants, for example, are 31 percent more likely to leave

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[16] The standard way of interpreting the hazard ratio is to subtract 1 and multiply by 100. This shows the percentage difference in the likelihood of remigration, when compared to the reference group. A table showing only the percentage difference in remigration for all variables is in Appendix B (Table B4).

than are migrants from the UK/Ireland in the first two years, but are 93 percent more likely to leave after two years. Other countries were not statistically different from the reference group in the first two years but had significant effects thereafter. Examples include migrants from Europe, South Korea and Other Asia (Asia excluding India, China, and South Korea) who were more likely to leave then the reference group after two years but not statistically different before two years.

Table 4: Percentage difference in likelihood of remigration by country of origin (compared with migrants from the United Kingdom and Ireland)

Country	Multivariate model (without interactions)	Multivariate model (with interactions)	
Reference: UK/Ireland	**Five years (%)**	**Before two years (%)**	**After two years (%)**
China	62**	31**	93**
Europe	36**	10	63**
India	-1	-11	7
Other	20**	10	28**
Other Asia	43**	12	74**
Pacific	-54**	-52**	-60**
Philippines	-50**	-60**	-38**
South Africa	-30**	-34**	-29**
South Korea	22**	-18	60**
US/Canada	104**	85**	119**

Note: * Variables significant at the .05 level. ** Variables significant at the .01 level.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Calendar year

Time-dependant variables were included in the model to control for environmental effects occurring in a particular calendar year. Examples of these types of effects would be the economic climate at the time or changes to policy occurring in a particular year. Only three years had significant results showing migrants were more likely to leave during 2006, 2007 and 2008 than 2011.

Table 5: Cox proportional hazards model

Analysis of Maximum Likelihood Estimates		Coefficient	Standard error	Hazard ratio	% difference in hazard (to reference group)
Year of residence uptake Reference: 2005	2004	0.11627**	0.04354	1.123	12
	2006	-0.06412	0.03464	0.938	-6
	2007	-0.0441	0.05418	0.957	-4
	2008	0.07066	0.07537	1.073	7
	2009	0.05268	0.10031	1.054	5
	2010	0.07228	0.12607	1.075	7
	2011	-0.02257	0.43213	0.978	-2
Have partner (first two years)		-0.15279**	0.03115	0.858	-14
Have partner (after two years)		-0.06434*	0.02934	0.938	-6
Number of children Reference: 0 children	1	-0.17123**	0.03526	0.843	-16
	2	-0.28296**	0.03488	0.754	-25
	3 or more	-0.23906**	0.04703	0.787	-21
Industry of first employment Reference: Health Care and Social Assistance (excluding doctors and nurses)	Accommodation and Food Services	-0.06359	0.05398	0.938	-6
	Agriculture, Forestry and Fishing	-0.24028**	0.08744	0.786	-21
	Architectural, Engineering and Technical Services	0.0176	0.06114	1.018	2
	Computer System Design and Related Services	0.08241	0.05784	1.086	9
	Construction	-0.03076	0.05675	0.970	-3
	Education and Training	0.01205	0.04925	1.012	1
	Financial and Insurance Services	0.13943*	0.0686	1.150	15
	Health Care and Social Assistance: Doctors	0.11097	0.07372	1.117	12
	Health Care and Social Assistance: Nurses	-0.01107	0.05788	0.989	-1
	Information Media and Telecommunications	-0.01719	0.06496	0.983	-2
	Legal and Accounting Services	0.07906	0.07613	1.082	8
	Management Consulting and Other Professional Services	-0.06654	0.0582	0.936	-6
	Manufacturing	-0.11919*	0.05208	0.888	-11
	Mining	0.68578**	0.15345	1.985	99
	Not employed/No industry info	0.11825	0.075	1.126	13
	Other Services and Transport	-0.06301	0.04924	0.939	-6
	Public Administration and Safety	-0.18248**	0.06498	0.833	-17
	Retail Trade	-0.01297	0.05545	0.987	-1
	Wholesale Trade	-0.05227	0.05773	0.949	-5
Self-employed		-0.41493**	0.07086	0.660	-34
Region of employment Reference: Auckland	Canterbury Region	-0.07168*	0.03102	0.931	-7
	Other North Island	-0.00231	0.03319	0.998	0
	Other South Island	0.06257	0.03893	1.065	6
	Unknown	0.3545**	0.06396	1.425	43
	Waikato Region	-0.08441*	0.04141	0.919	-8
	Wellington Region	0.04221	0.03107	1.043	4
Gender	Male	0.01976	0.02057	1.020	2
Application location (first two years)	Onshore	-0.41624**	0.05277	0.660	-34
Application location (after two years)	Onshore	-0.15566**	0.05886	0.856	-14

Analysis of Maximum Likelihood Estimates		Coefficient	Standard error	Hazard ratio	% difference in hazard (to reference group)
Previous visa type/time in NZ (first two years) Reference: No previous visa/time in NZ	Student/work visa, 3-5 years	-0.56869**	0.0904	0.566	-43
	Student/work visa, up to 3 years	-0.52119**	0.08929	0.594	-41
	Visitor or other visa, any time	-0.20165**	0.05205	0.817	-18
	Work visa only, 1-3 years	-0.31912**	0.06934	0.727	-27
	Work visa only, 3-5 years	-0.61912**	0.09222	0.538	-46
	Work visa only, up to 1 year	-0.10391	0.06794	0.901	-10
Previous visa type/time in NZ (after two years) Reference: No previous visa/time in NZ	Student/work visa, 3-5 years	0.04929	0.09729	1.051	5
	Student/work visa, up to 3 years	0.0744	0.09685	1.077	8
	Visitor or other visa, any time	-0.11304	0.07212	0.893	-11
	Work visa only, 1-3 years	0.15844	0.08348	1.172	17
	Work visa only, 3-5 years	-0.10439	0.10107	0.901	-10
	Work visa only, up to 1 year	0.09789	0.08372	1.103	10
Age group (first two years) Reference: 31–35 years	25 years and under	0.04218	0.05299	1.043	4
	26–30 years	0.02035	0.04169	1.021	2
	36–40 years	-0.03027	0.0456	0.970	-3
	Over 40	0.04902	0.04215	1.050	5
Age group (after two years) Reference: 31–35	25 years and under	0.31073**	0.04851	1.364	36
	26–30 years	0.15038**	0.04071	1.162	16
	36–40 years	-0.13007**	0.04826	0.878	-12
	40+ years	-0.11689*	0.04605	0.890	-11
Qualification points	50 points claimed	0.0412	0.02849	1.042	4
	55 points claimed	0.24835**	0.03769	1.282	28
Country of origin (first two years) Reference: UK/Ireland	China	0.27271**	0.06742	1.314	31
	Europe	0.09246	0.05317	1.097	10
	India	-0.11201	0.06302	0.894	-11
	Other	0.09171	0.07463	1.096	10
	Other Asia	0.11742	0.0604	1.125	12
	Pacific	-0.73248**	0.0965	0.481	-52
	Philippines	-0.91688**	0.08836	0.400	-60
	South Africa	-0.41682**	0.0584	0.659	-34
	South Korea	-0.20374	0.13023	0.816	-18
	US/Canada	0.61757**	0.04928	1.854	85
Country of origin (after two years) Reference: UK/Ireland	China	0.65873**	0.0603	1.932	93
	Europe	0.4874**	0.05019	1.628	63
	India	0.07119	0.06148	1.074	7
	Other	0.24983**	0.07331	1.284	28
	Other Asia	0.55563**	0.05673	1.743	74
	Pacific	-0.91487**	0.12018	0.401	-60
	Philippines	-0.48076**	0.09181	0.618	-38
	South Africa	-0.3373**	0.06417	0.714	-29
	South Korea	0.47295**	0.09634	1.605	60
	US/Canada	0.78603**	0.05491	2.195	119
year2004		-0.25836	0.30828	0.772	-23
year2005		0.02189	0.14191	1.022	2
year2006		0.25233*	0.11645	1.287	29
year2007		0.21129*	0.09436	1.235	24
year2008		0.18203*	0.07409	1.200	20
year2009		0.05265	0.05667	1.054	5
year2010		0.04818	0.0435	1.049	5
year2011		0	.		

