Migration and the Life Course: Does Retirement Trigger Interregional Moves?

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Abstract

In the context of population ageing, a good deal of controversy has emerged as to how we are to live in an ageing society. Of current concern to industry, government, and society are the consequences for tax bases, demographic compositions and social service requirements that will arise from the baby boom cohort reaching retirement in the foreseeable future. The baby boom is of distinctive nature with respect to past migration and holiday experiences, altered household structures, increased affluence and education levels. Along with the sheer size of the baby boom, these qualities underscore the need for comprehensive studies on the redistributional trends of the elderly in general and, in particular, the retirement-aged population. Although the patterns and intensities of retirement migration have been examined in several studies (Frey 1986, Haas and Serow 2002, Longino and Bradley 2003, Rogers 1988, Serow 2001), there is, as yet, no clear understanding of the causal relationships that underlie the migration behaviour of retirees. Even more importantly, the behavioural models that form the theoretical basis of most existing cross-sectional studies have barely been tested, mainly due to data and methodological constraints. Using the Household Income and Labour Dynamics Australia (HILDA) panel survey, 2001-06, we develop better insights into the causal relationship between two life course events: retirement and migration. We employed a representative sample of Australians who retired during the 6-year survey period and constructed a series of discrete-time hazard models that examined the pattern of duration dependence and the variations in the hazard of migration by type of move, socio-demographic characteristics and other contextual factors. Our results showed that the hazard of moving over long distances was highest in the year prior to retirement, while the hazard of undertaking short-distance moves was highest in the year of retirement. Long-distance movers tended to be well-educated, in the 'empty nest' stage and in their 50s, while short-distance moves were mainly undertaken for housing-related reasons.

Introduction

It is well recognised that the 21st Century will see an absolute and relative increase in the elderly population, including those of retirement-age (Himes 2001, Law and Warnes 1976, Rogers 1992, Warnes et al. 2004). At the same time, modernisation has acted to promote an increase in the level of migration among the elderly. This can be traced to a range of factors including a change in the socio-economic status of retirees with rising affluence, improved health and more flexible pension schemes, as well as the loosening of intergenerational relationships. It is often overlooked that migration contributes to shaping population age structure as much as its sister demographic processes, fertility and mortality. The changes in the population geography of the elderly, which arise from migration, have widespread implications for regional economies, housing demand, as well as the provision of health facilities and services. In the context of population ageing and the associated concerns raised by all levels of Government, an understanding of retirement migration is extremely timely, particularly when considering that the baby boom cohort is approaching retirement age.

Since their birth, members of the baby boom cohort born in the period 1946 – 1964, have displayed a very different behaviour than its predecessors. The baby boomers have more extensive travel experience, higher affluence, although differences in income and wealth have become more pronounced - and more flexible household structures with less family ties. As a result, they have higher expectations for their life following retirement. A high proportion of today's and tomorrow's retirees want to pursuit an independent and active lifestyle. Old age has been converted from a short 'empty' period marred by ill health and physical incapacities to a 'third age' of life during which new social and recreational activities are pursued (Laslett 1989). Quality leisure time, a high-amenity living environment and holidays have a higher importance for the baby boomers compared to their parents or grandparents. Considering these factors, it is little surprising that the baby boom cohort in the UK, the US and Australia has exhibited new redistribution tendencies throughout their lifecourse (see for example Frey 1986), contributing significantly to the counterurbanisation movement. Thus, it is more than likely that the migration patterns of the retired baby boom cohort will be quite different compared to those of the predecessor cohorts. With the trend towards early retirement, we are likely to witness the change in trends well before this cohort passes into the official retirement age category of 65 years.

In this context, it is somewhat surprising that only limited attention has been directed towards exploring the numerous factors that influence the migration decision making of the elderly, such as income and assets, housing tenure, and environmental stress, only to name a few. In particular, facilitated by the increasing availability of panel data, there is renewed interest in the life course perspective and causal relationships between events. While studies have highlighted the importance of life course events in determining migration decisions of the working-age population (e.g. Herzog et al. 1993), remarkably little attention has been given to the way migration behaviour is influenced by the life course event 'retirement'.

Event history methods are frequently employed in social research to study the occurrence and timing of life course events. Surprisingly few studies have yet attempted to use this increasingly popular method in migration research. This study represents a departure from the previous existent empirical literature on retirement migration. Using a taxonomy of discrete-time event history models, we sought to add to the knowledge of the dynamics and correlates of retirement migration. Our main focus lies on explaining the dynamics and correlates of retirees' migration behaviour *per se*, instead of describing the type of migration imposed by developmental and life-course models. We address the following questions: (1) How does the probability of migration around retirement change over time and does it vary by type of move? And (2), how do demographic characteristics, resources, housing composition, previous migration experience and health status influence migration? Unlike many previous studies on this subject, our study does not center on the analysis of covariations between the frequency of migration and the status of exogenous variables. Instead, this paper emphasizes the importance of individual life course patterns and the relative timing of events, including their causal relationships.

