

Holistic Housing Pathways for Australian families through the childbearing years

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Abstract.

In the 1950's the typical housing tenure pathway was more clearly defined with young adults leaving the family home to marry following by the birth of the first child while residing in a rental home, followed by entering home ownership. For the first time in Australia longitudinal data is available that allows to examine tenure transitions along with other life events, in particular birth of children, marital transitions and changes in employment. Sequences of tenure transitions and life events are derived from a sample of 4345 adults from ten waves of the longitudinal Household Income and Labour Dynamics in Australia (HILDA) survey with a focus on families of childbearing age. The statistical technique of multi-channel sequence analysis is used to group similar sequences of housing tenure transitions as they occur alongside other key life-events, identifying a typology of housing pathways. Over a period of ten waves, there is a large group of individuals (52.8%) that are referred to as 'stayers' and do not experience any transitions in housing tenure status during the period of the survey. This group shows relatively fewer transitions between marital statuses, compared to the 'mobile' group of individuals that changed their housing tenure status at least once throughout the observed period from 2001 to 2010. The main typologies identified were related to transitioning into home ownership and with the birth of a child either before or after the transition. The majority of tenure and life event sequences show that individuals are already married by the time of transitioning into home ownership. Changes in employment status have not been found to contribute to tenure changes in a substantial way. Results show that life events are still interrelated with housing transitions, but in a less predictive way. Pathways are now more diverse with transitions

into home ownership occurring before and after the birth of a child, noting that marriage seems to precede the decision of buying a home.

1. Introduction

Existing literature assumes that there is an appropriate order and timing for transitions of key life-events and it has been hypothesised that diverting from this order will lead to negative outcomes later on in life (George, 1993; Harley & Mortimer, 2000; Hogan & Astone, 1986). The traditional Australian family life cycle in the 1950's was clearly defined as entering into marriage, the birth of the first child while residing in a rental home, followed by entering home ownership, the birth of more children and residing in this same home until old age (Kendig, 1981; Kendig, 1984; Winter & Stone, 1999). This was challenged by the concept of 'choice', which led to the loosening of traditions and resulted in a diversity of life styles (Clapham, 2005; Giddens, 1991). Many of these changes are associated with changing life course patterns, for example, individuals are now spending more time in further education, which can explain delayed entry into the labour force; union formation that may or may not result in marriage and timing for the birth of a first child that has been pushed back within one's life course in the twenty-first century.

Understanding the pathways through housing transitions is of particular importance in Australia, as the Australian Age Pension is set at a lower rate compared to other countries, assuming outright home-ownership and hence low housing costs at retirement (Yates & Bradbury, 2010). This has long term implications for families that do not attain home ownership, making them vulnerable to poverty in retirement. The concept of linking housing transitions to life events was first developed by Rossi (1955), who concluded that housing transitions are a result of adapting housing needs to changes that have occurred throughout the life course. From around the period 1970-1980 this concept received more attention, and the associated body of literature reported a correlation between housing and key life events (Kendig, 1984; Payne & Payne, 1977). In fact, it was reported that households ascend three separate but related ladders, namely the employment, the life stage (including relationship formation and birth of first and consecutive children) and the housing ladder, referred to as a housing 'career'.

The term 'career', however implies an upwards notion, and (Kendig, 1982) defined housing careers as uniform, meaning most of the population follow the same career with the

common aim of home ownership. But recent literature (Beer & Faulkner, 2009; Clapham, 2005) on housing pathways in Australia has emphasized the increasing diversity and discontinuity of housing pathways and the emphasis has been on changes to housing 'pathways' rather than housing 'careers'. Badcock and Beer (2000) have found that housing careers do not only move upwards. They acknowledged the falling out of home ownership, and furthermore, that not everyone is making the desirable transition to home ownership. Hence, the expression "housing pathways" appears to reflect the current diverse sequence of housing transitions more appropriately.