Notes:* Variables significant at the .05 level. ** Variables significant at the .01 level. Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days. The "student/work" group includes migrants who had only a previous student visa and those who had both a previous student and a previous work visa.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

6   CONCLUSION

This study estimates that 25 percent of skilled migrants to New Zealand remigrate, either back home or to another country, within five years of taking up residence. While exactly comparable figures are not available, this remigration rate is in the lower range of those international studies that have been done on migrant remigration.

The study also observes that a migrant's risk of leaving is relatively steady in their first two years of settlement. At two years, the risk of leaving spikes and then stabilises four months later at a higher level but declining over time. This two year point is significant because after two years of residing in New Zealand (with certain conditions) migrants earn an indefinite right to return to New Zealand should they choose to remigrate to another country (see next section).

The spike in the risk of leaving at two years is due to migrants with particular characteristics being more likely to leave at this point. These groups include migrants aged 30 or younger, single migrants without children, former students, and migrants from Asia (excluding India), especially those from China. While there is considerable overlap between some of these groups, the regression modelling showed that age, bringing a partner or children, previous visa type, and country of origin all had an effect on retention after accounting for other factors.

Some variables were found to have quite different effects on retention before and after the two-year point. Migrants of all ages were similarly likely to leave during the first two years of residence. After two years, however, younger groups were more likely to leave and older groups were less likely to leave. Migrants who had previously held a student visa for any length of time or a work visa for three years or more were least likely to leave in the first two years. Those who had not been to New Zealand before or who had held a work visa for one year or less were most likely to leave during this period. After two years, however, remigration rates did not differ by the type and duration of a migrant's previous visa.

For other variables, the direction of the effect on remigration remained the same before and after two years, but the magnitude was different. For example, migrants from countries with a higher likelihood of leaving in the first two years[17] such as migrants from US/Canada or China were even more likely to leave after two years (three times more likely in the case of migrants from China). Migrants from Asia (excluding India[18] and China) and Europe had similar remigration rates to UK/Irish migrants in the first two years, but were significantly more likely to leave after two years. Migrants from South Africa, the Philippines and the Pacific Islands were less likely to leave at any time.

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[17] Relative to migrants from the UK/Ireland.

[18] Migrants from India did not have significantly different remigration rates, both before and after two years, than did migrants from the UK/Ireland.

Family characteristics were also important with migrants who were single and childless when they applied for residence more likely to leave than those with partners and/or children. Gender and region of settlement, on the other hand, had small or insignificant effects on the likelihood of remigration.

7 POLICY DISCUSSION

While the reasons skilled migrants remigrate are complex and not fully understood, this research has shown that some skilled migrants are more likely to remigrate than others. In light of these results, this section discusses some of the current policies affecting the retention of these groups and how these policies might be changed to improve retention outcomes.

7.1 Retention monitoring

Previous research has found that the benefits of migration to New Zealand increase the longer migrants stay in New Zealand. Since migrant retention is an outcome of policy interest, it is important to monitor migrant retention on a regular basis and support migrants with the greatest likelihood of leaving. Currently, the number of migrants who are long-term absent[19] is collected and reported annually in the Ministry of Business, Innovation and Employment's migration trends and outlook report (for example, MBIE, 2013). This information could be broken down by migrant characteristics associated with historically poor retention and be used by Immigration New Zealand's Settlement Services. Regular monitoring of the retention figures for these groups could help Immigration New Zealand target its services to the migrants most likely to remigrate.

7.2 Points given for age

The Skilled Migrant Category (SMC) points system offers the most points to applicants aged 20–29 and fewer points for older age groups. The intent of this policy is "to recognise the ability of younger people to make a long term contribution to New Zealand" (Immigration New Zealand, 2013). The notion is that if younger migrants settle permanently, they will contribute more over the course of their lifetime than will older migrants. This is true, however, only if younger migrants settle for longer than older migrants. This report finds that SMC migrants aged 30 or younger, particularly those aged 25 and younger, are much more likely to leave than those aged over 30, especially once they have earned a permanent residence visa (see section 7.3). This result has been found internationally (McKenzie, 2007) and it is also true for young native-born New Zealanders (MBIE, 2012). It may be unreasonable to expect then that younger migrants, especially those with high skill levels, will settle permanently or even as long as older migrants will.

One way to address this issue would be to offer more points for migrants in their late 20s and early 30s. Responding to employer pressure, Australia changed its age-points scale and now offers the most points to migrants aged 25–32 rather than those aged 18–29 as it had before 1 July 2011 (DIAC, 2011). There is scope for New Zealand to review the number of points it offers for age and consider similar changes to improve retention.

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[19] Long-term absent means gone from New Zealand for six months or more.

7.3   Indefinite right of return

The spike in the hazard of leaving at two years raises questions about the current settings around travel restrictions for permanent migrants and when they earn the indefinite right of return if they remigrate. Currently, almost all New Zealand residence visas, including those given to SMC migrants, have travel restrictions for the first two years of residence. After two years, migrants may apply for a permanent residence visa, which grants them an indefinite right to leave and return to New Zealand as they please. New Zealand is unique within the English-speaking world in offering an unlimited right of return to non-citizens. Skilled migrants in Australia and Canada must renew their right of return every five years and migrants with residence and work rights in the US risk losing them if they are outside the country for more than 365 days without a re-entry permit (730 days in the UK).

The intention of these policies is to reward migrants with return rights if they show a willingness to settle long term in their host country. In the case of New Zealand, a migrant must "demonstrate a commitment to New Zealand" to earn a permanent residence visa by meeting one of five conditions listed in the *Immigration New Zealand Operational Manual* (INZ, 2013).

1. The migrant must have spent at least 184 days of each of the preceding two years in New Zealand.

2. The migrant must have spent at least 41 days of each of the preceding two years in New Zealand, and they are assessed as having tax residence status in New Zealand for the past two years.

3. The migrant must have maintained an investment of $1 million or more for 24 months after the residence visa was granted.

4. The migrant must have established a business or purchased a 25 percent shareholding in an established business.

5. The migrant must have established a "base" in New Zealand. This is true if the migrant has purchased a home, and all of their immediate family have been in New Zealand for 184 days of each of the preceding two years, and the migrant has spent at least 41 days of each of the preceding two years in New Zealand.

Most SMC migrants who take up residence for two years will be entitled to a permanent residence visa by meeting the first condition. Since this study finds certain groups are more likely to leave after this two-year point than others,[20] it may be worth considering how a change in the way permanent residence visas are granted could improve their retention. While the study model shows that country of origin, age, and previous visa type all have their own individual effects on retention, these groups are also quite connected. Previous students make up 80 percent of the 25 and under age group and 42 percent of the 26-30 age group. Former students are also predominantly from Asia with non-Asian migrants making up only 10 percent of this population. China is highly

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[20] These include migrants aged under 30, singles without children, former students, and migrants from Asia (excluding India) and especially China.

represented in this group, accounting for around 60 percent of all previous students.[21]

Changes aimed at the retention of a group defined by one characteristic, therefore, are likely to have spillover effects for groups defined by other characteristics. This means that the retention of a number of these groups could be affected by one well-targeted policy. For example, an age requirement, in addition to the two-year waiting period, could smooth the attrition of migrants overall and better fulfil the intention of the permanent residence visa policy to offer the right of return to those migrants with an enduring commitment to settlement in New Zealand.