The next section of this paper reviews the critical concepts of, and measurement strategies associated with, retirement migration in a life course perspective. Within this section, we address problems associated with cross-sectional analyses using age-based proxy measures, discuss the progression from life cycle to life course models and summarize the improvements to empirical research provided by event history models. We then discuss state-of-the-art methods for measuring life course events and the relationships between different events and transitions. The data and methods employed in this work are introduced in the third section, followed by the methodology and a presentation of the modelling results. We close the paper with a discussion of the implications of our findings for future research.

2. The life course perspective in migration research

Cross-sectional analysis based on age migration schedules and age-based proxy measures

In the international literature it is well established that migration is selective with regard to age and life course stage (Rogers & Castro 1981). Age-specific migration rates show strong regularities both across countries and over time. Individuals aged 55 and over tend to move from metropolitan to non-metropolitan areas, while the younger adults aged 55 and under move in the opposite direction. Within the elderly age group, different types of types of migration (local, intrastate, interstate) are again dominated by a certain age cohort: the younger elderly (aged 55-69 years) tend to move interstate, while the older elderly (aged 70 and over) mainly undertake local moves. The regularities in age profiles of migration flows have been conceptualised by Rogers et al. (1978) in the model migration schedule. Four transitions from one life course stage to another shape the form of the migration schedule, namely early childhood, entry into the labour force, retirement, and late old age. In later studies, Rogers and Watkins (1987) extended the validity of the model migration schedule. Focusing on elderly migration, the authors suggested that age profiles of particular types of migration streams have a retirement peak in the 60-64 or 65-69 year age groups. This interval coincides with the compulsory retirement age at which people exit the labour force in most developed countries.

The research by Rogers et al. (1978) on the regularities in migration age profiles laid the foundation for subsequent studies on elderly migration in general, and retirement migration in particular. Following Roger's et al. (1978) discovery of a relationship of age with intensities and types of migration, several authors examined the distinctive geographical patterns produced by elderly migration. Recent trends toward younger retirement have led to attempts to include individuals under the age of 65 in studies of elderly migration. Studies of elderly migration frequently use age 60 as the elderly cut-off in order to capture these early retirees and to account for wives who migrate with their husbands (Longino 1980, Longino 1984, Flynn et al. 1985, Yeatts et al. 1987). An indirect result of lowering the cut-off age, however, is that a greater number of the elderly cite job-related motivations for migration. In an attempt to minimize the overlap between working and retired migrants, Rogers (1989) suggested the use of a 65-plus age threshold. Yet inevitably linked with this praxis is the assumption, that labour force motivations shape migration behaviour until retirement, at which point in time retirement motivations take over. Consequently, this approach overlooks the changing nature of both work and migration behaviour throughout the life course, and does not account for the possibility of lifestyle-motivated moves (which are commonly classed as retirement moves) to be undertaken in the eve of retirement while still in the labour force. In addition, lifestyle changes like second homes, flexible pension schemes including early retirement, and technologies like telecommuting have opened up new possibilities for combining – and blurring – retirement and work life. This results in further weakening of the position of an absolutist, age-based approach to retirement. When studying retirement migration we should thus be cautions in assuming that (a) the age at which people *retire* has limited influence on migration behaviour, (b) people move within a few years after the life course event that migration is linked to (i.e. retirement), and (c) the age at migration is a reliable predictor of the type of move.

Advances in theoretical research on migration and the life course

Rossi (1980) refers to the family life cycle, where formation at marriage, extension with birth of children, contraction with children leaving home, and dissolution with death of a spouse are the key stages that an individual goes through. But over the last decades, we have witnessed a departure from the rather straightforward life course that people tended to follow in the 1960s, the time when Rossi put forward his life cycle model.

Given the variation in life course trajectories and the timing and sequence of events within these trajectories, no clear picture could yet be painted of the ideal lifecourse in western societies. Due to a lack of consensus regarding what should be considered an ideal life course, together with the unavailability of longitudinal data sets, the life course model has shown marked resistance to empirical confirmation. While the analysis of the entire life course was thus outside the scope of scientific research, a number of studies have focused on individual life course events and transitions, such as leaving home or the birth of the first child. Following this trend, research on the relationship between life course trajectories and migration patterns has mainly focused on the behaviour of young adults and those in the latest stages of adult life. The events used to explain migration behaviour were limited to marriage, divorce and widowhood (see for example Bradsher, Longino, Jackson and Zimmerman 1992, Speare and Goldscheider 1987, Flowerdew and Al-Hamad 2004).

In an attempt to uncover the life course events related to elderly migration, Litwak and Longino (1987) suggested a concept called a ‘life course model of later life migration’. Based on limited empirical evidence from census data, they argue that elderly mobility is triggered either by the desire to maximise environmental and lifestyle amenities, or by declining health status and the associated need for care. In the 1990s, a number of studies were concerned with assistance-related moves and, based on the limited data that was available at the time, mostly confirmed the idea of a life course model of later life migration. However, there was a considerable lack of data suitable for testing causal models of migration (Longino et al. 2008).

