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Changes in social security eligibility and the international mobility of New Zealand citizens in Australia

Jacques Poot and Lynda Sanderson

Centre for Research and Analysis of Migration
Department of Economics, University College London
Drayton House, 30 Gordon Street, London WC1H 0AX

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Jacques Poot* and Lynda Sanderson†

* Population Studies Centre,
University of Waikato

† Ministry of Economic Development
Wellington, New Zealand

Non-Technical Abstract

This paper is concerned with the international mobility of New Zealanders who migrate to Australia. One in ten New Zealand citizens lives in Australia and their settlement and subsequent mobility is important from demographic, socio-economic and policy perspectives in both countries. Using a unique longitudinal dataset on New Zealand citizens arriving for a stay of 12 months or longer between 1 August 1999 and 31 July 2002, we track all subsequent moves of these migrants out of and back into Australia, up to July 2005. This allows us to assess the impact of the removal of labour market-related social security eligibility and some other policy changes affecting New Zealand migrants to Australia, implemented between February and June 2001. United Kingdom migrants to Australia, who were not affected by the policy changes, provide a 'control group'.

Using hazard models, we find that the policy changes increased the probability of remigration from Australia among those who had intended to settle permanently. Competing risk models suggested no difference between the impact of the policy changes on onward or return moves. Settlers arriving after the policy changes spend less time Australia and make more trips away than earlier migrants.

Centre for Research and Analysis of Migration
Department of Economics, Drayton House, 30 Gordon Street, London WC1H 0AX
Telephone Number: +44 (0)20 7679 5888
Facsimile Number: +44 (0)20 7916 2775

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Abstract

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Keywords: International Migration, International Travel, New Zealand, Australia, United Kingdom, Social Welfare, Immigration Policy, Selectivity

JEL Classification: C41, F22, J61

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[1] Population Studies Centre, University of Waikato, Private Bag 3105, Hamilton, New Zealand.
Email: jpoot@waikato.ac.nz

[2] Ministry of Economic Development, PO Box 1473, Wellington, New Zealand.
Email: Lynda.sanderson@med.govt.nz

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1. Introduction

The total number of international migrants in the world more than doubled since 1960 to almost 191 million in 2005, including 13.5 million refugees (United Nations, 2006). For many of these migrants there were significant administrative barriers prior to settlement in a host country, as governments try to control inward migration in order to avoid a potential avalanche of workers from low income countries. Sometimes, however, international movement is not subject to restrictions. A particularly good example, the focus of this paper, is the migration of citizens of Australia and New Zealand between their respective countries. Under the Trans-Tasman Travel Agreement (TTTA – referring to the Tasman Sea, which lies between the two countries), officially introduced in 1973 but effectively in force since the 1920s, citizens of Australia and New Zealand may freely live and work in each other's country.

The TTTA is effectively an open entry immigration policy. Until 2000 New Zealanders in Australia and Australians in New Zealand had the same rights as other non-citizen permanent residents. This changed in 2001, when new policies were introduced unilaterally by Australia that removed some of the rights of New Zealanders migrating across the Tasman subsequently. Specifically, New Zealanders can now no longer obtain Australian citizenship, nor are they eligible for social security while unemployed, unless they successfully apply for permanent residence, under the same immigration criteria in place for immigrants from other countries. The next section of the paper reviews the history of trans-Tasman migration and the background to these policy changes.

In this paper, we estimate the effect of these policy changes on the international mobility behaviour of New Zealanders by means of a unique longitudinal dataset provided by the former Australian Department of Immigration, Multicultural and Indigenous Affairs (DIMIA) that spans a period of both the old and the new policy regimes. The dataset contains all New Zealand citizens arriving for a stay of 12 months or longer between 1 August 1999 and 31 July 2002. We track all subsequent moves of these migrants out of and back into Australia, up to July 2005. United Kingdom migrants to Australia, who were not affected by the policy changes, provide a 'control group'.

Section 3 provides a theoretical framework that is particularly suitable for studying contemporary international mobility and the impact of the policy changes at the micro level. While traditionally international migration was seen as a one-off event over the life course, return and repeat migration are increasingly common phenomena. In addition, migrants may make various international trips for work, vacation, family visits, etc. With declining real costs of international travel and communication, short-term mobility is increasing.

However, we will argue that short-run mobility decisions are not taken independently of migration decisions. We therefore formulate a model of *migration* (the choice of a country to work and reside in), *attachment* (the proportion of time actually spent in the country of residence) and *travel* (the number of international trips). We measure, and model, these dimensions of mobility for New Zealand and UK immigrants to Australia in Sections 4 and 5 respectively.

Section 4 describes and summarises the longitudinal data provided by DIMIA. Section 5 discusses estimates of semi-parametric hazard functions of return or onward migration among NZ and UK immigrants to Australia. Attachment and travel abroad

are also modelled. Attachment is analysed by means of standard regression models and models for count data are applied to the number of trips away.

We find that the policy changes increased the probability of departure from Australia among those who had intended to settle permanently. However, competing risk models suggested no difference between the impact of the policy changes on onward or return moves. Migrants arriving after the policy changes have a higher absence rate from Australia, and make more trips away.

The paper makes a number of contributions to the literature. Firstly, while there are already various macro-level econometric studies of trans-Tasman migration (Brosnan and Poot, 1987b; Poot, 1993; Poot, 1995; Gorbey et al., 1999), this is the first study that adopts a longitudinal micro perspective. Secondly, the paper introduces a multidimensional approach to international mobility consisting of migration, attachment and travel. Thirdly, the three dimensions of mobility are integrated into one dynamic behavioural theory that defines optimal joint paths of locational choice, attachment and travel. Fourthly, we find that the hypotheses derived from the theoretical framework with respect to the impact of the policy changes are generally confirmed with the longitudinal data.

Section 6 provides some final comments and suggestions for further research.

2. Trans-Tasman migration

Migration between Australia and New Zealand has a long history, going back to 19th century colonial days. Detailed reviews of the demographic trends and their contexts can be found in Pool (1980) and Carmichael (1993). Historically, the net flow tended to be towards New Zealand and although New Zealand did not join the Australian Federation in 1901, significant historical, political, cultural and economic similarities were instrumental in the introduction of free movement of citizens between the two since the 1920s. In 1901 there were 25,788 New Zealand-born migrants in Australia and 26,991 Australia-born migrants in New Zealand.

Until the Depression the Australians in New Zealand continued to exceed the New Zealanders in Australia. By 1933 the balance had reversed but even in 1976, when there were 89,791 New Zealand-born in Australia, the number of Australia-born in New Zealand was still two-thirds of that (Brosnan and Poot, 1987a). Since then the flows of migrants between the two countries have grown rapidly, and fluctuated widely, but net migration has been persistently in the direction of Australia.

The reasons are complex and varied, but lower long-run economic growth in New Zealand vis-à-vis Australia, compounded by the consequences of radical economic reforms between the mid 1980s and mid 1990s in New Zealand (with more moderate reforms in Australia), played a major role. The declining real cost of air travel and large post-war baby boom cohorts seeking overseas experience were also major factors. 'Ripple' effects of return migration, following initial migration waves contributed to the volatility in the flows (e.g, Poot 1993b; Gorbey et al., 1999). Figure 1 displays annual Permanent and Long-Term Trans-Tasman migration flows 1948-2005.

It is clear from Figure 1 that since the mid 1970s migration from New Zealand to Australia is at higher levels and significantly more volatile than migration from Australia to New Zealand. Since trans-Tasman migration accounts for more than half of New Zealand's overall international migration, trans-Tasman migration has had a major impact on the growth rate of the New Zealand population (e.g., Poot 1993a).

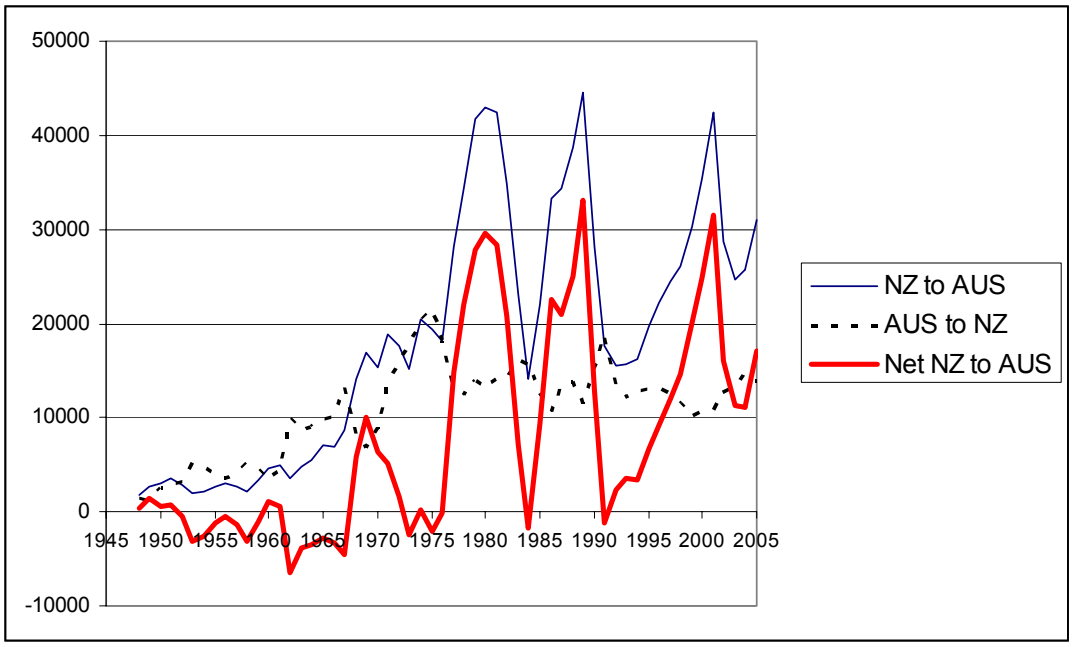

Fig. 1: Trans-Tasman Permanent and Long-Term Migration Flows, Year Ending 31 March, 1948-2005

Source: Statistics New Zealand

At the time of the 2001 Census, the New Zealand-born population in Australia was 355,765 and is expected to have increased by another 100,000 by the time of the June 2006 Census. The Australia-born population in New Zealand was 56,259 persons in 2001 and increased to 62,742 in 2006.[3] Given that the flows are not subject to administrative controls, the net migration from New Zealand to Australia may be interpreted as intra-country regional labour market adjustment in response to significant growth differentials (Poot, 1995), with New Zealand only a middling performer compared with fast growing Australian States such as Queensland and Western Australia (Grimes 2005).