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[21] In fact, 95 percent of Chinese migrants through the SMC have been former students.

8   FUTURE RESEARCH

This paper expands on previous retention research to offer an insight into the number of skilled migrants who remigrate after taking up residence in New Zealand, how their hazard of leaving changes over time, and which migrants are more or less likely to remigrate.

There are several questions that would benefit from further investigation. Data limitations constrained the timeframe of this report to the five years after a migrant took up residence. Once more data is available, researchers will be able to examine the remigration patterns of migrants after 10 or 15 years in New Zealand and see what effect, if any, the opportunity to take up citizenship at five years has on their retention.

This study found evidence that the risk of remigration is greatest once migrants earn the indefinite right to return to New Zealand. It is yet unclear how many migrants are living abroad with the right to return to New Zealand. Combined with emigrant New Zealanders, these migrants could represent a large population with the right to entitlements in New Zealand should they return. Further research is needed to fully understand these stocks and flows and their implications for New Zealand.

New Zealand is one of the most generous countries internationally in terms of the rights it offers to migrants with permanent residence status. Once a migrant earns a permanent residence visa, they are afforded nearly all the same rights as New Zealand citizens. It may be that these settings are an important incentive to attract skilled migrants but this notion has yet to be tested empirically. Further research is needed to understand how these settings affect migrant settlement decisions.

It is a priority of current immigration policy to build the study to residence pathway for migrants studying in New Zealand's tertiary education system. Since this study finds former students have a higher risk than other groups of leaving after two years, more research is needed to understand this phenomenon and how the retention from this pathway could be improved.

APPENDICES

Appendix A: Descriptive statistics

Table A1: Study population characteristics

Characteristic	Count	Percentage of total (%)
Year of residence		
2004	2,664	4
2005	11,598	16
2006	11,316	16
2007	11,511	16
2008	11,682	16
2009	10,683	15
2010	10,998	15
2011	2,514	3
Partnership		
Single	31,512	43
Partner	41,460	57
Number of children		
0	47,082	65
1	9,102	12
2	11,820	16
3 or more	4,965	7
Industry of first employment		
Accommodation and Food Services	5,988	8
Agriculture, Forestry and Fishing	1,431	2
Architectural, Engineering and Technical Services	2,451	3
Computer System Design and Related Services	3,075	4
Construction	5,166	7
Education and Training	5,499	8
Financial and Insurance Services	1,593	2
Health Care and Social Assistance: Doctors	1,428	2
Health Care and Social Assistance: Nurses	4,413	6
Health Care and Social Assistance: Others	3,816	5
Information Media and Telecommunications	2,220	3
Legal and Accounting Services	1,164	2
Management Consulting and Other Professional Services	3,042	4
Manufacturing	7,380	10
Mining	168	0.2
Not employed/No industry info	5,424	7
Other Services and Transport	7,866	11
Public Administration and Safety	2,706	4
Retail Trade	4,392	6
Wholesale Trade	3,744	5

Characteristic	Count	Percentage of total (%)
Self-employed		
Not self-employed	71,067	97
Self-employed	1,902	3
Region of first employment		
Auckland Region	32,085	44
Canterbury Region	7,959	11
Wellington Region	7,950	11
Other North Island	7,911	11
Waikato Region	4,809	7
Other South Island	4,623	6
Unknown	7,632	10
Gender		
Female	25,521	35
Male	47,451	65
Onshore or offshore application		
Offshore	12,993	18
Onshore	59,979	82
Previous visa type		
No previous visa	5,028	7
Visitor or other visa only	6,441	9
Student visa (or student and work visa)	20,538	28
Work visa only	40,965	56
Previous visa type/time in NZ before taking up residence		
No previous visa nor time in NZ	5,028	7
Visitor or other visa, any time	6,444	9
Student/work visa, up to 3 years	4,983	7
Student/work visa, 3–5 years	15,555	21
Work visa only, up to 1 year	13,704	19
Work visa only, 1–3 years	21,588	30
Work visa only, 3–5 years	5,670	8
Age group		
0–25 years	12,060	17
26–30 years	19,338	26
31–35 years	14,247	20
36–40 years	11,811	16
Over 40	15,519	21
Qualification points		
No qualification points claimed	16,776	23
Basic qualification (up to a bachelor's with honours)	49,506	68
Advanced qualification (masters or doctorate)	6,594	9

Characteristic	Count	Percentage of total (%)
Country of origin		
UK/Irish Republic	20,598	28
China	12,720	17
South Africa	7,428	10
India	6,390	9
Philippines	5,196	7
Europe	5,013	7
Other Asia	4,881	7
Pacific	3,552	5
US/Canada	2,985	4
Other	2,820	4
South Korea	1,389	2
Total	**72,876**	

Notes: The counts and totals for each characteristic have been randomly rounded to ensure the confidentiality of individuals within the population. The "student/work" group includes migrants who had only a previous student visa and those who had both a previous student and a previous work visa. Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Appendix B: Additional regression results

Table B1: Results of Cox proportional hazards models both individual models and the multivariate model (without interactions)

Analysis of Maximum Likelihood Estimates		Individual models			Multivariate model (without year2 interactions)		
Variable	**Subgroup**	**Coefficient**	**Standard error**	**Hazard ratio**	**Coefficient**	**Standard error**	**Hazard ratio**
Year of residence uptake Reference: 2005	2004	0.01642	0.03878	1.017	0.09816*	0.04345	1.103
	2006	-0.04569	0.02601	0.955	-0.05252	0.0346	0.949
	2007	-0.14185**	0.02806	0.868	-0.02724	0.05411	0.973
	2008	-0.08653**	0.03042	0.917	0.07106	0.07534	1.074
	2009	-0.21495**	0.04099	0.807	0.02929	0.10024	1.030
	2010	-0.28536**	0.05909	0.752	0.03524	0.12586	1.036
	2011	-0.29859	0.41146	0.742	-0.01437	0.4321	0.986
Have partner		-0.30901**	0.01805	0.734	-0.1073**	0.02217	0.898
Number of children Reference: 0 children	1	-0.41363**	0.03113	0.661	-0.17918**	0.03522	0.836
	2	-0.56103**	0.02865	0.571	-0.29624**	0.03485	0.744
	3 or more	-0.53497**	0.04199	0.586	-0.25695**	0.04699	0.773
Industry of first employment Reference: Health Care and Social Assistance (excluding doctors and nurses)	Accommodation and Food Services	0.01677	0.05091	1.017	-0.07604	0.05399	0.927
	Agriculture, Forestry and Fishing	-0.35623**	0.08539	0.700	-0.24255**	0.08743	0.785
	Architectural, Engineering and Technical Services	0.07471	0.05985	1.078	0.0104	0.06115	1.010
	Computer System Design and Related Services	0.16062**	0.05571	1.174	0.08456	0.05786	1.088
	Construction	-0.26915**	0.0543	0.764	-0.03702	0.05675	0.964
	Education and Training	0.13896**	0.04834	1.149	0.01127	0.04926	1.011
	Financial and Insurance Services	0.17471**	0.0673	1.191	0.13888*	0.0686	1.149
	Health Care and Social Assistance: Doctors	0.16683*	0.07224	1.182	0.12156	0.07373	1.129
	Health Care and Social Assistance: Nurses	-0.17367**	0.05637	0.841	-0.01005	0.05788	0.990
	Information Media and Telecommunications	0.0519	0.0632	1.053	-0.01914	0.06497	0.981
	Legal and Accounting Services	0.19955**	0.07501	1.221	0.07837	0.07613	1.082
	Management Consulting and Other Professional Services	0.04493	0.05723	1.046	-0.07003	0.05822	0.932
	Manufacturing	-0.2764**	0.05002	0.759	-0.12642*	0.05208	0.881
	Mining	0.62391**	0.15226	1.866	0.69901**	0.1534	2.012
	Not employed/No industry info	0.59924**	0.0463	1.821	0.11803	0.07491	1.125
	Other Services and Transport	-0.07426	0.04756	0.928	-0.06367	0.04924	0.938
	Public Administration and Safety	-0.17273**	0.06295	0.841	-0.18243**	0.06497	0.833
	Retail Trade	0.07942	0.05293	1.083	-0.01926	0.05546	0.981
	Wholesale Trade	-0.07512	0.05586	0.928	-0.04895	0.05773	0.952
Self-employed		0.07158	0.05172	1.074	-0.41904**	0.07071	0.658