Yet there are other aspects of the life course that are frequently linked to migration behaviour, but have received less consideration. Of particular importance is the need to uncover the causal relationship between retirement and migration, given that baby boomers will reach retirement-age in the foreseeable future. To the best of our knowledge, there is only one study that has yet attempted to address this issue. Longino et al (2008) use event history methods to analyse the contextual and personal characteristics that underlie non-local moves of the retirement-aged population. Using the US Longitudinal Study on Aging, the authors discover that persons who retired recently, meaning less than 6 months ago, are more likely to undertake a long-distance move than those who were not retired. Event history models also enable a closer look at the baseline hazard and duration dependence, that is whether the hazard of migration increased or decreased over time until the status change (i.e. migration) occurred.

Advances in empirical life course research on migration through event history methods

Almost three decades ago, DaVanzo (1982) highlighted the suitability of event history analysis for migration analysis. Somewhat surprisingly, his words remained mostly unheard in this field of study and event history methods have been slower to gain acceptance by migration researchers compared to other areas of demography and sociology. Yet event history methods have important advantages over cross-sectional methods, as they allow us to account for a number of factors that cannot be considered when using cross-sectional data. Firstly, retirement age ranges from 55 to 65 years and differ between men and women. Secondly, the trend towards early retirement, although it reversed in recent years, requires the age-based proxy measure to be adjusted to this trend when doing time-series analyses. Due to reasons of practicality, however, variations in retirement age over time are barely addressed in existing research. Thirdly, the timing of retirement is also depending on the type of job, household structure and wealth, health, personal preferences, a further complicating factor when using proxy measures. And fourthly, retirees become increasingly diverse, as life patterns and household structures diverge, the standards of living rise, attitudes to kin, care and place ties change, and holiday experiences widen the personal horizon. It becomes clear that there are a number of issues that have to be considered when undertaking life course research of retirees. As noted in Tuma et al. (1979), the dynamic analysis of event histories is highly suited for handling diverse migration careers. Yet there are some limitations to the scope of analyses, which are mainly due to data limitations. Most data available today on migration is measured in discrete-time, although the underlying migration process occurs on a continuous time scale. As a result, the distinctions that can be made between pre- and post-migration characteristics become less clear.

Despite these limitations, event history methods in life course research are still superior to cross-sectional methods, as they allow us to develop better insights into the question whether migration is a product of a status (here: retired) or of the transition into a status (here: retirement). A number of studies have addressed this question with respect to life course events of young adults and the very old segment of the population. Some of the first studies using event history methods in migration research looked at employment-related events. Sandefur and Scott (1981) and Sandefur (1985) used one of the first longitudinal dataset covering migration behaviour that was available in the US to study the effects of work careers and family life cycles on migration for people aged 39 or younger, thus missing the elderly age group. The role of migration in the transition to employment was also analysed by Herzog et al. (1993). In the British context, residential mobility and housing adjustment was studied by Ermisch and Jenkins (1999) and Clark and Huang (2003) using hazard models. The relationship between migration and marriage in the life course was examined by Mulder and Wagner (1993) and Odland and Shumway (1993), who confirmed that events related to marital status and employment status have an effect on migration behaviour. What remains missing, however, is empirical evidence of the association between migration and retirement.

While most studies of migration behaviour have centred on analyses of covariations between the frequency of migration and the status of exogenous variables, this paper focuses on the duration from the life course transition into retirement until migration occurs. Central to this approach is the baseline hazard and its variation over time. The baseline hazard summarises duration dependence, in other words: the main effect of time, and describes the overall level of risk. Thus the hazard will reveal at what point in time before or after retirement the hazard of migration is the highest. A crucial question in this context is as to whether migration propensity varies solely by *age at migration* (as assumed by most existing research) or also by *age at retirement*. Although the baseline hazard facilitates the discovery of fundamental aspects of retirement migration, no study has thus far addressed the duration dependence with respect to retirement and migration. The discrete-time event history model used in this study aims to address this deficiency by discovering and affirming the causal mechanisms that underlie geographic mobility of retirees.

3. Data

The data used for this project come from wave one to six of the Household, Income and Labour Dynamics Australia survey (HILDA, hereafter). A detailed description of this dataset can be found in Watson and Wooden (2002). The HILDA is a nationally representative sample of Australian households and contains information on individual and household level. Data on economic and subjective well-being, labour market dynamics, and family dynamics was collected from 13,969 individuals in 7,682 households in annual waves, six of which were conducted between 2001 and 2006. 3,884 persons of the initial sample were lost to attrition, resulting in 10,085 persons of the initial sample to be re-interviewed in the 6th wave. Personal interviews with all household members aged 15 years and over were supplemented with a household questionnaire and a self-completion questionnaire (SCQ) to be returned to the interviewer at a subsequent visit or by mail. For this study, information on household level about income and wealth was combined with the individual-level dataset. An unbalanced panel containing all person-periods (i.e. a person has a many records as periods of observation) of responding persons was then created using the 6 waves of data. The resulting dataset contained 77,810 person-period records.