The imbalance in the flows led the Australian government in the late 1990s to revisit the TTTA, as Australia perceived the situation to be one of a very unequal fiscal burden associated with the New Zealanders in Australia as compared with their counterparts in New Zealand.[4] New Zealand made no financial contribution to labour market-linked welfare payments to New Zealand citizens in Australia, while New Zealand contributions to state pensions paid to their citizens in Australia were considered to be far too little.

Another Australian reason for concern with the unbalanced migration flows was that a growing proportion of the flow from New Zealand to Australia in the 1990s consisted

[3] Many of these are Australia-born children of New Zealand citizens. Only 26,355 usual residents of New Zealand wrote "Australia" as an ethnic group they belong to (multiple ethnicity responses were permitted). Many Australia-born persons living in New Zealand may have stated to be "New Zealand European".

[4] It has been shown that Australia receives in fact a net fiscal benefit from the presence of New Zealand migrants and that this benefit is greater than for other migrant groups (NZIER, 2000).

of immigrants to New Zealand, who moved on to Australia after obtaining New Zealand citizenship. This form of 'backdoor entry' into Australia was perceived by the Australian Government as diminishing its ability to control settler entry into that country.

Pressures to terminate the TTTA were successfully resisted, as doing so would have been inconsistent with a trend towards greater economic integration between the two countries, formalised under the 1983 Closer Economic Relations (CER) agreement, and subsequent liberalisation of trade and capital mobility (see, e.g., Grimes et al., 2000). However, on February 26 2001, a policy change was announced that aimed to overcome the problems noted above. From June 2001, New Zealand citizens migrating to Australia were no longer eligible for labour market-related social welfare payments (primarily the unemployment benefit) regardless of the length of time they had been living in Australia. Instead, New Zealand citizens must now successfully apply for permanent residence in Australia, subject to the same conditions as migrants from other source countries, in order to be eligible for such social welfare payments.

Alongside access to social welfare benefits, New Zealanders also lost their eligibility to apply for Australian citizenship and to sponsor family members to join them in Australia, without having first gained permanent residence. These changes brought New Zealanders' access to social support and the privileges of citizenship more in line with migrants from other source countries, while retaining their right to live and work freely in Australia as agreed under the TTTA. New Zealanders also retain access to non-labour market based benefits, including a range of family allowances and tax credits, rent assistance, and Medicare, as well as public housing and education services. In effect, the policy changes remove the safety net of social welfare in the case of loss of labour income, while maintaining access to social services. Migration statistics suggest that the policy changes led to smaller post-announcement flows, at least initially, while the proportion of 'backdoor' migrants among the NZ citizens dropped as well (Bedford et al., 2003). These observations are reconfirmed with our micro-level dataset in Section 3.

In this paper we measure the impact of the policy changes by observing differences in the international mobility behaviour between New Zealanders arriving before the policy changes were announced, as compared with those who arrived subsequently. As noted in the introduction, to control for other factors that may impact on mobility behaviour over time we use a sample of United Kingdom citizens who migrated to Australia at the same time as a 'control group'.

The econometric analysis is applied to a unique dataset of 112,454 NZ citizens and 108,734 UK citizens who stated an intention of remaining in Australia for at least 12 months upon first entry between 1 August 1999 and 31 July 2002. Their subsequent movements out of, and back into, Australia have been recorded until 30 June 2005. As noted in the introduction, we consider three dimensions of international mobility: the likelihood of remigration, the percentage of time actually spent in the host country, and the frequency of travel. Before summarising the data in Section 3, we first provide in the next section a theoretical framework that combines these dimensions of international mobility.

3. An economic theory of migration, attachment and travel

One issue that is remarkably neglected in the international migration literature, yet is of growing importance given the growth in international travel, is the pattern of international mobility that follows an initial decision to migrate. With longitudinal data at our disposal on the mobility of NZ and UK migrants to Australia, the subsequent international mobility of these migrants following their arrival in Australia is central to our analysis. This mobility includes both short-term movement and long-term migration, for example back to the home country, onward to a third country, or involving several additional long spells in the host country interspersed with long spells at home.

Traditionally, the move to a foreign land was seen as a once in a lifetime decision, but increasingly migrants continue to nurture links with the home country, or develop links with third countries, not just to maintain personal or business contacts, but also as a rational strategy to prepare for return or onward migration. The incidence and determinants of return and repeat migration have already been addressed quite extensively in the internal migration literature (e.g., DaVanzo, 1983; Kau and Sirmans, 1976), but have in recent years also attracted growing attention in the international migration literature (Constant and Zimmermann, 2003; Dustmann, 2003; Bijwaard, 2005); However, what is often neglected in this literature is the importance of the linkages between short-term and long-term movement.

Potential international migrants have several choices to make. They choose a path of locations that may involve one or several spells of work abroad (referred to as *migration* in what follows), but while abroad they must decide on the amount of time they wish to actually be in the host country (referred to as *attachment*) and the frequency of trips back home or elsewhere (referred to as *travel*).

The innovation of the proposed theory is that the three phenomena of migration, attachment and travel are considered interlinked. For example, when the cost of international travel is high or visas are hard to obtain, the incentive to migrate may be low but once migration has taken place the optimal attachment to the host country is likely to be high and international mobility relatively low. Consequently, a lowering of the effective cost of international movement (e.g. by greater flight frequencies or lower airfares) may lead to a greater desire to migrate, but may also lower attachment to the host country and increase mobility. The remainder of this section formalises these ideas by means of an integrated dynamic cost-benefit model of migration, attachment and travel. In line with an emphasis on economic considerations, the focus is here solely on the migration of people for work-related reasons.

To simplify matters, but without loss of the essence of the international residential mobility process, consider two countries: home H and abroad A. Migration is defined, as is common in actual migration statistics, by intended or actual residential relocation for a period of twelve months or more. Consequently, the unit of time is a year. Workers may move between countries within the year, but such short-term mobility does not affect their residence status, which – as is conventional in tax laws – is defined by the country from which they obtain a wage. During a given initial year, $t = 0$, a worker decides a sequence of residences (home H or abroad A) for years $t = 1, 2, \ldots, N$, with N the expected remaining years of work until retirement.[5] The

[5] Issues of "tied movers" and "tied stayers" in household migration are not considered here, as the available data refer to individuals only.

sequence of residences is a vector $\mathbf{l} = (l_0, l_1, l_2, \ldots, l_N)$, with $l_t = 0$ if the worker is employed in H and $l_t = 1$ if the worker is employed in A. By assumption $l_0 = 0$.

In each year t, workers gain utility from consumption activities C_t; from amenities available at a given location (e.g. climate, public facilities) Q_t; and from the strength of ties with family and friends P_t. The latter are initially assumed to be mostly, but not entirely, located in H. By spending time in A, the worker accumulates additional utility-yielding personal relationships there as well. All (state) variables measuring outcomes in year $t = 1, 2, \ldots, N$ are interpreted as expected values, given the information available in year 0.

However, in line with the growing prevalence of trans-national location observed in many countries, the worker has additionally a choice to decide what proportion of the year to allocate to actually being in A, while being in H for the remainder of the year. As noted earlier we refer to this as *attachment*. This is here defined with respect to A, so that attachment a_t is the proportion of the year t that the worker actually spends in A. Wage income is only obtained when the worker is actually in the country of residence, so time spent in H would be costly for a worker who decides to work in A and vice versa. By assumption $a_0 = 0$.

Having decided what proportion of time to allocate to H and A, the third and final decision which the worker must make is that of the frequency of trips between the two countries, referred to above as *travel*. The variable m_t measures the number of return trips between H and A, following the initial decision of where to work in year t. If $a_t = 0$ or $a_t = 1$, then $m_t = 0$. But as long as $a_t \in (0,1)$, $m_t = 1, 2, 3, \ldots$ In that case, given a_t and m_t, the average duration of a spell in H is the fraction $(1 - a_t)/m_t$ of a year while spells in A are of duration a_t/m_t. Because $a_0 = 0$, $m_0 = 0$.

Individuals are assumed to experience diminishing marginal utility not just with respect to consumption goods but also with respect to the amount of time spent in a given country. Consequently, it is assumed that a migrant living in country A gains greater utility from a number of short sojourns to H than from one extended trip of equal aggregate duration, and similarly for migrants living mainly in country H and visiting A.

The worker now chooses three vectors **l**, **a** and **m** to maximise the following objective function

$$V = \sum_{t=1}^{N} \frac{U(C_t, Q_t, P_t)}{(1+\rho)^t} + \frac{\vartheta(W_N - W_N^*)^2}{(1+\rho)^N}, \tag{1}$$

in which U refers to the utility function, ρ refers to the person's internal rate of time preference (which may also reflect risk aversion), C_t is the real value of the worker's consumption measured in H's currency, Q_t is an index of the stock of amenities enjoyed globally and P_t is an index of the global stock of personal relationships. In addition, the objective function includes a 'penalty' component for the deviation of endpoint wealth W_N from a desired level of endpoint wealth W_N^*. The utility function is assumed to have the usual properties and for simplicity takes the form:

$$U(C_t, Q_t, P_t) = C_t^{\alpha_1} Q_t^{\alpha_2} P_t^{\alpha_3} \tag{2}$$

with $\alpha_i > 0; \alpha_1 + \alpha_2 + \alpha_3 < 1$. By spending time in *A* and *H*, the volume of amenities enjoyed in year *t* is simply the combination of $a_t Q_t^A$ and $(1-a_t) Q_t^H$ respectively, whereby Q_t^A and Q_t^H are the exogenous levels of amenities in *A* and *H* at time *t* respectively. Enjoyment of the amenities is also a function of the number of times they are experienced per year. Because of assumed diminishing marginal utility of amenities for an increasing spell length at a particular location, more aggregate enjoyment is gained from several shorter trips for a given fraction of time per year spent at a location. It is easy to see that total utility, for given a_t, converges to a limit for $m_t \to \infty$. This suggests the following specification for the Q_t , the index of the stock of amenities enjoyed globally:

$$Q_t = \beta_0 \left(1 - e^{-m_t}\right) \left[a_t Q_t^A\right]^{\beta_1} \left[(1-a_t) Q_t^H\right]^{\beta_2} \tag{3}$$

with $\beta_i > 0; \beta_1 + \beta_2 < 1$; $Q_t = \beta_0 \left(Q_t^A\right)^{\beta_1}$ when a_t = 1; and $Q_t = \beta_0 \left(Q_t^H\right)^{\beta_2}$ when $a_t = 0$ (in both cases $m_t = 0$ also).