Analysis of Maximum Likelihood Estimates		Individual models			Multivariate model (without year2 interactions)		
Variable	Subgroup	Coefficient	Standard error	Hazard ratio	Coefficient	Standard error	Hazard ratio
Region of employment Reference: Auckland	Canterbury Region	0.00629	0.03041	1.006	-0.06424*	0.03102	0.938
	Other North Island	-0.04468	0.03212	0.956	-0.00265	0.0332	0.997
	Other South Island	0.09749**	0.03787	1.102	0.06294	0.03893	1.065
	Unknown	0.52759**	0.02694	1.695	0.35052**	0.06383	1.420
	Waikato Region	-0.13967**	0.04093	0.870	-0.08267*	0.04141	0.921
	Wellington Region	0.09057**	0.03042	1.095	0.04233	0.03108	1.043
Gender	Male	-0.12615**	0.0186	0.881	0.01677	0.02057	1.017
Onshore or offshore application	Onshore	-0.23304**	0.02174	0.792	-0.29717**	0.039	0.743
Previous visa type/time in NZ Reference: No previous visa/time in NZ	Student/work visa, 3–5 years	0.09536**	0.03537	1.100	-0.31377**	0.06499	0.731
	Student/work visa, up to 3 years	-0.03292	0.04508	0.968	-0.26601**	0.0644	0.766
	Visitor or other visa, any time	-0.1218**	0.04147	0.885	-0.18857**	0.04232	0.828
	Work visa only, 1–3 years	-0.3609**	0.03578	0.697	-0.13725**	0.05301	0.872
	Work visa only, 3–5 years	-0.58052**	0.05235	0.560	-0.41694**	0.06785	0.659
	Work visa only, up to 1 year	-0.37105**	0.03749	0.690	-0.06562	0.05253	0.936
Age group Reference: 31–35 years	25 years and under	0.38913**	0.02865	1.476	0.20154**	0.03589	1.223
	26–30 years	0.20515**	0.02715	1.228	0.0894**	0.02931	1.094
	36–40 years	-0.13624**	0.03241	0.873	-0.07569*	0.03346	0.927
	Over 40	-0.05926*	0.02976	0.942	-0.01634	0.03147	0.984
Qualification points Reference: 0 points claimed	50 points claimed	0.35219**	0.02509	1.422	0.0395	0.02848	1.040
	55 points claimed	0.72287**	0.03334	2.060	0.25059**	0.03769	1.285
Country of origin Reference: UK/Ireland	China	0.44165**	0.02464	1.555	0.48288**	0.04523	1.621
	Europe	0.2437**	0.03535	1.276	0.30436**	0.03655	1.356
	India	-0.06165	0.03837	0.940	-0.01242	0.0447	0.988
	Other	0.00389	0.05066	1.004	0.18482**	0.05246	1.203
	Other Asia	0.26416**	0.03664	1.302	0.35842**	0.04143	1.431
	Pacific	-0.93873**	0.07401	0.391	-0.78242**	0.07551	0.457
	Philippines	-0.90129**	0.06202	0.406	-0.69618**	0.06423	0.498
	South Africa	-0.56221**	0.04193	0.570	-0.35658**	0.04359	0.700
	South Korea	-0.03573	0.07276	0.965	0.20182**	0.07722	1.224
	US/Canada	0.80691**	0.03565	2.241	0.71224**	0.03731	2.039
year 2004		-0.17556	0.27166	0.839	-0.17725	0.30814	0.838
year 2005		0.05143	0.06668	1.053	0.05188	0.14176	1.053
year 2006		0.28918**	0.0495	1.335	0.26772*	0.1163	1.307
year 2007		0.20978**	0.04478	1.223	0.20413*	0.09411	1.226
year 2008		0.17294**	0.04292	1.189	0.15473*	0.07392	1.167
year 2009		0.03484	0.04238	1.035	0.01808	0.05661	1.018
year 2010		0.04364	0.04103	1.045	0.03524	0.04351	1.036
year 2011					0	.	

Notes:* Variables significant at the .05 level. ** Variables significant at the .01 level. The "student/work" group includes migrants who had only a previous student visa and those who had both a previous student and a previous work visa. Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Table B2: Results of the Cox proportional hazards model (with interactions) – if time in New Zealand is less than two years, year2 = 0

Analysis of Maximum Likelihood Estimates		Coefficient	Standard error
Year of residence uptake Reference: 2005	2004	0.11627**	0.04354
	2006	-0.06412	0.03464
	2007	-0.0441	0.05418
	2008	0.07066	0.07537
	2009	0.05268	0.10031
	2010	0.07228	0.12607
	2011	-0.02257	0.43213
Partner		-0.15279**	0.03115
Partner*year2		0.08845*	0.02934
Number of children Reference: 0 children	1	-0.17123**	0.03526
	2	-0.28296**	0.03488
	3 or more	-0.23906**	0.04703
Industry of first employment Reference: Health Care and Social Assistance (excluding doctors and nurses)	Accommodation and Food Services	-0.06359	0.05398
	Agriculture, Forestry and Fishing	-0.24028**	0.08744
	Architectural, Engineering and Technical Services	0.0176	0.06114
	Computer System Design and Related Services	0.08241	0.05784
	Construction	-0.03076	0.05675
	Education and Training	0.01205	0.04925
	Financial and Insurance Services	0.13943*	0.0686
	Health Care and Social Assistance: Doctors	0.11097	0.07372
	Health Care and Social Assistance: Nurses	-0.01107	0.05788
	Information Media and Telecommunications	-0.01719	0.06496
	Legal and Accounting Services	0.07906	0.07613
	Management Consulting and Other Professional Services	-0.06654	0.0582
	Manufacturing	-0.11919*	0.05208
	Mining	0.68578**	0.15345
	Not employed/No industry info	0.11825	0.075
	Other Services and Transport	-0.06301	0.04924
	Public Administration and Safety	-0.18248**	0.06498
	Retail Trade	-0.01297	0.05545
	Wholesale Trade	-0.05227	0.05773
Self employed		-0.41493**	0.07086
Region of employment Reference: Auckland	Canterbury Region	-0.07168*	0.03102
	Other North Island	-0.00231	0.03319
	Other South Island	0.06257	0.03893
	Unknown	0.3545**	0.06396
	Waikato Region	-0.08441*	0.04141
	Wellington Region	0.04221	0.03107
Gender	Male	0.01976	0.02057
Application location	Onshore	-0.41624**	0.05277
Application location*year2	Onshore	0.26057**	0.05886
Previous visa type/time in NZ Reference: No previous visa/time in NZ	Student/work visa, 3-5 years	-0.56869**	0.0904
	Student/work visa, up to 3 years	-0.52119**	0.08929
	Visitor or other visa, any time	-0.20165**	0.05205
	Work visa only, 1-3 years	-0.31912**	0.06934
	Work visa only, 3-5 years	-0.61912**	0.09222
	Work visa only, up to 1 year	-0.10391	0.06794
Previous visa type/time in NZ*year2 Reference: No previous visa/time in NZ	Student/work visa, 3-5 years	0.61798**	0.09729
	Student/work visa, up to 3 years	0.59559**	0.09685
	Visitor or other visa, any time	0.08861	0.07212
	Work visa only, 1-3 years	0.47756**	0.08348
	Work visa only, 3-5 years	0.51472**	0.10107