In this paper we analyse the migration behaviour of retirees. Accordingly, we extracted a subset of individuals from the unbalanced panel that met the following criteria: (a) aged between 50 and 75 years in at least one survey wave, (b) retired during the survey period, and (c) had no gaps in survey participation (missing waves). We used a measure of employment status from the personal questionnaire to identify transitions into retirement. A change in employment status from (a) full-time employment, (b) part-time employment (c) 'unemployed but looking for work' or (d)'home duties' to either 'retired' or 'home duties' was define as retirement. Following a suggestion by Glaser and Grundy (1998), we also included housewives into the sample who stated a transition from 'home duties' to retirement, and also females who stated 'home duties' throughout the survey period (i.e. housewife without retirement transition). We also incorporated the latter two subgroups into the sample since the literature suggests that retirement moves are frequently undertaken by couples. In a one-income family, the retirement of the husband may be the triggering event and the housewife becomes a 'tied mover'. In the context of moving couples, it was also necessary to randomly selected one person per household of all married couples to reduce sample bias.

In order to measure the duration from retirement to migration, we set the time variable (i.e. year) to start (i.e. be equal to one) one year prior to retirement. The motivation for including the year prior to retirement is twofold: (1) to account for the possibility of retirement-related moves to be undertaken in the eve of retirement while still in the labour force, and (2) to include migration events of wives who move together with their retired husbands as 'tied movers', but are still employed (possibly part-time) at the time of the move. Persons who were already retired at the beginning of the survey in 2001 are not considered in this analysis. Since the event of retirement occurred in any of the six HILDA waves, the implementation of the time variable resulted in 6 cohorts to be formed based on the year of retirement. The cohort setting lead to the deletion of all person-periods that were recorded two or more years prior to an individual's retirement (see Figure 1). After applying the above mentioned criteria, 4,156 person-period records representing 1,128 persons remained in the dataset.

	HILDA Data set					
	Wave 1	**Wave 2**	**Wave 3**	**Wave 4**	**Wave 5**	**Wave 6**
Cohort 1	2 Retirement	3	4	5	6	-
Cohort 2	1	2 Retirement	3	4	5	6
Cohort 3	-	1	2 Retirement	3	4	5
Cohort 4	-	-	1	2 Retirement	3	4
Cohort 5	-	-	-	1	2 Retirement	3
Cohort 6	-	-	-	-	1	2 Retirement
	Retirement Time (years since retirement -1)					

Figure 1. The construction of the data set with 6 cohorts based on the year of retirement

We defined migration - the event of interest in this study - as a change of usual residence by an individual over a one-year time interval, including short-distance moves within the same administrative region. Although the HILDA in-confidence dataset includes individual-level information for Census Collection Districts, the smallest geographic area for which Australian

Census data is available (about 220 dwellings in urban areas), we aggregated these small geographic units and measured migration for 69 Temporally consistent Statistical Divisions (TSDs) covering the whole of Australia (Bell et al. 2000) (see Appendix I for details). This reduced the number of zeros in the dataset and allowed us to compare the spatial patterns discovered in this study with other work that employed cross-sectional data from the Australian Census. We distinguished between short-distance moves within the same TSD and inter-TSD moves over longer distances.

4. Methodology

We conducted discrete-time event history analysis of the timing of migration following retirement that occurred between 2001 and 2006. Our approach was designed to pinpoint when retirees were most likely to (i.e. at risk) migrate and to identify personal and contextual characteristics that influenced the probability (i.e. the hazard) of migration. It is apparent that only a small percentage of the individuals in our sample migrated during the observation period. The majority of respondents remained in the same place of residence during the survey. These observations are right-censored with respect to our analysis of migration. Standard econometric tools such as logistic regression cannot handle censored data adequately. In event history analysis, both migrants and non-migrants contribute to the hazard calculation. In discrete-time, the hazard (h_j) is the conditional probability that a person migrates in a particular year (time interval t_j), given that he/she has not migrated before t_j. The discrete-time hazard is defined as:

$$H_j = P(T = t \mid T \geq t_j)$$

where T is a discrete random variable that indicates the time of the event (Jenkins 1995, 131).

A widely used model in discrete-time event history analysis is the complementary log-log model, which is the discrete-time counterpart of an underlying continuous-time proportional hazard model (Prentice and Gloeckler, 1978). The log-log link function is suitable if a proportional hazards model holds in continuous time and the survival times are interval censored. In proportional hazard models, the hazard rate $\theta(t, X)$ satisfies an important separability assumption: $\theta(t, X) = \theta_0(t)\exp(\beta' X)$, thus is the product of a non-parametric baseline hazard $\theta_0(t)$, which may differ in each interval, and $\exp(\beta' X)$ where β' is a vector of parameters to be estimated and X is a vector of covariates that captures the observed differences between individuals. The hazard function $h(t_j, X_{ij})$ shows the yearly hazard of migration for the time interval t_j (i.e. the time between two annual HILDA interviews). The discrete-time hazard in the *j*th interval thus has the following form:

$$h(t_j, x_{ij}) = 1 - \exp\{-\exp(\beta' X_{ij} + \gamma_j)\}$$

where γ_j refers to the baseline hazard. We had no reason to impose restrictions on the baseline hazard (i.e. to specify it parametrically) and thus used a set of dummy variables to represent the effect of time since one year prior to retirement.