The strength of ties with family and friends in year *t* is a function of the stocks of relationships built up in both *H* and *A*, and the number of visits made to nurture these relationships. It is assumed that stocks of relationships in a location build up linearly with the amount of time spent in that location. The number of new friends and acquaintances made per year is π^H in *H*, and π^A in *A*. Hence

$$P_t^H = (1-\eta) P_{t-1}^H + \pi^H (1 - a_{t-1}) \tag{4}$$

$$P_t^A = (1-\eta) P_{t-1}^A + \pi^A a_{t-1} \tag{5}$$

for $t = 1, 2, \ldots, N$; P_0^H and P_0^A are the given initial stocks of relationships in *H* and *A* respectively and η is the rate of depreciation of this social capital. Equations (4) and (5) take into account that the ease with which relationships build up can differ between *H* and *A*, as π^A and π^H need not be the same. If in year *t* the worker has not yet been in *A* (and recall $a_0 = 0$), then obviously $P_t^A = P_0^A$. The 'volume' of benefits from the global network of relationships is, similarly to amenities, a function of the combination of $a_t P_t^A$ and $(1-a_t) P_t^H$ whereby P_t^A and P_t^H are now the endogenous stocks of relationships in *A* and *H* in year *t* respectively. The volume of personal interaction is also positively related to the number of trips between the countries, but with the limit again determined by instantaneous marginal utility upon arrival at a location:

$$P_t = \gamma_0 \left(1 - e^{-m_t}\right) \left[a_t P_t^A\right]^{\gamma_1} \left[(1-a_t) P_t^H\right]^{\gamma_2} \tag{3}$$

with $\gamma_i > 0; \gamma_1 + \gamma_2 < 1$; $P_t = \gamma_0 \left(P_t^A\right)^{\gamma_1}$ when a_t = 1; and $P_t = \beta_0 \left(P_t^H\right)^{\gamma_2}$ when $a_t = 0$ (again coinciding with $m_t = 0$).

Consumption equals income minus savings minus the cost of migration whenever it occurs, and minus the cost of return trips between the two countries, i.e.

$$C_t = l_t \varphi_t Y_t^A + (1-l_t) Y_t^H - S_t - D_t \left| l_t - l_{t-1} \right| - m_t \tau_t \tag{7}$$

in which φ_t is the purchasing power parity exchange rate that converts foreign nominal income into comparable home consumption, Y_t^A and Y_t^H are income obtainable in A and H respectively, S_t is financial saving, D_t is the cost of job migration from H to A or back (which only occurs when $l_t \neq l_{t-1}$; and is assumed to take place at the beginning of a year) and τ_t is the unit cost of a return trip between H and A. Consumption is spread evenly over the year, irrespective of location. The cost of migration D_t would include the transportation cost of the worker and family members, the removal of household belongings, job separation costs, etc.

The worker possesses human capital from a given level of education (including initial experience) E_0 that yields, through work, a rate of return δ_t^H or δ_t^A. In addition, working in either H or A yields additional experience in these countries that is rewarded in that country but not in the other (i.e., on-the-job training is country-specific). The return to experience is proportional to the time worked, with ε_t^H and ε_t^A being the rates of return.

Both in H and A, income depends on the availability of work. The unemployment rate of home and abroad are given by u_t^H and u_t^A respectively. When a person is unemployed, the government pays a social security benefit of B_t^H and B_t^A respectively. However, this benefit is only available when the person is actually in the country and when the person is eligible. Consequently, when working in A, expected income is

$$Y_t^A = (1-u_t^A)a_t\delta_t^A E_0 + \varepsilon_t^A \sum_{j=1}^{t} l_{j-1}(1-u_{j-1}^A)a_{j-1} + u_t^A a_t B_t^A \tag{8}$$

while when working in H,

$$Y_t^H = (1-u_t^H)(1-a_t)\delta_t^H E_0 + \varepsilon_t^H \sum_{j=1}^{t} (1-l_{j-1})(1-u_{j-1}^H)(1-a_{j-1}) + u_t^H(1-a_t)B_t^H \tag{9}$$

with $t = 1, 2, \ldots, N.$. The worker accumulates financial wealth as follows:

$$W_t = (1 + l_t i_t^A + (1-l_t) i_t^H) W_{t-1} + S_t \tag{10}$$

Initial financial wealth is exogenously given as W_0, which may be negative (e.g. in the case of the worker having incurred debt in gaining human capital E_0). Equation (10) allows for an effective after tax interest rate that depends on whether the worker resides and works in A or H. For example, a worker starting with negative financial wealth (a student loan) may have interest applied to the debt when in A, but not when in H (as is the case for New Zealanders).

Equations (1) to (10) describe a fully specified discrete-time dynamic programming model of wealth accumulation with given initial and desired endpoint wealth. The problem is to select vectors **l**, **a**, **m** and **S** to maximise the objective function (1). For given expected values of amenities, benefits from interaction with family and friends, returns to human capital and experience, migration costs, travel

costs, unemployment rates and government policies (social security rates, taxes, etc), the optimal path could be calculated numerically by means of the principle of optimality (e.g. Dreyfus and Law, 1977, p. 100-102). For each value of the year index t, we can compute the maximum of the remaining contributions to the objective function (1) for both $l_t = 1$ and $l_t = 0$. The decision to re(migrate) is then simply determined by whether l_t is the same as l_{t+1} or not.

While numerically solvable, it is clear that the problem as formulated above is too complex for analytical solutions. However, for a given work location, the effects of wages and travel costs on optimal attachment and travel frequency can be obtained for a somewhat simplified sub-model (McCann et al., 2007). The optimal path evaluated at time 0 is denoted $(\mathbf{l}_0^*, \mathbf{a}_0^*, \mathbf{m}_0^*, \mathbf{S}_0^*)$.

Optimal paths could be never to leave H (i.e., $\mathbf{l}_0^* = [0, 0, \ldots, 0]$), to migrate to A and stay there (i.e., $\mathbf{l}_0^* = [0, 1, 1, \ldots, 1]$), to migrate to A and eventually return to H (i.e., $\mathbf{l}_0^* = [0, 1, \ldots, 1, 0, \ldots, 0]$), or more complex patterns. While working in one of the two countries, the optimal path is likely to involve nonetheless *some* time being spent in the other country (due to the benefits of amenities and personal interaction). The optimal number of trips between the countries can be shown to be inversely related to the cost of each trip, while the fraction of time spent visiting a country is in a steady-state approximately a square root function of the trip frequency (McCann et al., 2007).

Given the assumption of diminishing marginal utility with respect to consumption, amenities, relationships and frequency of travel, the first order conditions of the optimization problem will be in a steady state in the form of expressions for the marginal benefit of the optimal steady-state choice being equal to the marginal cost. More specifically, the steady-state optimal attachment to the host country is such that the marginal benefit of an additional day spent in A equals the value of marginal benefit of an additional day spent in H. This is shown diagrammatically in Figure 2. The marginal benefit gained from being in A, MB^A, declines with the proportion of time spent in A, while the marginal benefit of time spent in H, MB^H, increases when time spent in A increases.

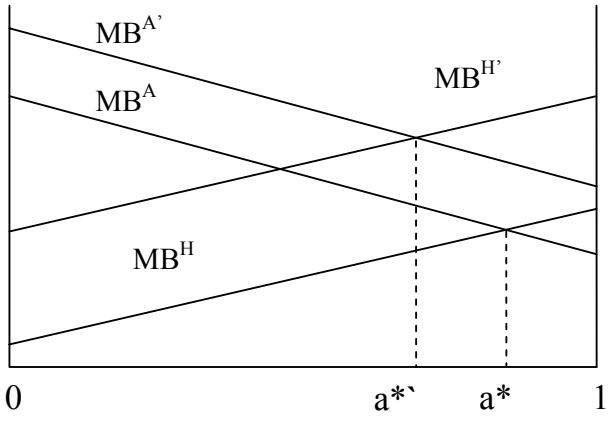

Fig 2: Optimal Attachment to Location A

As such, it is possible to determine an optimal allocation of time, a*, which maximizes total utility, given optimal residence, frequency of travel and savings.
Similarly, the optimal number of trips is such that the marginal benefit of an additional trip (which will be implicitly also a function of the selected level of attachment, savings and the decision of where to work) is equal to the marginal cost τ_t. This is shown in Figure 3. The marginal cost of an additional trip is shown as an exogenous constant – the cost of flights, departure taxes and other associated costs are not dependent upon the number of trips made each year. Under the adopted assumptions, the marginal benefit of trip frequency *MB* is downward sloping. The optimal trip frequency is therefore equal to *m**.

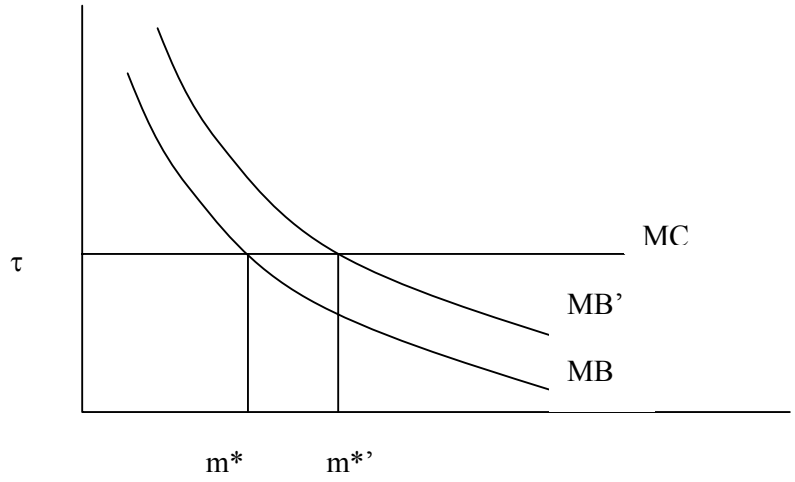

Figure 3: Optimal Travel Frequency

The optimal location path $\mathbf{l}_0^*$ determined in year $t = 0$ is such that any other possible permutation of work/residence locations yields an expected present value of utility that is less or at most equally high, given the information set available at the time when the initial optimal path is evaluated. However, changes in either the information set available or in actual external conditions may cause migrants to re-evaluate and alter their initial intentions.