Analysis of Maximum Likelihood Estimates		Coefficient	Standard error
	Work visa only, up to 1 year	0.20181	0.08372
Age group Reference: 31–35 years	25 years and under	0.04218	0.05299
	26–30 years	0.02035	0.04169
	36–40 years	-0.03027	0.0456
	Over 40	0.04902	0.04215
Age group*year2 Reference: 31–35 years	25 years and under	0.26855**	0.04851
	26–30 years	0.13002*	0.04071
	36–40 years	-0.09979	0.04826
	Over 40	-0.16591**	0.04605
Qualification points	50 points claimed	0.0412	0.02849
	55 points claimed	0.24835**	0.03769
Country of origin Reference: UK/Ireland	China	0.27271**	0.06742
	Europe	0.09246	0.05317
	India	-0.11201	0.06302
	Other	0.09171	0.07463
	Other Asia	0.11742	0.0604
	Pacific	-0.73248**	0.0965
	Philippines	-0.91688**	0.08836
	South Africa	-0.41682**	0.0584
	South Korea	-0.20374	0.13023
	US/Canada	0.61757**	0.04928
Country of origin*year2 Reference: UK/Ireland	China	0.38602**	0.0603
	Europe	0.39494**	0.05019
	India	0.1832*	0.06148
	Other	0.15812	0.07331
	Other Asia	0.43821**	0.05673
	Pacific	-0.18238	0.12018
	Philippines	0.43611**	0.09181
	South Africa	0.07953	0.06417
	South Korea	0.67669**	0.09634
	US/Canada	0.16846*	0.05491
year 2004		-0.25836	0.30828
year 2005		0.02189	0.14191
year 2006		0.25233*	0.11645
year 2007		0.21129*	0.09436
year 2008		0.18203*	0.07409
year 2009		0.05265	0.05667
year 2010		0.04818	0.0435

Notes:* Variables significant at the .05 level. ** Variables those significant at the .01 level. The "student/work" group includes migrants who had only a previous student visa and those who had both a previous student and a previous work visa. Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Table B3: Results of the Cox proportional hazards model (with interactions) – if time in New Zealand is less than two years, year2 = 1

Analysis of Maximum Likelihood Estimates		Coefficient	Standard error
Year of residence uptake Reference: 2005	2004	0.11627**	0.04354
	2006	-0.06412	0.03464
	2007	-0.0441	0.05418
	2008	0.07066	0.07537
	2009	0.05268	0.10031
	2010	0.07228	0.12607
	2011	-0.02257	0.43213
Partner		-0.08845*	0.04113
Partner*year2		-0.06434*	0.02934
Number of children Reference: 0 children	1	-0.17123**	0.03526
	2	-0.28296**	0.03488
	3 or more	-0.23906**	0.04703
Industry of first employment Reference: Health Care and Social Assistance (excluding doctors and nurses)	Accommodation and Food Services	-0.06359	0.05398
	Agriculture, Forestry and Fishing	-0.24028**	0.08744
	Architectural, Engineering and Technical Services	0.0176	0.06114
	Computer System Design and Related Services	0.08241	0.05784
	Construction	-0.03076	0.05675
	Education and Training	0.01205	0.04925
	Financial and Insurance Services	0.13943*	0.0686
	Health Care and Social Assistance: Doctors	0.11097	0.07372
	Health Care and Social Assistance: Nurses	-0.01107	0.05788
	Information Media and Telecommunications	-0.01719	0.06496
	Legal and Accounting Services	0.07906	0.07613
	Management Consulting and Other Professional Services	-0.06654	0.0582
	Manufacturing	-0.11919*	0.05208
	Mining	0.68578**	0.15345
	Not employed/No industry info	0.11825	0.075
	Other Services and Transport	-0.06301	0.04924
	Public Administration and Safety	-0.18248**	0.06498
	Retail Trade	-0.01297	0.05545
	Wholesale Trade	-0.05227	0.05773
Self employed		-0.41493**	0.07086
Region of employment Reference: Auckland	Canterbury Region	-0.07168*	0.03102
	Other North Island	-0.00231	0.03319
	Other South Island	0.06257	0.03893
	Unknown	0.3545**	0.06396
	Waikato Region	-0.08441*	0.04141
	Wellington Region	0.04221	0.03107
Gender	Male	0.01976	0.02057
Application location	Onshore	-0.26057**	0.07881
Application location*year2	Onshore	-0.15566**	0.05886
Previous visa type/time in NZ Reference: No previous visa/time in NZ	Student/work visa, 3-5 years	-0.61798**	0.13207
	Student/work visa, up to 3 years	-0.59559**	0.13097
	Visitor or other visa, any time	-0.08861	0.08867
	Work visa only, 1-3 years	-0.47756**	0.10753
	Work visa only, 3-5 years	-0.51472**	0.135
	Work visa only, up to 1 year	-0.20181	0.10716
Previous visa type/time in NZ*year2	Student/work visa, 3-5 years	0.04929	0.09729

Analysis of Maximum Likelihood Estimates		Coefficient	Standard error
Reference: No previous visa/time in NZ	Student/work visa, up to 3 years	0.0744	0.09685
	Visitor or other visa, any time	-0.11304	0.07212
	Work visa only, 1-3 years	0.15844	0.08348
	Work visa only, 3-5 years	-0.10439	0.10107
	Work visa only, up to 1 year	0.09789	0.08372
Age group	25 years and under	-0.26855**	0.07121
Reference: 31–35 years	26–30 years	-0.13002*	0.05789
	36–40 years	0.09979	0.06569
	Over 40	0.16591**	0.06147
Age group*year2	25 years and under	0.31073**	0.04851
Reference: 31–35 years	26–30 years	0.15038**	0.04071
	36–40 years	-0.13007**	0.04826
	Over 40	-0.11689*	0.04605
Qualification points	50 points claimed	0.0412	0.02849
	55 points claimed	0.24835**	0.03769
Country of origin	China	-0.38602**	0.08938
Reference: UK/Ireland	Europe	-0.39494**	0.07278
	India	-0.1832*	0.08657
	Other	-0.15812	0.10426
	Other Asia	-0.43821**	0.08229
	Pacific	0.18238	0.15341
	Philippines	-0.43611**	0.12629
	South Africa	-0.07953	0.0859
	South Korea	-0.67669**	0.16136
	US/Canada	-0.16846*	0.07256
Country of origin*year2	China	0.65873**	0.0603
Reference: UK/Ireland	Europe	0.4874**	0.05019
	India	0.07119	0.06148
	Other	0.24983**	0.07331
	Other Asia	0.55563**	0.05673
	Pacific	-0.91487**	0.12018
	Philippines	-0.48076**	0.09181
	South Africa	-0.3373**	0.06417
	South Korea	0.47295**	0.09634
	US/Canada	0.78603**	0.05491
year 2004		-0.25836	0.30828
year 2005		0.02189	0.14191
year 2006		0.25233*	0.11645
year 2007		0.21129*	0.09436
year 2008		0.18203*	0.07409
year 2009		0.05265	0.05667
year 2010		0.04818	0.0435