Sociological research (Baizan, Aassve & Billari, 2004; Beer, Paris, Faulkner & Clower, 2011; Boyle, Kulu, Cooke, Gayle & Mulder, 2008; Feijten, 2002; McDonald & Merlo, 2002; McLeod & Ellis, 1982) has previously shown how life course transitions such as entering marriage, birth of a child, getting a new job, all influence the likelihood of a change in housing tenure status. Relationship formation and birth of children were identified as the primary triggers for a housing transition. In recent times, these life-events have become less predictable due to underlying changes related to the acceptance of social circumstances: the social expectation to marry has declined, and there are now several other socially acceptable alternatives to traditional marriage, including cohabiting, single life and same sex relationships (Hunt, 2005). In Australia, the birth of the first child is no longer a primary trigger for a housing transition with one third of Australian women predicted to be childless in the future, while on the other hand divorce is increasingly associated with tenure transitions (Beer & Faulkner, 2009).

The decision to undertake a tenure transition is also based on opportunities in terms of availability and accessibility of suitable housing and financial resources. Housing requires payment, and therefore it is important that a family has the financial capacity to pay for it, which in turn is strongly linked to income, education, employment status and finance, as well as household type and lifestyle choices (Clapham, 2005; Giddens, 1991).

Most up-to-date Australian research on housing pathways has been conducted taking a qualitative approach or by using primarily quantitative cross-sectional data, focussing on transitions between tenure states at a point in time (Beer & Faulkner, 2009; Beer et al.,

2011). However, to fully understand the interrelationships among housing transitions and life course events, longitudinal data is required (George, 1993). The use of cross-sectional data to investigate housing transitions, which is a longitudinal concept, is a limitation and cannot be put into context of the life course. During the twenty-first century there has been an increase in the number of studies analysing the interaction between life-events and housing transitions using longitudinal quantitative survey data. Most of these studies have been conducted by international researchers (Clark, Deurloo & Dieleman, 2003; Clark & Huang, 2003; Kulu, 2005; Kulu & Milewski, 2007; Michielin & Mulder, 2008; Mulder, 2006; Mulder & Lauster, 2010; Pollock, 2007).

Many authors have previously used event history analysis to analyse time until an event occurs (Feijten, 2002; Ginsburg, 2010), such as time until birth of a child or time until a change in tenure status. However, the focus with this analysis is on the transition itself, detaching it from past and future events. Sequence analysis on the other hand considers the whole sequence of events, putting the transitions into context. It was developed by biologists to compare DNA sequences and to draw conclusions about common ancestors. In the 1980s Abbott introduced Sequence Analysis into the discipline of sociology as it was particularly useful for theoretical approaches that are sequential theories, such as the life course theory (Abbott, 1983). In sociology research, sequence analysis is used to address questions such as “Do people share a common (life) trajectory, and if so, how is it defined?”. In reality, people deal with multiple roles simultaneously and one single sequence cannot capture an actual insight into the life course (Elder, 1985, 2003). Hence, more than one sequence should be observed in parallel over the same period of time to explain an individual’s life experience (Stovel & Boland, 2004). To better understand patterns of housing tenure transitions, it is crucial to also examine the interrelationships with transitions in other key life events such as marital status, presence and age of children and employment status. This acknowledges the principle of linked lives which emphasises that individuals are making active decisions and active choices based on opportunities and so create their own pathway, which is the basic principle of the life course approach (Elder, 1978; Neugarten & Danan, 1973). Some writers have referred to the approach that analyses multiple interrelated pathways as 'holistic' pathways (Pollock, 2007).

Australian research in this area has been extremely limited. The HILDA panel survey is the only source of longitudinal data on housing transitions in Australia and with more than ten waves of data it is now possible to analyse sequences of life events in a ten year window to identify housing tenure pathways for families of childbearing age with and without children under the age of 18 years.

In this paper, housing tenure pathways were investigated using Australian longitudinal panel data over the time period from 2001-2010 and in the context of life experiences of Australian families in childbearing age. Three research questions are addressed:

1. What are the main housing pathways in relation to tenure status that can be identified?
2. What are the interrelationships between housing pathways and marital status, employment and birth?
3. When do families enter or exit home-ownership in relation to the other life-events?

In Section 2 the selection criteria of the analytic sample are described followed by the list of variables included in the analysis in this paper. Section 3 informs about the analytic strategy, Section 4 describes the results, followed by the discussion in Section 5.