The optimal choices are updated annually. Hence, in year 1, the optimal path becomes $(\mathbf{l}_1^*, \mathbf{a}_1^*, \mathbf{m}_1^*, \mathbf{S}_1^*)$ and takes into account any new information. If external conditions do not change unexpectedly, workers will not deviate from their initially chosen optimal sequence of locations. However, if there are unexpected changes in conditions (such as an unexpected change in the unemployment rate in *A* or *H*), or if new information becomes available which alters the expected current and future utility paths, workers will adjust their plans of work location, attachment and travel accordingly. Any initially planned residence spell in *A* may then be *curtailed* or *prolonged*.

This theory suggests that a migrant's likelihood of return migration will change over time after better information is acquired (which may lead some to return already soon after arrival). Subsequently, on-the-job training and a growing stock of

acquaintances leads to greater utility from staying longer. While migrants may have difficulty getting full information about employment and living conditions in the host country prior to arrival, it is likely that this knowledge will increase dramatically over a short time in the host country. In contrast, changes in the *actual* conditions in a country are likely to occur more gradually over time. As such, remigration decisions that are made within a short time after arrival are expected to be due to the acquisition of new information. Remigration in the longer term may be caused more by changes in actual conditions *or* may be part of a planned sequence of migratory moves. *Planned* return is unlikely to occur after short residence spells due to the fixed costs associated with migration itself.

These considerations suggest that the likelihood of an onward or return migration is initially increasing with increasing duration of stay (as the number of revisions of initial migration plans will increase when more information is obtained), but at a later stage the propensity to remigrate may decline. The decline in subsequent mobility is also due to the fact that migrants gain greater experience and both social and economic connections in their current location. As the balance of personal and economic locational capital shifts towards the current location, migrants will face a lower incentive to remigrate. Known as 'cumulative inertia' or '(negative) duration dependence' in the migration literature, this has often been confirmed in empirical studies (e.g. Greenwood, 1997). Put together, the information effect and the accumulation of location-fixed capital lead to an expectation of a concave-shaped hazard function. This is confirmed by the semi-parametric estimation of the hazard function in Section 5.

We can now also predict the impact of a change in social security eligibility on migration, attachment and travel. The rules of eligibility of New Zealand citizens in Australia have gradually been tightened. Before 1986 migrants were eligible upon arrival. Between 1986 and 2000, a six month 'stand down' period was introduced, which was then extended to a 24 month period between February 2000 and February 2001. Subsequently, automatic eligibility was revoked entirely. Effectively, this implies in the model above that $B_t^A = 0$ for $t \geq T$ with $0 < T < N$.

From equation (8) it is clear that $\partial Y_t^A / \partial a_t$ is increasing in B_t^A. A reduction in the unemployment benefit in *A* reduces therefore the expected additional income from an additional day spent in *A*. This lowers the likelihood of migration from *H* to *A* (which we cannot observe with our data) but increases the likelihood of return migration (which we do observe, as will be shown in Section 5).

Two opposing forces affect the impact of the benefit change on the allocation of time between the two countries. On the one hand, the decline in expected income raises the marginal benefit from an additional day working in *A* (this is essentially equivalent to the income effect on the demand for leisure when the expect wage declines in the standard labour supply model), but on the other it also increases the marginal benefit of spending an additional day in *H* (which is essentially equivalent to the substitution effect of the decline in the expected wage on the demand for leisure). These two effects lead to MB^A and MB^H both shifting upwards. The way these shifts have been drawn in Figure 2 yields a new optimal attachment to *A*, a*', which is less than it was previously (equivalent to moving down an upward sloping labour supply curve). Moreover, the lower expect income in *A* raises the marginal benefit of an additional trip back to *H*, because of diminishing marginal utility of increasing spell lengths. Consequently, the *MB* curve in Figure 3 shifts upwards so that, for given marginal trip costs, more frequent travel may be expected.

In Section 5 of this paper we apply this theory to the mobility behaviour of UK and New Zealand migrants to Australia. We measure and model the hazard rate of repeat or return migration following an intention to settle for 12 months or more in Australia. The attachment to Australia and the number of trips out of Australia are also considered. We then assess the extent to which these various measures of international mobility are affected by the policy changes introduced by the Australian Government in 2001. The empirical results reported in Section 5 show that the 2001 social security changes in Australia are an example of the case in which the optimal attachment declines as shown in Figure 2. Similarly, removal of the unemployment benefit for New Zealand workers in Australia indeed increased the frequency of trips back home as shown in Figure 3. However, first we describe and summarise the data in the next section.

4. International mobility data

Australian legislation requires all passengers who enter or leave Australia by airplane or ship to complete a passenger card. The cards include questions about current travel itineraries as well as personal characteristics such as age and occupation.

When a non-Australian resident arrives stating an intention to remain in Australia for 12 months or more, they are classified as a Permanent or Long-Term (PLT) migrant. Passenger card details are recorded in full for all PLT arrivals and are then integrated with details available from the Travel and Immigration Processing System (TRIPS), which records travellers' passport and visa information, including age, sex, and marital status.[6] After new PLT arrivals have been captured in the system all their subsequent moves into and out of Australia are fully documented, regardless of the intended or actual duration of each trip.

The full sample used in this paper includes all NZ and UK citizens whose first entry to Australia (after the current electronic recording system began in July 1998) occurred over the period from August 1999 to July 2002, and who stated an intention to remain in Australia for at least 12 months. The sample is split into three one-year cohorts of new arrivals. These cohorts broadly align with the different phases of Australia's policy change with respect to New Zealand citizens. The first cohort, from August 1999 to July 2000, entered Australia under a system in which New Zealanders became eligible for social welfare assistance, could apply for Australian citizenship, and sponsor family members for permanent residence once they had been in the country for two years. The second cohort, from August 2000 to July 2001, covers those people who arrived over the period during which the policy change was being discussed, announced, and implemented. The final cohort, from August 2001 to July 2002, covers only those people who arrived after the policy change had been fully implemented. Figure 4 below shows the timeline for data collection, and relates this to the changes in welfare policy.

[6] Marital status is recorded on visa applications and is not available for New Zealand citizens, who are issued a Special Category Visa on arrival in Australia.

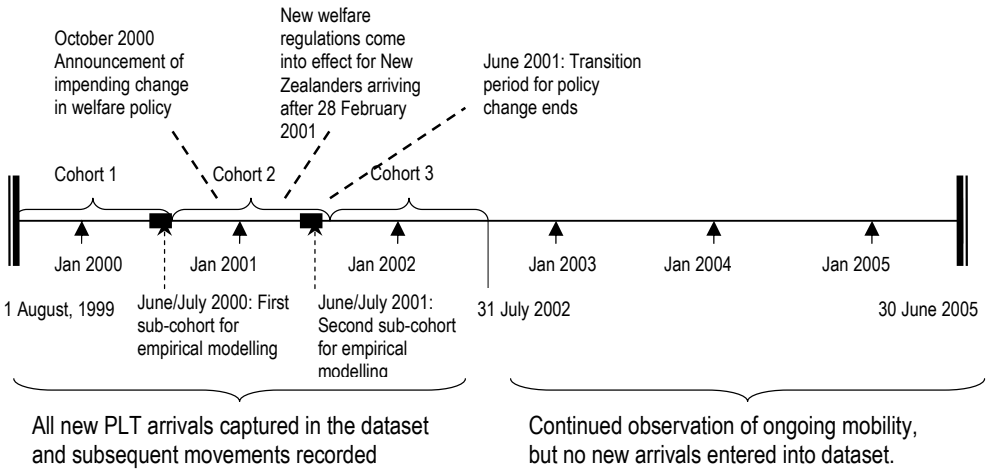

Fig 4: Timeline of Data Collection, Policy Changes, and Selected Samples

A reduced sample is used for the multivariate empirical analysis of Section 5. The sub-sample takes two two-month cohorts of arrivals – those who arrived in June and July of 2000, before the announcement of the policy change, and those who arrived in June or July of 2001, after the policy change was fully implemented. This sub-sample was chosen to maximize the duration of time over which the migrants could be observed (four years minimum), while minimizing the differences between the two sub-cohorts due to either seasonal differences or changes in the overall environment by taking two periods exactly one year apart. In order to focus on the determinants of remigration and mobility among labour force participants, the sub-sample is restricted to those migrants who stated an intention to remain permanently in Australia, and for whom a main occupation could be determined under the Australian Standard Classification of Occupations (ASCO).

The full dataset covers a total of 221,188 people and 1,272,531 border crossings, either into or out of Australia. Among the 112,454 New Zealanders who migrated to Australia, 80,074 arrived as permanent settlers and 32,380 as temporary long-term residents. The total number of new arrivals from the UK was similar (108,734), but the composition very different, with 21,466 UK citizens arriving permanently and 87,268 as temporary migrants.

While the total number of migrants from each source country was similar, there were noticeable differences in the distribution of arrivals over the three time periods. The inflow of UK citizens was relatively stable across the three year periods, with a small annual decline of around 1,000 people. In contrast, the number of New Zealanders arriving rose from 41,458 in the first cohort, to 45,553 in the second, before dropping to 25,443 in the final cohort (Figure 5). While it is tempting to attribute this variation solely to the change in Australia's welfare policy with respect to new migrants from New Zealand, Bedford et al. (2003) show that 2000/01 was also a time of unusually high emigration from New Zealand to all destinations, not only to Australia. However, the dip in the total number of New Zealanders moving to Australia in the period after the implementation of the new policy may have be

partially self-correction, to a long-run level, after the large increase of the previous year.

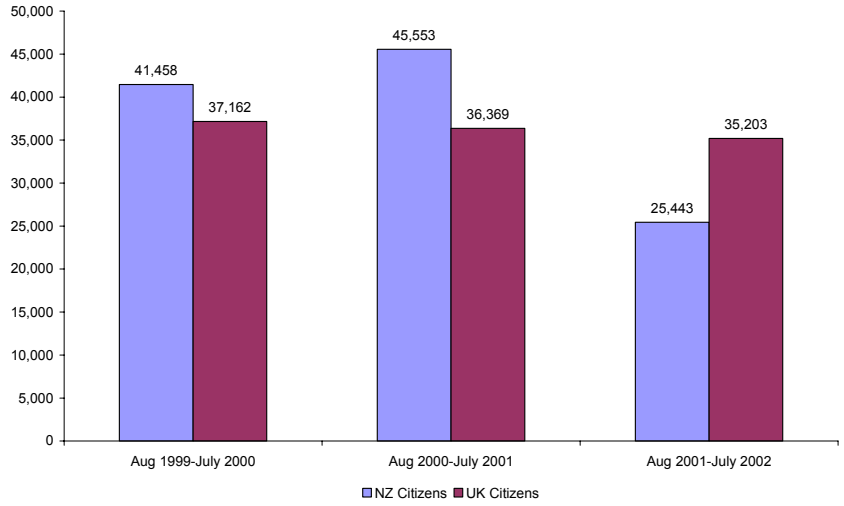

Fig 5: Size of Arrival Cohorts, by Citizenship

Alongside the difference in the number of people arriving in Australia in each year, the composition of new arrivals across cohorts was less stable for the New Zealanders than the UK migrants. These differences are most obvious in the birthplace composition of new arrivals (Figure 6).