Notes:* Variables significant at the .05 level. ** Variables significant at the .01 level. The "student/work" group includes migrants who had only a previous student visa and those who had both a previous student and a previous work visa. Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Table B4: Percentage difference in the likelihood of remigration for all variables

Analysis of Maximum Likelihood Estimates		Multivariate model without year 2 interactions	Multivariate model with year2 interactions (where significant)		
Variable	Subgroup	Five years (%)	Five years (%)	Before 2 years (%)	After 2 years (%)
Year of residence uptake Reference: 2005	2004	10*	12**		
	2006	-5	-6		
	2007	-3	-4		
	2008	7	7		
	2009	3	5		
	2010	4	7		
	2011	-1	-2		
Have partner		-10**		-14**	-6*
Number of children Reference: 0 children	1	-16**	-16**		
	2	-26**	-25**		
	3 or more	-23**	-21**		
Industry of first employment Reference: Health Care and Social Assistance (excluding doctors and nurses)	Accommodation and Food Services	-7	-6		
	Agriculture, Forestry and Fishing	-22**	-21**		
	Architectural, Engineering and Technical Services	1	2		
	Computer System Design and Related Services	9	9		
	Construction	-4	-3		
	Education and Training	1	1		
	Financial and Insurance Services	15*	15*		
	Health Care and Social Assistance: Doctors	13	12		
	Health Care and Social Assistance: Nurses	-1	-1		
	Information Media and Telecommunications	-2	-2		
	Legal and Accounting Services	8	8		
	Management Consulting and Other Professional Services	-7	-6		
	Manufacturing	-12*	-11*		
	Mining	101**	99**		
	Not employed/No industry information	13	13		
	Other Services and Transport	-6	-6		
	Public Administration and Safety	-17**	-17		
	Retail Trade	-2	-1		
	Wholesale Trade	-5	-5		
Self employed		-34**	-34**		
Region of employment Reference: Auckland	Canterbury Region	-6*	-7*		
	Other North Island	0	0		
	Other South Island	6	6		
	Unknown	42**	43**		
	Waikato Region	-8*	-8*		
	Wellington Region	4	4		
Gender	Male	2	2		
Onshore/offshore application	Onshore	-26**		-34**	-14**

| Analysis of Maximum Likelihood Estimates		Multivariate model without year 2 interactions	Multivariate model with year2 interactions (where significant)		
Variable	Subgroup	Five years (%)	Five years (%)	Before 2 years (%)	After 2 years (%)
Previous visa type/time before taking up residence Reference: No previous visa/time in NZ	Student/work visa, 3-5 years	-27**		-43**	5
	Student/work visa, up to 3 years	-23**		-41**	8
	Visitor or other visa, any time	-17**		-18**	-11
	Work visa only, 1–3 years	-13**		-27**	17
	Work visa only, 3–5 years	-34**		-46**	-10
	Work visa only, up to 1 year in NZ	-6		-10	10
Age group Reference: 31–35 years	25 years and under	22**		4	36**
	26–30 years	9**		2	16**
	36–40 years	-7*		-3	-12**
	Over 40	-2		5	-11*
Qualification points Reference: 0 points claimed	50 points claimed	4	4		
	55 points claimed	28**	28**		
Country of origin Reference: UK/Ireland	China	62**		31**	93**
	Europe	36**		10	63**
	India	-1		-11	7
	Other	20**		10	28**
	Other Asia	43**		12	74**
	Pacific	-54**		-52**	-60**
	Philippines	-50**		-60**	-38**
	South Africa	-30**		-34**	-29**
	South Korea	22**		-18	60**
	US/Canada	104**		85**	119**
year 2004		-16	-23		
year 2005		5	2		
year 2006		31*	29*		
year 2007		23*	24*		
year 2008		17*	20*		
year 2009		2	5		
year 2010		4	5		
year 2011					

Note: * Variables significant at the .05 level. ** Variables significant at the .01 level.

Note: These are derived from the estimated hazard ratios in the final multivariate model. The standard way of interpreting the hazard ratio is to subtract 1 and multiply by 100. This shows the percentage difference in the likelihood of remigration, when compared to the reference group. Up to 1 year = 0–364 days; 1–3 years = 365–1,094 days; 3–5 years = 1,095–1,825 days.