The dependent variable was a binary indicator variable $d_{it} = 1$ if a person *i* makes a transition (migration) (their spell ends) in year *t*, and $d_{it} = 0$ otherwise. The setup of the binary dependent variable was similar to that used in logistic regression. Although 141 of the 349 moves undertaken by individuals in the sample were repeat moves (i.e. the individual moved more than once during the survey), we did not analyse multiple spells. The distinction made between short- and long-distance moves, however, resulted in a marked decrease of the number of multiple spells since several respondents moved twice during the study but undertook different types of moves each time. Since we calculated two separate taxonomies of models by type of move (i.e. for short- and long-distance migration), the multiple moves contributed to a different model.

Maximum likelihood estimates of the coefficients of the discrete-time hazard model were estimated using standard regression techniques with a log-log link (Jenkins 1995, Singer and Willett 1993). The complementary log-log models were estimated using the cloglog command in Stata Version 10. The discrete-time hazard h_{ij} (the probability that the *i*th retiree would migrate in year *j*, given that he/she had not migrated before), was modelled using a complementary log-log function. The β' parameters were estimated using the person-period data outlined above. Period-specific dummies for each of the six waves of HILDA data were included to estimate the non-parametric baseline hazard (Jenkins 1995, Singer and Willett 1991, 1993).

Covariates

Using a flexible non-parametric baseline hazard specification, the proportionate change in the baseline hazard caused by changes in the independent variables is indicated by the model coefficients. The time-varying covariates in the model cause the hazard of migration in year *j* to be dependent on the value of the time-varying covariate in that particular year *j*. The covariates used in this project were selected based on findings in the literature and have been used frequently in other studies on migration. Previous research indicates that long-distance retirement migrants are positively selected with respect to income, education, health and housing assets (Biggar 1980, Clark and Davies 1990, Sommers and Rowell 1992), while short-distance moves are primarily housing- and assistance related (e.g. Litwak & Longino 1987). Studies have also found that family structure (Bradsher et al. 1992), number of adult children (Spitze et al. 1992), proximity to next of kin (Lee et al. 1990), health and economic resources (Longino et al. 1984), and proximity to recreational facilities (Steinnes & Hogan 1992) explain the selectivity of retirement migration. Lifestyle-related migration tends to be undertaken by couples, whereas lone person households tend to move over shorter distances for health-related reasons (Biggar 1980; Haas & Serow 1993; Sommers & Rowell 1992). Most of these studies, however, employed cross-sectional data and traditional methods of analysis. We incorporated variables that represent a wide range of personal and contextual factors to assess the validity of the findings outlined above in a dynamic event history framework. Another major benefit of event history methods is the inclusion of time-varying covariates. This allowed us to account for changes of characteristics (e.g. marital status) that occur during the survey period and to evaluate their influences on the hazard of migration. The covariates used here are listed in Table 1.

Table 1 Covariate definition

Retirement Time	Time since the wave prior to retirement in years (period dummies)
Female[a]	Dummy variable that takes the value of 1 if female, 0 if male
Education tertiary[a]	Dummy variable that takes the value of 1 if the respondent has a postgraduate degree, bachelor degree or a graduate diploma, 0 otherwise
Move history[a]	Dummy variable that takes the value of 1 if the respondent has moved previously at least once in the last 10 years, 0 otherwise
Age below 60[b]	Dummy variable that takes the value of 1 if the respondent is aged 59 years or younger, 0 otherwise
Married [b]	Dummy variable that takes the value of 1 if the respondent is legally married or de facto, 0 if single
Divorced [b]	Dummy variable that takes the value of 1 if the respondent is divorced, 0 if single
Widowed [b]	Dummy variable that takes the value of 1 if the respondent is widowed, 0 if single
Empty nest [b]	Dummy variable that takes the value of 1 if the respondent's children have all left home, 0 if never had any children or resident children at home
High household income [b]	Dummy variable that takes the value of 1 if the respondent has a yearly household income of at least AU$35,000 (mean)
Renting [b]	Dummy variable that takes the value of 1 if the respondent is renting, 0 if he lives in self-owned property or lives rent-free
Low home value [b]	Dummy variable that takes the value of 1 if the property of the respondent is worth less than AU$192,000
Poor health [b]	Dummy variable that takes the value of 1 if the respondent stated fair or poor health, 0 if stated good, very good or excellent health

Note: a = time-constant, b = time-varying

5. Results

In order to better understand the duration dependence in migration behaviour, we first evaluated the baseline hazard of both long-distance and short-distance moves within Australia. We used the baseline hazard as a sensitive lens to detect when migration was most likely to occur relative to the timing of retirement. Figure 2 shows the hazard functions for our sample of retirees by type of move plotted as step functions. Examining this panel, we see that, among the 1,128 retirees in our sample, about 7% made a long-distance move in the first year of observation (i.e. the year prior to retirement), while almost no retiree made a short-distance move. The hazard of long-distance moves declines markedly in the year of retirement and is reduced even further in the years after retirement. The hazard of short-distance moves shows that retirees were most likely to move short-distance in the same year in which they retire, suggesting that the circumstances surrounding the move, and the motivations triggering it are different by type of move.