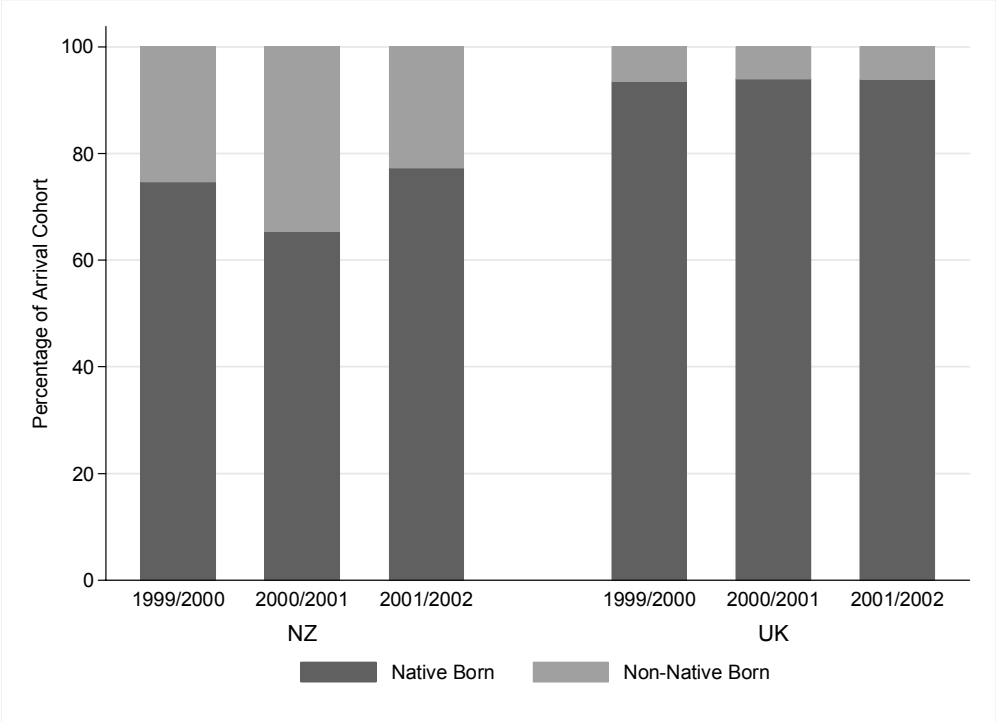

Fig 6: Birthplace of New Arrivals, by Citizenship and Entry Cohort

The proportion of NZ citizen arrivals who were not born in New Zealand rose dramatically in 2000/01 and fell again in 2001/02. This growth was particularly noticeable among those born in Asia, who accounted for 10.3 percent of NZ citizen arrivals in 1999/00, 18.1 percent in 2000/01 and 5.6 percent in 2001/02.

As well as details of their current travel itineraries and personal characteristics such as date of birth and nationality, all travellers are asked to state their *usual occupation*. While basic details such as date of birth can be cross-referenced to visa and passport details, and response rates for items such as *main reason for overseas travel* and *state of (intended) residence in Australia* are generally high, the question on usual occupation is frequently left blank. The high incidence of unrecorded occupation in the data set creates a substantial difficulty for research on both the determinants and the implications of migration. Occupation may be considered as a proxy for skill and, hence, for an individual's ability to contribute productively to the economy of their country of residence, as well as giving an indication of personal characteristics such as income and employment-related mobility.

However, this problem is significantly alleviated in the current dataset by the availability of multiple records for each individual. While only 32 percent of all observations (border crossings) include a stated occupation, 97 percent of the individuals in the sample provided an answer to this question *at least once* over the course of their trips into and out of Australia. While individuals may hold a number of jobs over their lifetimes, it seems reasonable to assume that the skill sets involved in these jobs are likely to be similar, especially over the relatively short period of three to six years covered by the current dataset.

Therefore, in order to capture the greatest possible information set, a variable *main occupation* is defined as being the modal stated occupation over each individual's observations. In cases where the modal occupation is not unique, the *higher* skilled occupation is chosen as the main occupation. This definition is justified where the focus is on skill levels, with the assumption that a person who usually works in a skilled occupation does not lose the associated skill set if they choose to take time out of the workforce, or are temporarily working in a different field.

A second variable, *skill level*, is then defined as a proxy for the skill level of this occupation. The allocation of occupations into skill classes follows the definitions used by Glass and Choy (2001) and Shevland (1999). Glass and Choy (2001) refer to the three skill categories as high-skill, semi-skill and low-skill, and allocate occupations to these categories according to their one-digit New Zealand Standard Classification of Occupations (NZSCO). As the Australian Standard Classification of Occupations (ASCO) system is very similar to the NZSCO, the same allocations are used for this study. Table 1 shows the allocation of occupations to skill classes.

Table 1: Occupations and Skill Categories

Skill Category	ANZSCO Classification
High-skilled	Managers and Administrators
	Professionals
	Associate Professionals
Semi-skilled	Tradespersons and Related Workers
	Intermediate and Advanced Clerical, Sales and Service Workers
	Intermediate Production and Transport Workers
Low-skilled	Elementary Clerical Sales and Service Workers
	Labourers and Related Workers

For people outside the labour force, the unemployed, and those whose responses to the occupation question cannot be classified into a skill category (for example, those who stated their occupation as 'self employed'), the skill variable is left blank.
The variable *main occupation* is complete in 98 percent of all observations, compared with a response rate of only 32 percent for the basic occupation variable. In the case of the skill variable, *skill level*, is available for 71 percent of observations, while the original skill variable was observed for only 21 percent.

Comparing across cohorts and source countries shows differences in both labour force status and skill levels. Overall, a lower proportion of NZ citizen arrivals were in the labour force (see Figure 7). This is largely due to the different age structure of the two migrant groups, with UK citizens being more strongly concentrated in the working age range of 20 to 64. In turn, this is due mainly to age restrictions for both permanent and long-term temporary visas which are required for UK citizens but not for New Zealanders. Controlling for age, UK and NZ labour force participation rates are more similar (Figure 7).

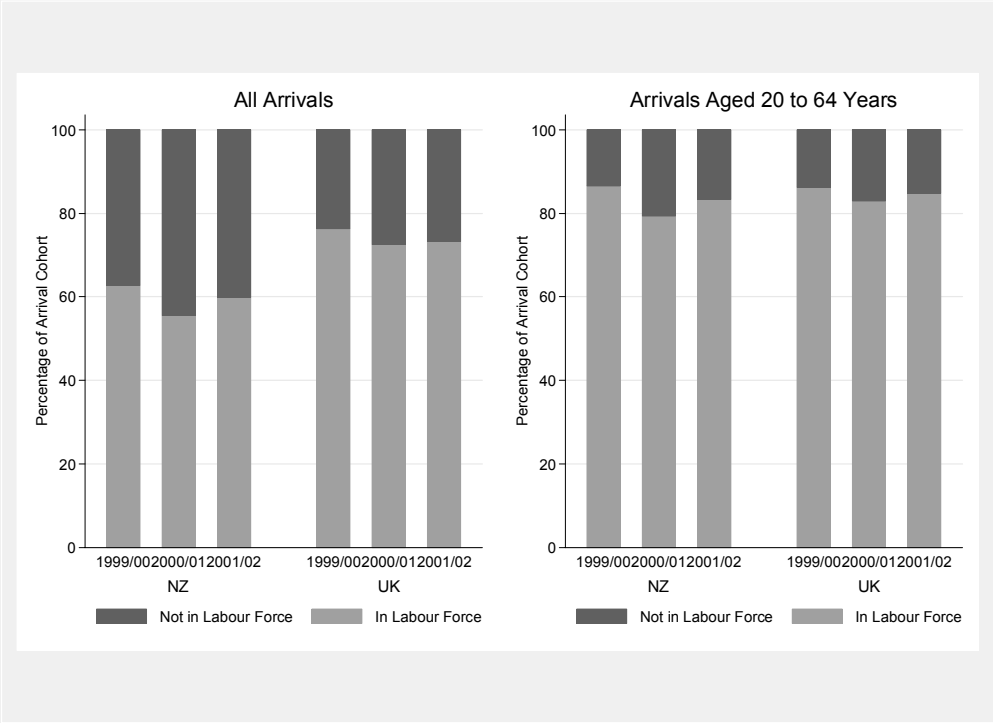

Fig 7: Labour Force Status of New Arrivals, by Citizenship and Entry Cohort

The middle cohort of New Zealanders shows a lower probability of being in the labour force than either the pre- or post-policy cohorts. While the UK migrants show a similar pattern across cohorts, it is less pronounced than that of the NZ migrants. Figure 7 shows the labour force participation rates of the three migrant cohorts from each country, comparing the full sample with those aged 20 to 64, to control for the different demographic structure across the two source countries.

UK migrants are also more likely to be employed in highly skilled occupations (Figure 8). Cohort differences in occupational skill are smaller, with the only notable difference being a slightly higher proportion of highly skilled individuals in the second and third cohorts of New Zealand citizens. These proportions are not affected

by considering only those of working age, as the skill definitions exclude non-labour force participants.