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.
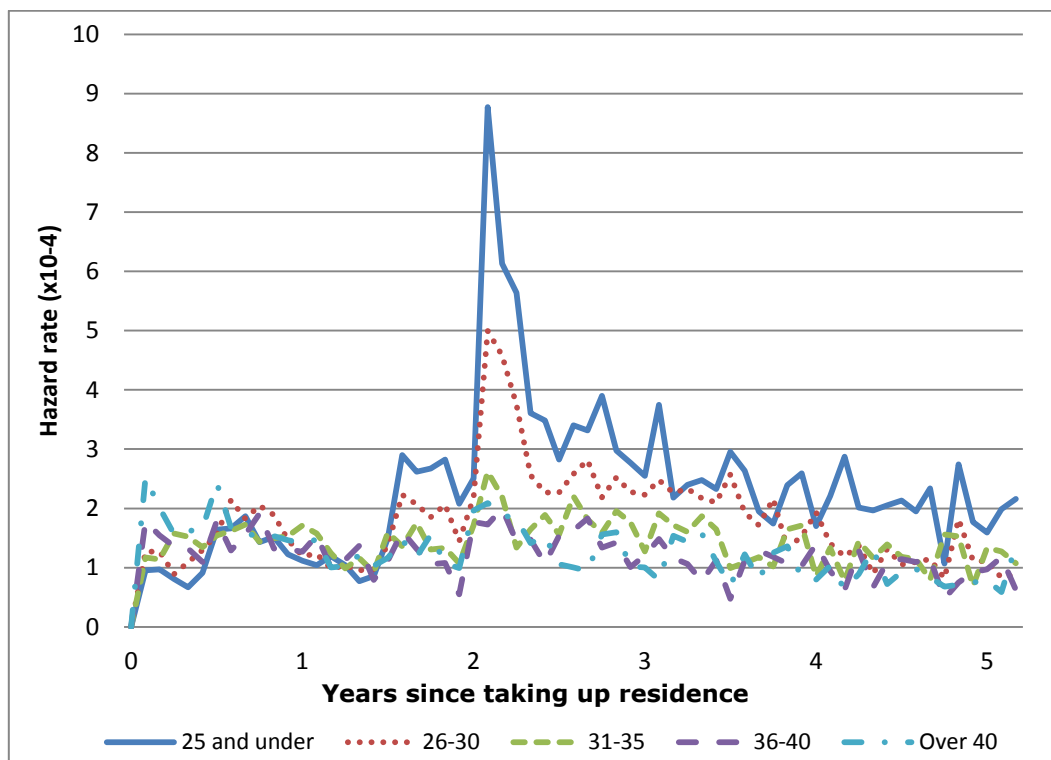
Appendix C: Selected hazard curves
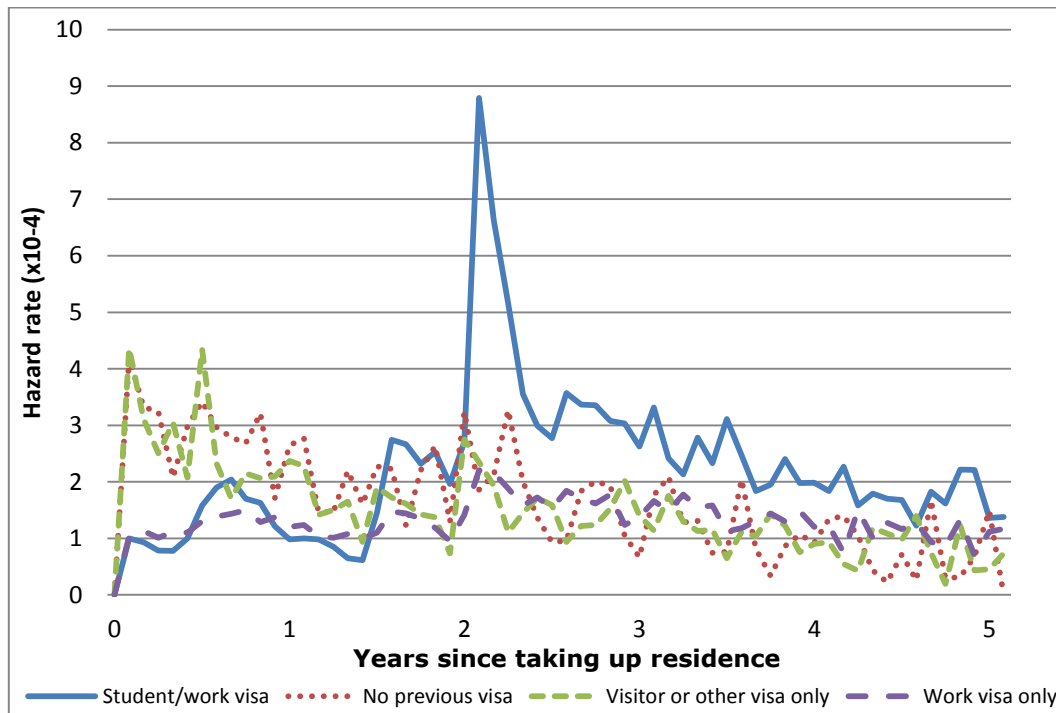
Figure C1: Hazard curves – partnership
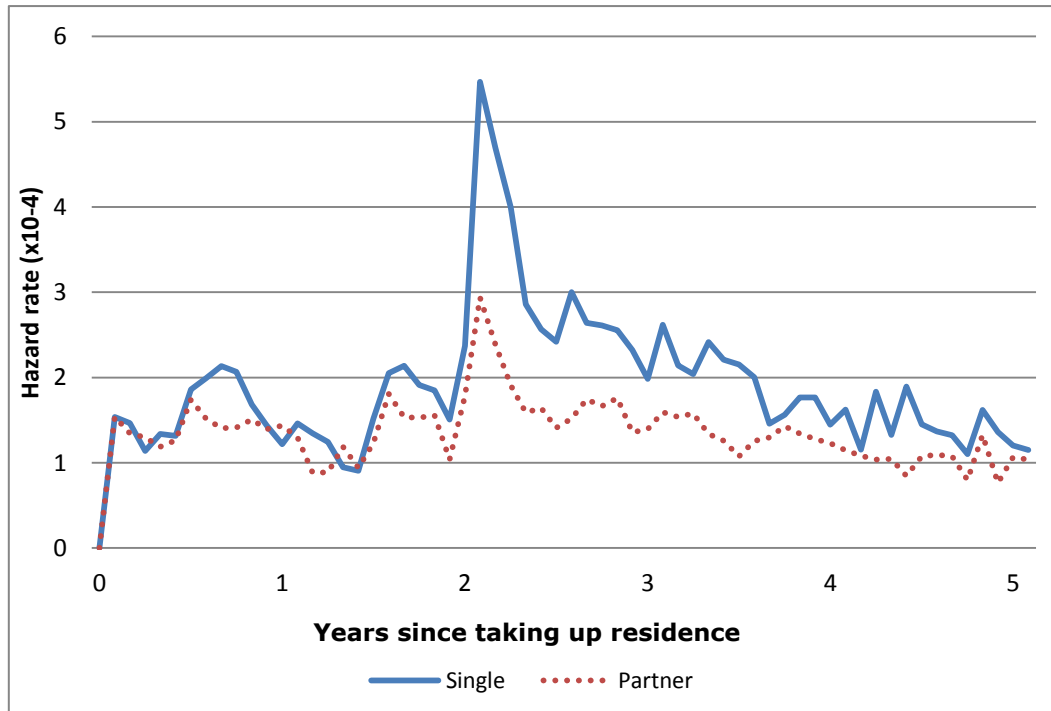
Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.
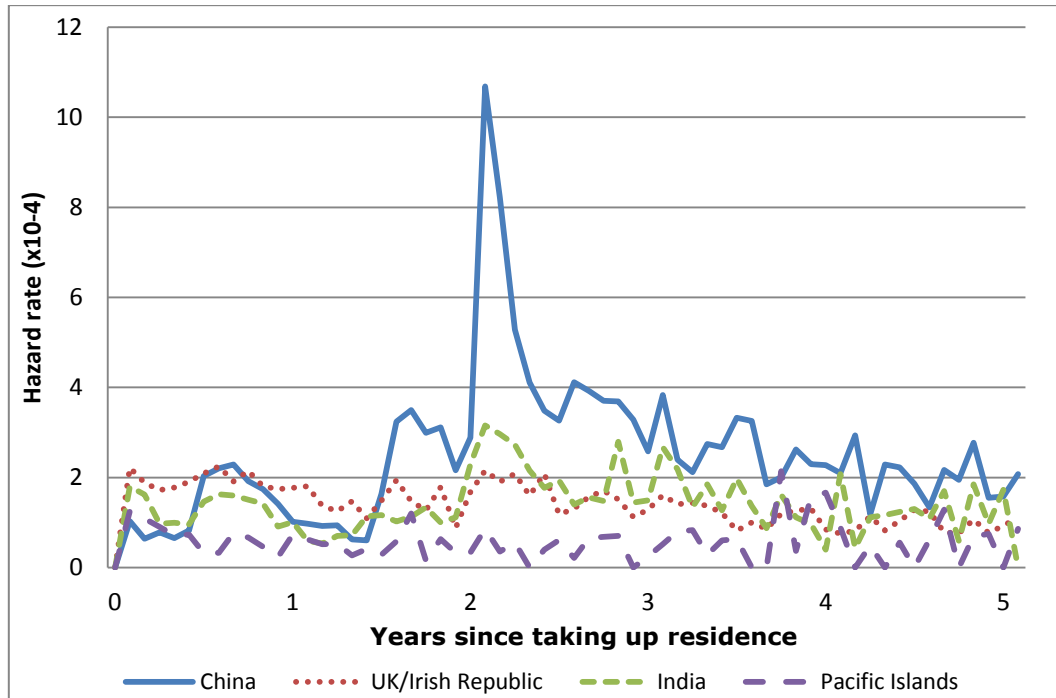
Figure C2: Hazard curves – age groups

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

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Figure C3: Hazard curves – previous visa type

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

Figure C4: Hazard curves – country of origin (selected countries)

Source: Figures have been extracted from the Integrated Data Infrastructure managed by Statistics New Zealand.

REFERENCES

Allison, P (2010) *Survival Analysis Using SAS.* Second edition. Cary, NC: SAS Institute.