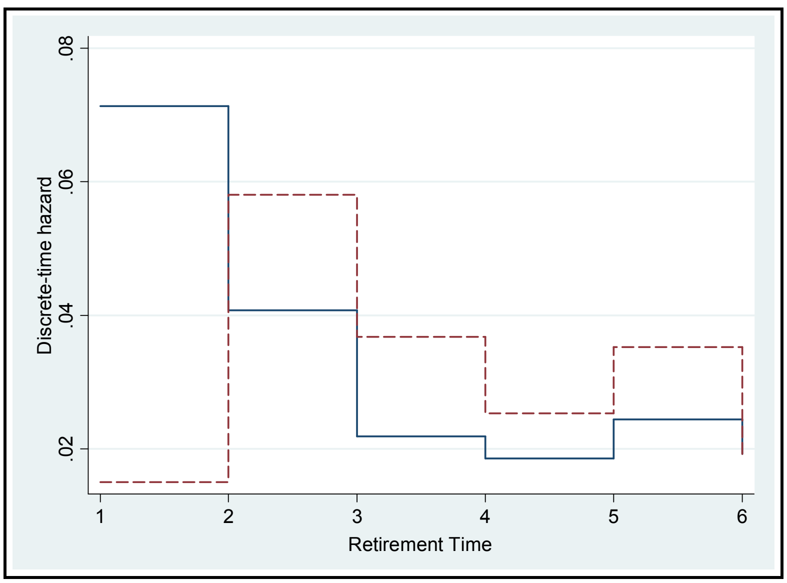

Figure 2. Sample hazard functions for long-distance (solid) and short-distance (dashed) moves

Disaggregating the sample of retirees by gender and examining the hazard of long-distance moves, we found stinking differences between the sample hazard calculated using females and the hazard for males. Figure 3 shows that the hazard for males remained at a very high level in the year of migration, while the hazard for females dropped suddenly to a very low level.

Following an initial assessment of the baseline hazard, we estimated the β' parameters using the cloglog command in Stata Version 10, constructed estimates of the hazard in each time interval, and obtained a maximum likelihood estimate of the hazard functions of short- and long-distance moves. To analyse the effects of a range of covariates on the hazards, we fitted a taxonomy of

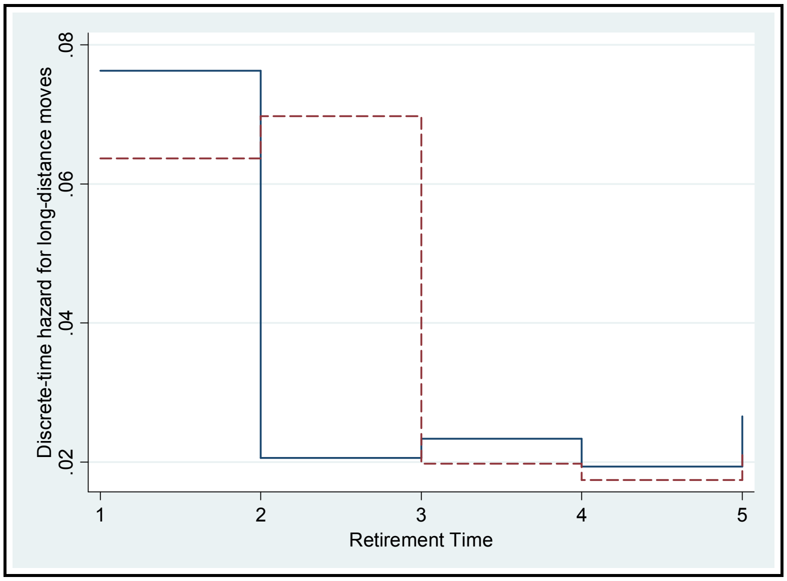

Figure 3. Sample hazard functions for long-distance moves for females (solid) and males (dashed)

models. The parameter estimates, significance levels and goodness-of-fit statistics for six models are shown in Table 2. Model 1a and 1b contain the time indicator variables and two time-constant predictors. Model 2a and 2b present an extension of Model 1 in that we included a number of time-varying covariates. The goodness-of-fit statistics of the extended models have decreased for both short- and long-distance moves, for the loss of 9 degrees of freedom. The addition of the time-varying predictors did significantly improved the overall fit of the hazard models. While the fit of the short-distance model was not greatly improved through the inclusion of time-interaction variables, the fit of the long-distance model was improved (a difference of 26.9 for the loss of 4 degrees of freedom) when time-interaction variables were included.

A major benefit of modelling the binary migration outcome using a complementary log-log link is that the results are closely comparable to those of continuous-time proportional hazard models (Allison 1995, Singer and Willett 1993). We can thus interpret the exponentiated coefficients in our results as hazard ratios. Our models for short-distance moves (Table 2, Models 1a, 2a and 3a) showed that all covariates except 'Renting' had no statistically significant effects on retirement migration, although a number of coefficients were in the expected direction. High education levels, being in the empty nest stage and being married caused the hazard to decrease, while an active moving history, and renting a home increased the hazard of moving. In every period under observation, the hazard of migrating were almost 4-times higher for individuals who rented a property compared to those who lived in privately owned homes. Respondents who retired prior to age 60 had a higher hazard of moving short-distance, although the exponentiated coefficient was much lower than the corresponding value for long-distance moves. The hazard rations of Model 1a to 3a indicate that short-distance moves were primarily motivated by housing-related reasons. This is confirmed by the question on reasons for moving, which was included in the HILDA self-completed questionnaire (SCQ). Based on the answers given in the SCQ, more than 50% of retirees who stated a reason for moving in the SCQ moved a short distance for housing-related reasons. In comparison, only 35% of retirees who moved over a long-distance did this because of housing issues.