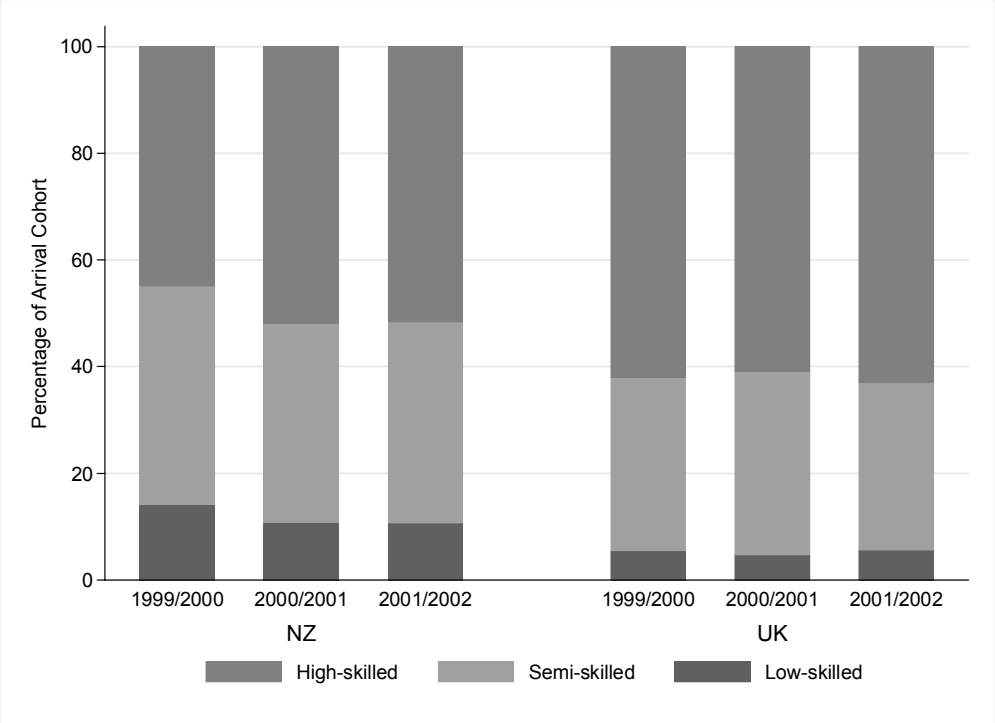

Fig 8: Skill Distribution of New Arrivals, by Citizenship and Entry Cohort

As noted earlier, a smaller dataset was designed for the multivariate analysis of the next section. This dataset covers 3,473 NZ and 1,111 UK citizens.[7] The distribution according to time of arrival and a comparison with the large sample cohorts is shown in Table 2. The small samples for each cohort are structurally very similar to the large samples for the corresponding cohort. Comparisons are given of the fraction of time spent in Australia for those who do not re-migrate, the percentage male, the percentage aged less than 30, and the percentage in professional and managerial jobs.

Finally, it is useful to explicitly motivate the choice of the selected small sample of UK migrants are a good control group for the NZ migrants in the pseudo-experimental setting resulting from the policy change. The analysis of the next section uses the standard difference in differences approach, which assumes that in the absence of the policy change, any difference in average behaviour between the 'treatment group' (the New Zealanders) and the 'control group' (the UK migrants) would have remained the same. In addition, no other 'shock' may have affected the post policy change NZ migrants at the same time.

[7] For a sensitivity analysis, the two cohorts were extended to four months of first arrivals, effectively doubling the sample sizes. Estimated coefficients and statistical significance remained generally very similar.

Table 2: Size of Arrival Sub-Samples, by Citizenship and Migration Intention

(a) Number of employed persons of working age

	First cohort – small sample	First cohort – large sample	Second cohort – small sample	Second cohort – large sample
NZ Settlers	2,197	14,421	1,276	8,263
UK Settlers	550	4,141	561	4,432

(b) Persons not re-migrating: fraction of time spent in Australia

	First cohort – small sample	First cohort – large sample	Second cohort – small sample	Second cohort – large sample
NZ Settlers	0.964	0.964	0.957	0.959
UK Settlers	0.965	0.964	0.969	0.963

(c) Percentage male

	First cohort – small sample	First cohort – large sample	Second cohort – small sample	Second cohort – large sample
NZ Settlers	59.9	57.9	55.4	53.7
UK Settlers	60.7	62.6	64.2	62.6

(d) Percentage aged less than 30

	First cohort – small sample	First cohort – large sample	Second cohort – small sample	Second cohort – large sample
NZ Settlers	36.0	36.0	37.8	36.9
UK Settlers	27.5	28.8	20.9	21.4

(e) Percentage managers, administrators and professionals

	First cohort – small sample	First cohort – large sample	Second cohort – small sample	Second cohort – large sample
NZ Settlers	46.7	47.0	51.6	53.2
UK Settlers	62.7	59.6	62.8	64.3

These assumptions are plausible for a number of reasons. The most important is that the time difference between recruitment of the cohorts (12 months) is small compared with subsequent period of observation (four years). Because relevant macro variables had similar levels at the time of recruitment of the samples (June/July 2000 and June/July 2001), differences in behavioural responses do not affect sample selection.[8] In addition, coincident changes that may affect the NZ migrants only (such as subsequent changes in Aus-NZ tax differential and exchange rates) would affect both NZ cohorts almost identically. Of course, the UK group, who are on average somewhat older and higher skilled, may have responded during the subsequent four years somewhat differently to changing macro conditions, but to control for this we will calculate the treatment effect after accounting for such composition effects, both parametrically and non-parametrically. As the next section will show, the policy change impact remains significant after accounting for the composition effects.

5. Models of remigration, attachment and travel

While the differences across cohorts of New Zealand migrants suggest that there may indeed have been an effect from the policy change on the magnitude and composition of migration from New Zealand to Australia, the main focus of this paper is on

[8] Andrew Leigh kindly provided us with the relevant macro trends over the observation period.

changes in subsequent mobility patterns. The theoretical model outlined in Section 3 suggests that the increased risk associated with living in Australia without the safety net of publicly provided unemployment insurance lowers expected income and increases the likelihood that New Zealand citizens choose to return home or to move on. Similarly, they may choose to make greater efforts to maintain connections with New Zealand, in order to benefit more from the ties they still have.

Secondary mobility is discussed first with respect to first arrival in Australia, looking at the length of time for which Australia remains the main residential location. Multivariate duration analysis is used to examine the effect of personal characteristics and the change in social welfare eligibility on the probability of remigration among New Zealand citizens. A competing risks model is then used to determine the destination of New Zealand citizen departures – looking at whether those migrants who left Australia were returning to New Zealand, or travelling on to a secondary destination. Finally, the degree of attachment which migrants have to Australia is examined through statistical modelling of the proportion of time that new migrants spend in Australia, and the number of overseas trips they make.

The concept of migration, as developed in Section 3, is defined in terms of a long-term change in residential location, associated with a change in the location of employment. According to their own stated intentions on arrival, all the migrants in the sample arrived in Australia planning to stay for a year or more. This is a significant period of time, and while a small number of these people may have come to Australia with sufficient funds to spend a year travelling, most would have been expecting to find work in Australia or to be supported by working family members. As such, the initial arrival of these people in Australia falls into the category of migration.

Due to the fluidity of moves into and out of Australia it is not possible to state when a person has 'permanently departed'. Remigration is therefore defined as a spell of at least six months out of the country, broken by no more than one short re-entry (defined as spanning no more than one month). This prevents some of the people who spend most of their time outside Australia, but return for regular short trips, from being counted as resident in Australia. Using this definition of remigration, 46.7 percent of all migrants in our sample were counted as still being resident in Australia at the end of June 2005. The corresponding figures were 67.2 and 67.0 percent for NZ and UK permanent settlers respectively, 47.8 percent for NZ long-term visitors, and 22.4 percent for UK visitors. Hence even among those migrants who intended to settle permanently, one third remigrated within four years.

Using the sub-sample described in the previous section, we now turn to an examination of the impact of personal characteristics and the social welfare policy change on the probability of remigration from Australia. This is done through the use of duration/survival analysis. We focus on the hazard rate, which is here the conditional probability of remigration at time t, given that remained resident of Australia up to time t.

Table 3 presents the results of a Cox Proportional Hazard model of the duration of time before remigration among permanent settlers. The Cox model is based on the assumption that there is an underlying probability of departure at any given duration t, $\lambda_0(t)$, which is scaled proportionately according to a vector of explanatory variables, x, representing individual characteristics and environmental changes, with unknown coefficients, β, which have a multiplicative effect on the

baseline hazard function. The overall hazard function $\lambda(t, x, \beta, \lambda_0)$ therefore simplifies to $\phi(x, \beta)\lambda_0(t)$ with the factor ϕ commonly specified as $\phi(x, \beta) = \exp(x'\beta)$.

Both sub samples are observed over the same duration since arrival, namely 48 months.[9] As the baseline hazard is estimated at a zero value of the covariates, the age variable is normalised so that the baseline hazard is estimated for migrants in the 20-25 year age group. Robust standard errors are reported throughout.

Table 3: Cox Proportional Hazard Estimates

	NZ Permanent Settler			UK Permanent Settler		
Variable	Coef.		Std. Err.	Coef.		Std. Err.
Semi-skilled	0.027		0.064	-0.250	**	0.117
Low-skilled	0.012		0.095	-0.495		0.361
Age	-0.074	***	0.009	0.003		0.022
Age squared/100	0.165	***	0.027	0.020		0.060
Non-native	-0.331	***	0.079	0.596	***	0.154
Female	0.014		0.060	0.117		0.109
Eastern State	0.094		0.096	-0.144		0.191
Cohort	0.182	***	0.059	-0.212	**	0.104
n	3471			1110		
Number of Failures	1152			359		
Log-likelihood	-9108.44			-2447.35		
$\chi^2(8)$	148.30			29.94		

Significance levels: * : 10% ** : 5% *** : 1%

After controlling for compositional effects, the results show a significant difference in the duration of stay in Australia of 'settler' NZ migrants who arrived before and after the policy change. Individuals who arrived in the later cohort are estimated to have a higher probability of departure at any given time than an identical migrant from the earlier cohort. The difference is equal to *exp*(0.182)-1, i.e. 20 percent. In contrast, the probability of departure among UK permanent settlers was lower for the later cohort. If it is assumed that, absent the change in welfare policy, NZ migrants would have experienced a similar change in hazard rates over time as the UK migrants, a comparison of the difference between the two coefficients gives an estimate of the total effect due to the policy change. In this case, the difference-in-differences estimator is *exp*(0.182-(-0.212))=1.48, and statistically significant at the one percent level. That is, the policy change appears to have increased the instantaneous probability of departure among NZ settlers by almost 50 percent.[10]

[9] Those people who arrived in the June/July 2001 sub-cohort are observed over a period of four years. In order to preserve consistency across the two sub-cohorts, it is therefore necessary to use a 48 month observation period for all the multivariate analysis.