Aydemir, A, and Robinson, C (2008) 'Global markets, return, and onward migration.' *Canadian Journal of Economics* 41(4): 1,285–1,311.

Beenstock, M (1996) 'Failure to absorb: remigration by immigrants into Israel.' *International Migration Review* 30(4): 950–978. Available at www.jstor.org/stable/2547599

Beggs, JJ, and Chapman, B (1991) 'Male immigrant wage and unemployment experience in Australia.' In JM Abowd and RB Freeman (eds) *Immigration, Trade, and the Labor Market*. Chicago: University of Chicago Press.

Bijwaard, GE (2004) 'Dynamic economic aspects of migration.' *Medium Econometrische Toepassingen* 12-3: 26–30.

Bijwaard, GE (2007) *Modelling Migration Dynamics of Immigrants: The case of the Netherlands*. IZA Discussion Paper 2891. Bonn: Institute for the Study of Labour (IZA).

Borjas, GJ, and Bratsberg, B (1996) 'Who leaves? The outmigration of the foreign-born.' *Review of Economics and Statistics* 78: 165–176.

Bratsberg, B, Raaum, O, and Sorlie, K (2007) 'Foreign-born migration to and from Norway.' In Ç Özden and M Schiff (eds), *International Migration, Economic Development and Policy*. New York: Palgrave Macmillan.

Castles, S, and Miller, MJ (1998) *The Age of Migration*. New York: Guilford Publications.

Constant, A, and Zimmermann, KF (2003) *Circular Movements and Time Away for the Host Country*. IZA Discussion Paper 960. Bonn: Institute for the Study of Labour (IZA).

Constant, A, and Zimmermann, KF (2007) *Circular Migration: Counts of exits and years away for the host country.* IZA Discussion Paper 2999. Bonn: Institute for the Study of Labour (IZA).

Cox, DR (1972) 'Regression models and life-tables.' *Journal of the Royal Statistical Society. Series B (Methodological)* 34(2):187–220.

De Coulon, A, and Wolff, F-C (2006) *The Location of Immigrants at Retirement: Stay/return or 'va-et-vient'?* IZA Discussion Paper 2224. Bonn: Institute for the Study of Labour (IZA).

Department of Labour (2009) 'Foreword.' In *Migration Trends and Outlook 2008/09*. Wellington: Department of Labour. Available at www.dol.govt.nz/publications/research/migration-outlook-200809/index.asp

DIAC (2011) *1 July 2011: Points test for certain skilled migration visas.* Australia: Department of Immigration and Citizenship. www.immi.gov.au/skilled/general-skilled-migration/pdf/points-test.pdf

Dustmann, C (2007) *Return Migration, Investment in Children, and Intergenerational Mobility: Comparing sons of foreign and native born fathers.* IZA Discussion Paper 3080. Bonn: Institute for the Study of Labour (IZA).

Dustmann, C, and Weiss, Y (2007) 'Return migration: Theory and empirical evidence from the UK.' *British Journal of Industrial Relations* 45: 236–256.

Immigration New Zealand (2013) *Immigration New Zealand Operational Manual*. Section SM18.1. Wellington: Ministry of Business, Innovation and Employment. Available at www.immigration.govt.nz/opsmanual/30599.htm

Jensen, P, and Pedersen, PJ (2007) 'To stay or not to stay? Out-migration of immigrants from Denmark.' *International Migration* 45(5): 87–113.

Khawaja, M, and Boddington, B (2010) 'Informing the debate on population ageing in New Zealand: The role of Statistics New Zealand.' *New Zealand Population Review* 36: 117–135.

MBIE (2012) *Migrants in New Zealand: Retention and onward migration, 1998–2011*. Wellington: Ministry of Business, Innovation and Employment. Available at www.dol.govt.nz/publications/research/migrants-in-nz-retention-onward-migration-1998-2011/

MBIE (2013) *Migration Trends and Outlook 2011/12*. Wellington: Ministry of Business, Innovation and Employment. Available at www.dol.govt.nz/publications/research/migration-trends-1112/index.asp

McKenzie, DJ (2007) *A Profile of the World's Young Developing Country Migrants.* IZA Discussion Paper 2948. Bonn: Institute for the Study of Labour (IZA). Available at http://ftp.iza.org/dp2948.pdf

McLeod, K, Henderson, A, and Bryant, J (2010) *Leaving so Soon? Skilled migrants in New Zealand: Who stays and who goes?* Wellington: Department of Labour.

Nana, G, and Sanderson, K (2008) *Migrants and Labour Market Outcomes*. Wellington: Department of Labour. Available at www.dol.govt.nz/publications/research/migrant-types

Nana, G, Sanderson, K, and Hodgson, R (2009) *Economic Impacts of Immigration: Scenarios using a computable general equilibrium model of the New Zealand economy*. Wellington: Department of Labour. Available at www.dol.govt.nz/publications/research/cge/index.asp

Nekby, L (2006) 'The emigration of immigrants, return vs onward migration: Evidence from Sweden.' *Journal of Population Economics* 19(2): 197–226.

Newland, K, Agunias, DR, and Terrazas, A (2008) *Learning by Doing: Experiences of circular migration.* MPI Insight, September. Washington DC: Migration Policy Institute (MPI). Available at www.migrationpolicy.org/pubs/Insight-IGC-Sept08.pdf

NZIER (2012) *Demographic Change a Force that Firms Ignore at their Peril*. Insight 37. Wellington: New Zealand Institute for Economic Research. Available at http://nzier.org.nz/publications/demographic-change-a-force-that-firms-ignore-at-their-peril-nzier-insight-37

OECD (2008) 'Return migration: A new perspective.' In *International Migration Outlook SOPEMI – 2008 Edition*. Paris: Organisation for Economic Co-operation and Development.

Poot, J (2009) *Trans-Tasman Migration, Transnationalism and Economic Development in Australasia*. Motu Working Paper 09-05. Wellington: Motu Economic and Public Policy Research. Available at http://motu-www.motu.org.nz/wpapers/09_05.pdf

Reagan, PB, and Olsen, RJ (2000) 'You can go home again: Evidence from longitudinal data.' *Demography* 37(3): 339–350.

Ruddick, E (2008) 'Onward/circular migration and integration: A Canadian perspective.' Paper presented at the 13th International Metropolis Conference, Bonn, October 2008.

Shorland, P (2006) *People on the Move: A study of migrant movement patterns to and from New Zealand.* Wellington: Department of Labour.

Slack, A, Wu, J, and Nana, G (2007) *Fiscal Impact of Migrants to New Zealand 2005/06.* Economic Impacts of Immigration Working Paper Series. Wellington: Department of Labour. Available at www.dol.govt.nz/PDFs/fiscal-impacts-of-immigration-2005-06.pdf

Statistics New Zealand (no date) *How Researchers are Using the Integrated Data Infrastructure*. www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure/researchers-using-prototype-idi.aspx

Statistics New Zealand (no date) *Integrated Data Infrastructure*. www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx

Stillman, S, and Maré, DC (2009) *The Labour Market Adjustment of Immigrants in New Zealand*. Working paper. Wellington: Department of Labour. Available at www.dol.govt.nz/publications/research/lmainz/

Van Hook, J, Zhang, W, Bean, FD, and Passel, JS (2006) 'Foreign-born emigration: A new approach and estimates based on matched CPS files.' *Demography* 43(2): 361–382.

Winkelmann, L, and Winkelmann, R (1998) 'Immigrants in the New Zealand labour market: A cohort analysis using 1981, 1986 and 1996 census data.' *Labour Market Bulletin* 1 & 2: 34–70.