Table 2. Discrete-time survival models using a complementary log-log link for migration of retirees, 2001-06, by type of move (N = 4,156 person-period records)

	Short-distance moves			Long-distance moves		
Variable	**Model 1a Exp(β)**	**Model 2a Exp(β)**	**Model 3a Exp(β)**	**Model 1b Exp(β)**	**Model 2b Exp(β)**	**Model 3b Exp(β)**
Period 1	0.0167***	0.0050***	0.0076***	0.0628***	0.0063***	0.0051***
Period 2	0.0659***	0.0436***	0.0419***	0.0353***	0.0032***	0.0050***
Period 3	0.0423***	0.0257***	0.0234***	0.0223***	0.0022***	0.0016***
Period 4	0.0291***	0.0191***	0.0169***	0.0188***	0.0020***	0.0019***
Period 5	0.0406***	0.0289***	0.0286***	0.0249***	0.0028***	0.0025***
Period 6	0.0215***	0.0213***	0.0445***	0.0193***	0.0023***	0.0023***
Female	0.8612	0.9451	0.4232	0.8795	0.9650	1.3975
Education tertiary	0.7540	0.7530	0.7640	1.4948**	1.8576***	1.8916***
Move history	1.6127	1.3666	1.3714	6.6214***	6.4317***	6.2404***
Age below 60		1.2885	1.2866		1.4262**	1.4575**
Married		0.8089	0.8053		3.4335	3.3496
Divorced		0.8956	0.8951		2.8997	2.6973
Widowed		0.7902	0.7923		2.4707	2.4531
Empty nest		0.9266	0.9300		1.9739***	1.9924***
High h'hold income		1.1691	1.1661		1.1589	1.1532
Renting		3.8853***	3.9115***		2.4119***	2.4115***
Low home value		1.0355	1.0329		1.3320	1.3180
Poor health		1.0732	1.0674		1.3594	1.3861
Period 2 X female			2.3807			0.2734***
Period 3 X female			2.5957			1.1361
Period 4 X female			2.6895			0.7975
Period 5 X female			2.2591			0.8605
Period 6 X female						0.6927
-2LL	1527.69	1246.90	1232.52	1530.93	1382.54	1356.19
Change in -2LL (df)		280.79 (9)	14.38 (4)		148.39 (9)	26.35(4)
p		0.00	0.00		0.00	0.00

$^{**}p \leq .05$; $^{***}p \leq .01$ (two tailed)

Models 1b-3b for long-distance moves showed that being well educated, having moved numerous times before, being aged younger than 60, being in the empty nest stage and renting a home significantly increased the risk of migrating during the survey period. A transition from married to divorced or widowed reduced the exponentiated coefficient by 0.7 and 0.9 points, respectively. In other words, marriage dissolution reduces the hazard of migrating over long distances. In every time period, the hazard of a long distance move was twice as high for individuals who were in the empty nest stage (i.e. all children had left home) compared to those who had either no children or children still living at home. This supports the common theory that an 'empty nest' facilitates long-distance moves. Neither the effect of income nor housing value was significant, although the sign of coefficient indicates that high income households have a 15% higher risk of moving than low income households. Our findings showed that, in every period of the observation window, a health deterioration increased the risk of migrating over long distances by 35%. Although the effect was only marginally significant (p=0.06), this finding contradicts earlier research which stated that long-distance retirement migrants tend to be of better health than non-migrants. The interaction variables of sex with time in Model 3b confirmed statistically what we observed earlier from the sample hazard plots by gender: the hazard for females in the second period (the year of retirement) was significantly reduced by 73 %, compared to the hazard in the first period. Thus we can reject the proportional hazard assumption with respect to gender.

7. Discussion and conclusion

The dynamic analysis of HILDA panel data presented in this paper allowed us to develop better insights into the validity of the life course model with respect to retirement migration. We examined the timing of migration with respect to the life course event ‚retirement' and shed some light on the causal relationship between the work- and migration careers of individuals in Australia. We were concerned with the effects of personal and contextual characteristics on migration behaviour, but our approach differed from that of most existing research in that we accounted for the effects of change in the status of covariates on migration. We found marked differences between the baseline hazard of short-distance moves and the hazard of long-distance moves for the entire sample. In the survey period 2001-06, the hazard of long-distance moves was higher in the year prior to retirement, while short-distance moves occurred at a higher rate in the years after retirement, particularly in the year of withdrawal from the workforce. From our observation of the baseline hazard functions we can conclude first, that gender is related to the probability and the timing of migration; secondly, that the majority of retirement migration occurs in the year of retirement and the year leading up to it; and thirdly, that most females move prior to their retirement. This suggest a high proportion of female 'tied mover' as well as less place-ties associated with the job-location of females compared to males.