[10] Alternative models were also estimated which allowed for possible interaction between the change in social welfare policy and the personal characteristics of the migrants, including occupational skill level and birthplace. Among UK migrants, neither of these interaction factors was significant. Among New Zealand citizens, the cohort effect was found to be significantly weaker for the semi-skilled migrants than for those in either low-skilled or high-skilled occupations. Birthplace did not significantly interact with the cohort effect. The stronger cohort effect for the low-skilled vis-à-vis semi-skilled may reflect a higher probability of unemployment among the former, and hence a greater relevance of the policy change. The higher departure probability for the later cohort of highly skilled migrants vis-à-vis semi-skilled migrants may reflect relatively buoyant economic conditions in New Zealand in recent years. Difference in differences estimates based on group means are given in Table 7.

Other factors which show up as important determinants of the probability of remigration include age, which for New Zealanders has a non-monotonic relationship with the conditional probability of departure, with the lowest hazard rates being among those people in their thirties, the years when many people are starting families. Being a non-native (i.e., a migrant from New Zeeland or the UK who was not born in these two countries respectively) is also an important explanatory factor, but has different effects for NZ and UK Citizens. Among UK settlers, the relationship between birthplace and remigration propensity follows the expected pattern – those people who have already made at least one international move are more likely to remigrate from Australia. In contrast, non-native born New Zealand citizens show a lower propensity for remigration. This adds some support to the Australian contention that some migrants use New Zealand as a 'back-door' entry point for migration to Australia – taking advantage of New Zealand's less restrictive migration policies to gain first permanent residence, then citizenship, with the attending right to live and work in Australia. Having reached Australia they then settle down and do not leave again.[11]

As the sample used for the model reported in Table 3 is constructed only of those who initially stated an intention to remain permanently in Australia, all those who departed experienced a change of mind over the intervening period. As noted in Section 3, this may occur either due to an unexpected change in external circumstances or a change in the information set available to migrants. Figure 9 plots the estimated baseline hazard functions for the two groups of migrants.

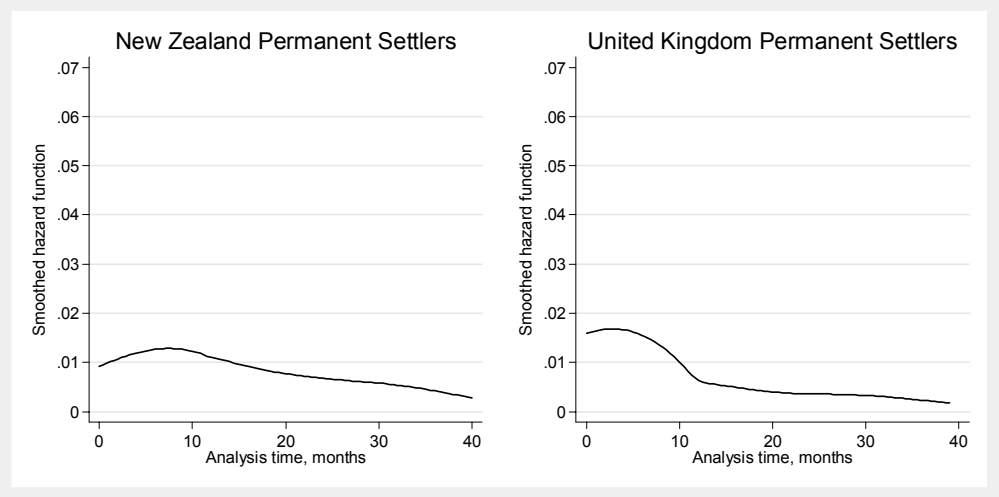

Fig 9: Estimated Baseline Hazard Functions, Cox Proportional Hazard Model

The non-monotonic shape of these functions, with a more pronounced peak for the UK migrants, suggests that information effects may indeed play an important role in the remigration decision. Both NZ and UK migrants have a relatively high probability of remigration in the early months after arrival. This probability is stronger among UK migrants, who presumably have less pre-migration information about their new

[11] Supplementary regressions showed that the lower departure probability among non-NZ born was particularly significant among those born in the Pacific Islands, but that the difference between Asia-born and New Zealand-born was not significant. These are two groups who were of particular concern to the Australian government as potential 'back-door' migrants. However, neither group showed significant differences in remigration propensity before and after the policy change.

host country, due to the greater distance between source and host countries. Over time, the probability of migration falls, as remaining migrants build up productive locational capital and personal relationships in Australia.[12]

From the source country perspective, the question of how long emigrants remain in Australia is perhaps of secondary importance to the question of whether those who depart return to their country of origin or move on to an alternative destination. Table 4 reports the results of a competing risks proportional hazard model, examining the differences among three groups of New Zealand settlers: those who remain in Australia; those who return to New Zealand; and those who move on to other countries.

Table 4: Competing Risks Analysis

	NZ Permanent Settler		
Variable	Coef.		Std. Err.
Semi-skilled	-0.019		0.091
Low-skilled	-0.062		0.148
Age	-0.056	***	0.013
Age Squared/100	0.106	**	0.041
Non-native	-0.585	***	0.125
Female	0.142	*	0.086
Eastern State	0.213		0.142
Cohort	0.546	***	0.085
Onward	-0.997	*	0.524
Semi-skilled*onward	-0.557	**	0.265
Low-skilled*onward	-1.190	**	0.545
Age*onward	-0.109	***	0.037
Age squared/100*onward	0.272	**	0.117
Non-native*onward	1.214	***	0.282
Female*onward	-0.371		0.249
Eastern State*onward	-0.426		0.369
Cohort*onward	0.085		0.243
n (1846 persons x 2 destinations)	3692		
Number of Remigrants	636		
Log-pseudolikelihood	-4811.81		
$\chi^2(15)$	387.45		

Identifying the destination of departing migrants is somewhat complicated as only those migrants who state that they are 'residents of Australia departing permanently' are asked to give a country of next permanent residence (CNPR).[13] As many departures in the sample class themselves as 'visitors' in Australia (despite their

[12] One commonly recognised difficulty with the estimation of duration of stay models is the potential for duration dependence or 'cumulative inertia' to be confused with the presence of unobserved heterogeneity. Individual heterogeneity can, in principle, be included in duration modelling, through the use of *frailty* models. However, as the Cox model does not place any restrictions on the shape of the underlying hazard function, estimation with individual heterogeneity is not practicable, due to the high degrees of freedom lost relative to the number of observations. Frailty models were estimated using a parametric model with log-logistic baseline hazard functions. This model produced qualitatively similar estimates for the effect of covariates, and suggested that some, but not all, of the observed duration dependence was due to unobserved heterogeneity. Overall, however, the Cox model provided a better fit to the data.

[13] Australian resident departing temporarily, which can be for 12 months or more, are asked to simply specify the country in which they will spend most time abroad.

earlier assertion that they intended to settle permanently), this means that response rates for the question on CNPR are very low. However, by combining migrant responses to CNPR with their response to 'country of disembarkation from this flight' it is possible to get a reasonably good response rate for the destination of NZ migrants. Due to their relative geographic positions, it seems reasonable to assume that travellers departing from Australia and disembarking in New Zealand will have New Zealand as their main destination. This analysis cannot be performed for UK migrants, as the recorded country of disembarkation for migrants travelling to the northern hemisphere will generally be a stopover or transit point, rather than an intended destination.

Departing migrants who gave neither an intended country of next permanent residence nor a country of disembarkation are excluded from the analysis. In order to redress the balance between stayers (who are overrepresented in the remaining sample, due to the exclusion of those who departed without giving an intended destination) and remigrants, a random selection of just under half of the stayers were also excluded from the sample. This is justifiable under the assumption that there were no systematic differences between those who did and those who did not state an intended destination on departure from Australia. The resulting sample consists of 1,846 permanent settlers, of whom 1,210 remained resident in Australia throughout the four year observation period, 558 returned to New Zealand, and 78 left Australia for a third destination.

The formulation of the model shown in Table 5 assumes that individual characteristics will impact differently on the conditional probability of return than on the conditional probability of an onward move, but restricts the underlying shape of the baseline hazard function to be the same for both types of departure. An additional variable, type, is added to capture the different base probability of an onward move, relative to a return move. 'Onward' is a binary variable equal to zero for return moves and one for onward moves. As such, the coefficient of -0.997 associated with the onward variable suggests that for the average migrant, the probability of an onward move is around $exp(-0.997)=37$ percent of the probability of a return to New Zealand.

The basic coefficients relate to the probability of return migration, while the coefficients on the interaction terms show how the probability of departure differs from the base when the event in question is onward migration, rather than return. The coefficient of 0.546 on the *cohort* variable suggests that those migrants who arrived in the June/July 2001 cohort have a probability of departure at any given duration of stay $exp(0.546)=1.72$ times that of those from the earlier cohort. The lack of significance of the interaction between *cohort* and *type* suggests that being in the latter cohort does not have a differential effect on the probability of an onward move, relative to a return.

Where interaction terms are significant, the relative probability of an onward move associated with the characteristic in question can be calculated by adding the exponentiated coefficient on the basic variable to that of the interacted variable. For example, the probability of return among the non-native born is only $exp(-0.585) = 0.56$ times that of the NZ born, while the relative probability of an onward move is $exp(-0.585+1.214)=1.88$. That is, the non-NZ born have an 88 percent higher probability of departing for a secondary destination, and a probability of returning to New Zealand 43 percent lower than that of the NZ born. This suggests that the non-NZ born have weaker attachment to New Zealand, perhaps due to continuing attachment to their country of birth. Alternatively, they may also have a greater preference for travel and new residential locations.

Skill also came out as an important determinant of the destination of remigration, with higher skill levels being associated with a greater probability of onward migration. Skilled migrants are likely to be more internationally mobile due to both a more globalised labour market in skilled occupations, better skills for gathering and processing information about opportunities in other locations, and less restrictive immigration barriers to entering other countries than unskilled workers. Age had a non-monotonic relationship with both onward and return migration, while females showed a slightly higher probability of re-migration than males. However, there is no evidence for a gender difference in the choice between onward and return migration.

Alongside the questions surrounding actual duration of stay, the dataset also provides valuable information about the ongoing mobility patterns of new migrants to Australia. Among those migrants who were not observed to remigrate from Australia, 99 percent spent over three quarters of their time onshore. Table 5 reports OLS estimates of the determinants of attachment of those migrants who remained resident in Australia. The results show that skill levels are important in determining the proportion of time which new migrants spend onshore, with lower skill levels being associated with higher attachment to Australia. Cohort effects are again important for the NZ settlers, but not for the UK citizens, and suggest that the change in social welfare policy indeed had the anticipated effect of reducing observed attachment to Australia.

Table 5: OLS Regression of Attachment Rate, Australian Residents Only

	NZ Permanent Settler			UK Permanent Settler		
Variable	Coef.		Std. Err.	Coef.		Std. Err.
Semi-skilled	0.015	***	0.003	0.014	***	0.004
Low-skilled	0.018	***	0.004	0.020	*	0.011
Age	0.001	***	0.000	0.001		0.001
Age squared/100	-0.004	***	0.000	-0.005	*	0.002
Non-native	0.004		0.003	-0.006		0.008
Female	-0.003		0.002	-0.001		0.004
Eastern State	-0.009	**	0.004	-0.006		0.004
Cohort	-0.006	**	0.003	0.003		0.004
Intercept	0.955	***	0.005	0.952	□□ □	0.009
n	2320			751		
R^2	0.03			0.03		
F(8,2320/1103)	8.86			3.30		

Table 6 turns the focus to the extent of international travel among those who remain resident in Australia. The table reports negative binomial regression models of the number of international trips away. Clearly, travel frequencies are closely interrelated with overall attachment levels – those people who choose to spend more time abroad will naturally be expected to make more overseas trips. In order to control for the proportion of time that migrants choose to spend abroad, while reducing the problem of endogeneity associated with the relationship between attachment to Australia and the travel frequency, the dependent variable in the model is the number of exits made over the *last three years* of observation, while attachment to Australia in the *first year* after arrival is used as an instrument for the overall degree of attachment. Attachment to Australia is found to have a strong and significant negative relationship to international mobility in the following periods.

Table 6: Negative Binomial Regression for Number of Trips Away in Years 2-4, Australian Residents

	NZ Permanent Settler			UK Permanent Settler		
Variable	Coef.		Std. Err.	Coef.		Std. Err.
Semi-skilled	-0.465	***	0.050	-0.662	***	0.102
Low-skilled	-0.607	***	0.067	-0.775	**	0.303
Age	-0.001		0.007	-0.007		0.019
Age Squared/100	-0.002		0.020	0.048		0.054
Non-native	-0.344	***	0.049	-0.001		0.173
Female	0.018		0.042	0.127		0.096
Eastern State	0.333	***	0.069	0.494	***	0.102
Attachment in first year	-3.865	***	0.227	-3.434	***	0.453
Cohort	0.228	***	0.043	0.154	*	0.092
Intercept	4.353	***	0.288	3.200	***	0.480
Alpha	0.557	***	0.029	0.759	***	0.081
n	2320			751		
Log pseudolikelihood	-4681.67			-1194.64		
$\chi 2(9)$	502.90			164.76		

Significance levels: * : 10% ** : 5% *** : 1%

After controlling for the total proportion of time spent out of the country, the cohort effect is highly significant for NZ citizens but less for UK citizens (and only significant at the 10 percent level), with those New Zealanders who arrived after the policy change being relatively more likely to travel internationally. In summary, we find that NZ settlers who arrived after the policy change and stayed for at least four years have nonetheless a greater incentive to maintain connections with their home countries (New Zealand or elsewhere) through travel there (Table 6), to have less attachment to Australia (Table 5) and a greater probability of eventual return (Table 3).

It is of course possible to argue that there is heterogeneity in the samples in that the cohort effect interacts with subgroup characteristics. Difference in differences estimates have therefore also been calculated at the sample means for narrowly defined subgroups (with reasonable sample sizes). The results are reported in Table 7, which disaggregates into age, gender and skill groups. For all groups, the change in social security eligibility increased the likelihood of remigration from Australia, lowered the mean proportion of time in Australia among residents, and increased the mean number of trips away (except for the latter in the case older low skilled migrants).

Distance and travel costs also appear to play an important role in determining travel frequency. This is implied by the comparison of travel frequency between NZ and UK citizens, and between native born and non-native born New Zealanders. Using the intercept terms to compare basic travel frequency shows that New Zealanders tend to make more trips on average than their UK counterparts. This reflects the greater expense involved in travelling 'home' when the source country is more distant. At the same time, non-native born New Zealanders show lower travel frequency than the native born, as the non-native born are more inclined to travel to more distant destinations rather than back to New Zealand.

Table 7: Difference in Differences Estimates of the Impact of the Social Security Policy Change on Mobility for Specific Sub-Groups

(a) Young, low-skilled, both sexes

	Probability of remaining in Australia		Mean Proportion of time in Australia		Mean number of trips away		Sample Size	
	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers
Early Cohort	71.74	82.5	0.777	0.861	1.49	0.89	1097	80
Late Cohort	68.14	85.11	0.743	0.869	1.67	1.01	408	94
Δ	-3.6	2.61	-0.034	0.008	0.18	0.12		
Δ - Δ	-6.21		-0.042		0.06			

(b) Older, low-skilled, both sexes

	Probability of remaining in Australia		Mean Proportion of time in Australia		Mean number of trips away		Sample Size	
	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers
Early Cohort	82.44	76.81	0.849	0.841	1.87	0.8	837	69
Late Cohort	74.08	76.06	0.781	0.843	2.01	1.08	355	71
Δ	-8.36	-0.75	-0.068	0.002	0.14	0.28		
Δ - Δ	-7.61		-0.07		-0.14			

(c) Younger, highly-skilled males

	Probability of remaining in Australia		Mean Proportion of time in Australia		Mean number of trips away		Sample Size	
	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers
Early Cohort	70.93	67.74	0.779	0.741	3.15	1.79	1758	840
Late Cohort	68.16	75.53	0.751	0.795	3.57	1.92	1126	850
Δ	-2.77	7.79	-0.028	0.054	0.42	0.13		
Δ - Δ	-10.56		-0.082		0.29			

(d) Younger, highly skilled females

	Probability of remaining in Australia		Mean Proportion of time in Australia		Mean number of trips away		Sample Size	
	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers
Early Cohort	69.66	64.86	0.77	0.715	3.07	1.77	1539	629
Late Cohort	69.31	70.17	0.76	0.756	3.54	1.79	1111	637
Δ	-0.35	5.31	-0.01	0.041	0.47	0.02		
Δ - Δ	-5.66		-0.051		0.45			

Table 7 continued

(e) Older, highly skilled males

	Probability of remaining in Australia		Mean Proportion of time in Australia		Mean number of trips away		Sample Size	
	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers
Early Cohort	77.33	61.99	0.805	0.673	2.81	2.29	2131	613
Late Cohort	75.3	65.44	0.781	0.721	3.99	2.44	1162	871
Δ	-2.03	3.45	-0.024	0.048	1.18	0.15		
Δ - Δ	-5.48		-0.072		1.03			

(f) Older, highly skilled females

	Probability of remaining in Australia		Mean Proportion of time in Australia		Mean number of trips away		Sample Size	
	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers	NZ Settlers	UK Settlers
Early Cohort	80.53	61.4	0.836	0.681	2.39	1.62	1356	386
Late Cohort	75.38	69.72	0.789	0.765	2.89	1.64	995	492
Δ	-5.15	8.32	-0.047	0.084	0.5	0.02		
Δ - Δ	-13.47		-0.131		0.48			

In contrast, there is no significant difference in the travel frequency of UK citizens according to birthplace. While the distance between home and host countries is generally greater for the UK citizens, the non-native born do not systematically live in more distant locations than the native born, as is the case for New Zealand.

The positive relationship between skill levels and travel frequency is strong and consistent across the migrant groups.[14] Those in skilled occupations are likely to have higher disposable incomes, and hence greater opportunities to travel overseas for personal reasons, as well as a higher likelihood of work-related international travel.

6. Conclusions

In this paper we focused on the international mobility of New Zealand migrants to Australia. This topic is of interest for public policy in both countries, given that the number of New Zealand citizens residing in Australia has increased markedly in recent decades and given that more than one out of ten New Zealanders now lives across the Tasman Sea. Unique longitudinal information on arrivals and departures by individuals permitted an assessment of the likelihood of remigration of New Zealand migrants from Australia, their attachment to that country, and their international travel. To assess the impact of the removal of eligibility to labour market-related social security in Australia to visa-free trans-Tasman migrants, United Kingdom migrants acted as a control group.

[14] This relationship is also strong and consistent among temporary migrants, though the results are not shown in this paper.

We found that of New Zealand migrants who came to Australia to settle permanently, one third remigrated within four years, but this proportion is almost the same for those from the United Kingdom. However, the impact of the policy changes on the hazard rate of the mobility process is quite high: the difference-in-differences estimator suggested a 50 percent increase on the baseline hazard rate of remigration among New Zealanders. No difference was detected in the impact on onward and return moves, but settlers arriving after the policy changes had lower attachment to Australia and made more trips away. This is equally true for migrants born in New Zealand as for 'back-door' migrant from elsewhere who arrived in Australia after obtaining citizenship in New Zealand.

The present analysis can be extended in various ways. The most obvious is that it would be helpful to extend the data to a longitudinal sample of a decade or longer. This would permit the more conventional definition of remigration, i.e. a spell away of twelve months or more. With the longer observation period, it would also be possible to take account of place (home and host country) rather than just person characteristics. As noted earlier, the omission of the former is justified in the present analysis by the observation that over the short time span considered *relative* economic conditions in the UK, Australia and New Zealand did not change much.

Another extension is to contrast migrants' intension as stated on their arrival and departure cards with actual outcomes. The analysis of causes of prolonging or curtailment of trips is only appropriate for long-term visitors rather than permanent settlers and has not been considered here (but see Sanderson 2006).

A further extension that becomes possible with data on longer time-spans is to consider how travel and attachment affect subsequent remigration decisions. For example, one could ask if an increased frequency of trips home would be simply an income elastic response to successful settlement, or an investment that might pay off in subsequent return migration.

It is clear that the arrival and departure cards, combined with visa information, provide very limited information on migrant characteristics. Further in-depth analysis of migrant behaviour would certainly benefit from an in-depth survey of randomly selected new settlers, ideally followed up by subsequent interviews to maintain the information longitudinally.

Finally, some recent research using New Zealand international movement data suggests that remigration of new settlers in New Zealand is much higher than the propensity of New Zealanders to emigrate (Shorland, 2006). A comparison and analysis of international mobility patterns of the native born and migrants in both Australia and New Zealand also remains a potentially fruitful avenue for further research.

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