Our results demonstrate that several time-varying covariates have a significant effect on migration behaviour. Crucial in this context is the timing between migration and retirement as well as status changes in covariates. The timing of migration is associated with the timing of retirement and also the status changes in household composition (with respect to resident children) and tenure. Therefore, our findings confirm the general hypothesis that retirees adjust their place of residence in response to the altered conditions brought about by retirement, although the hazard ratios representing status changes in health, marital status, income and home value were not significantly different from the reference categories. In conclusion, we emphasise that individuals who are on the eve of retirement display a migration behaviour that is commonly associated with the time following retirement. This is particularly the case for long-distance moves and female migrants.

The findings presented in this paper contribute to better understand the determinants of retirement migration and its spatial patterns and have implications for service and infrastructure provision. Yet our work has several limitations. We had only 6 waves of data available from the HILDA survey, which limits the number of retirement and migration events that can be observed in the sample. As a result, out dataset contained a high proportion of censored individuals. Although this reduces the power of our results, we could provide new insight into the causal relationship between retirement and migration. One of the key questions that this paper addressed was whether migration propensity varies solely by *age at migration* or also by *age at retirement*. Examining at the sample hazard function of migration by age group, we can conclude that people who retire before age 60 have a higher hazard of moving around retirement than those who retire at an older age.

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Appendix I

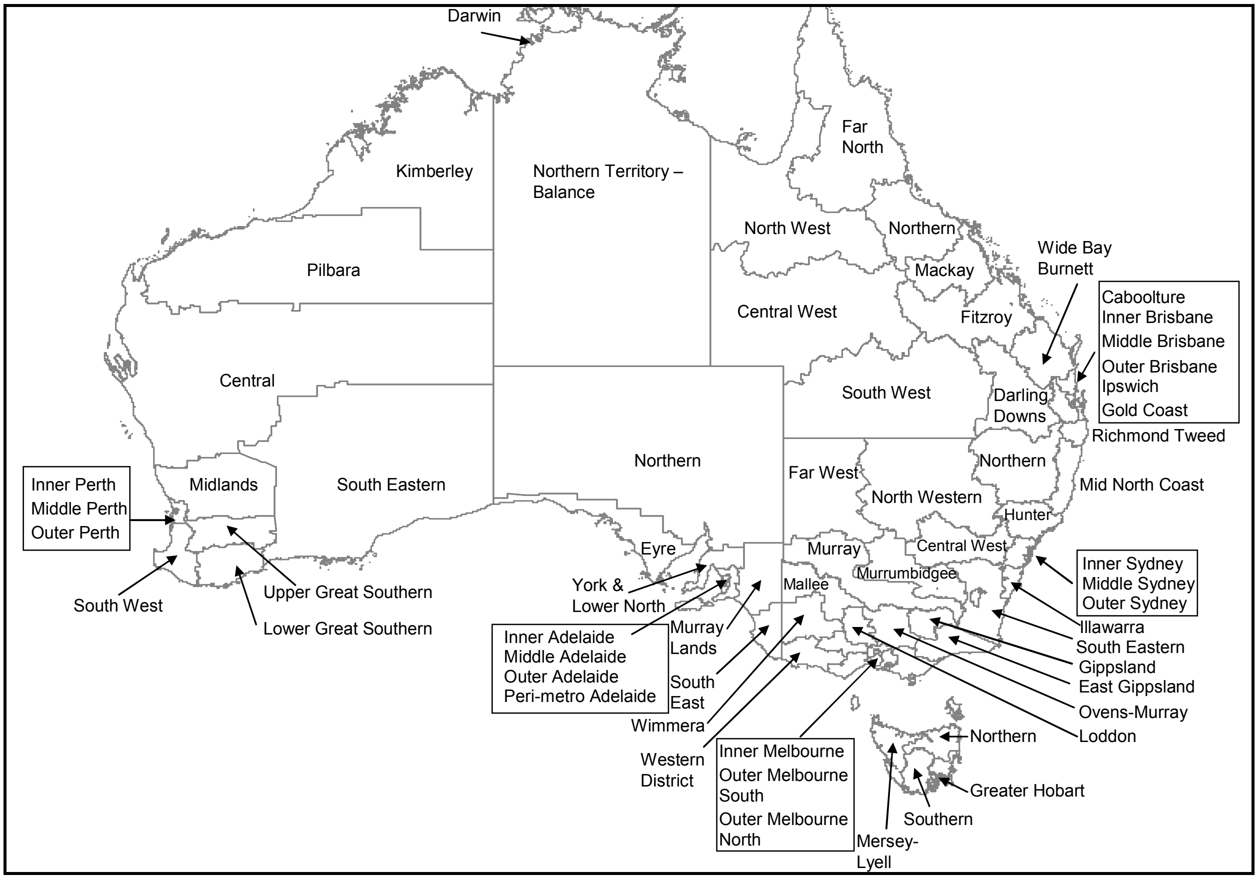

Figure 1) Temporally consistent Statistical Divisions (TSDs), Australia, 1976-81 to 1996-01 (Bell et al. 2000)