2. *Analytic Sample and Variables*

2.1 *Sample*

For this research, ten successive waves from the HILDA longitudinal survey were analysed. HILDA is a nationally representative household-based panel study, that has been collecting data annually since 2001. HILDA provides a rich source of data on economics, well-being, labour market and family dynamics over the life course. A total of 7,682 households were interviewed at wave one, which resulted in 13,696 interviewed individuals aged 15 years and older. More information about the study design can be found online in the first report of the HILDA discussion papers series by Wooden and Watson (2001).

The analytic sample is restricted to families of childbearing age across the first ten waves of HILDA, both with and without children, covering the time period from 2001-2010. The sample includes individuals in the survey from wave one with own children under the age of 18 years either living in their household or elsewhere, and independent of marital status. Additionally, individuals without children were included if they were males aged 44 years or less and females aged 41 years or younger. A sequence analysis of data across all ten waves requires a dataset that is balanced with observations at each wave for all individuals. Hence, only individuals that were interviewed at each wave from 2001 to 2010 were included. The final analytic sample included 4,345 individuals of childbearing age and who had a complete interview pattern.

2.2 *Variables*

The main focus of this study is housing pathways, particularly related to tenure change. Housing pathways can be translated into sequences of housing tenure states. Specific life events were also examined in parallel to changes in tenure status, in particular changes in marital status, age of youngest child in the household and changes in employment status. Housing tenure status was categorised into [1] paying off/owning a home (n=2453 at wave 1), [2] renting (private sector) (n=1024), [3] renting (public sector)(n=142), [4] other (n=81) and [5] living with parents (n=645). Marital status was categorised into [1] legally married (n=2266 at Wave 1), [2] de facto (n=550), [3] separated, divorced and widowed (n=314) and

[4] never married and not de facto (n=1214). Age of youngest own child was grouped into four categories, with [0] indicating no own children present in the household (n=1935 at Wave 1), [1] own child aged five and under present in the household (n=1305), [2] own child in the household aged 6-18 years (n=1099), and [3] representing own adult child(aged 18 and above) are present in the household (n=6 at wave one, but consistently increases to n=281 at wave 10). Regarding employment status, three main groups were considered, [1] employed (n=3308), [2] unemployed (n=203) and [3] not in the labour force (n=834).

3. *Analysing Sequences*

In this paper, we consider four life event sequences, with transitions in housing tenure of primary interest. Sequences of transitions in marital status, employment status, and age group of youngest own child in the household were considered as potentially motivating events for a transition in housing tenure. Before analysing the transitions as sequences, transition probabilities for housing tenure and life events were explored separately. This step of analysis allows identifying which type of transition occurs more likely than others. Then the distributions of sequences were explored separately by examining the ten most frequent sequences for each of the corresponding transition variables, that is, housing tenure, marital status, employment status and age group of youngest child. Furthermore, for each of these demographic variables, transversal state frequency plots of tenure status were produced. The examination of the ten most frequent sequences as well as the transversal state frequency plots can be found in the Appendix.

3.1 Defining multi-channel sequences

Multi-channel sequence analysis (MCSA) (Gauthier, Widmer, Bucher & Notredame, 2010; Pollock, 2007) was used to identify patterns of interrelationships among housing tenure pathways, marital transitions, the birth of a child and changes in participation in the labour market. To represent an individual's combined status across all four variables at each wave, a four digit number was used. The first digit refers to the individual's housing tenure status, the second digit refers to the marital status, the third digit refers to the employment status and the fourth digit represents responsibility for children by age group. For example, the combined status 1211 at one point in time identifies an individual that is paying off/owning

the home [1...], is in a de facto relationship [.2..], is employed [..1.], and has an own child younger than 5 years in the household [...1]. Table 1 shows four possible combined sequences for individuals present in the sample. The first sequence describes the pathway of an individual that lives with his/her parents, has never been married, is employed and has no children at wave 1 in 2001 [5410]. From wave 1 to wave 2 this individual leaves the parental home and transitions to a rental home, enters a de-facto relationship, remains employed and still has no children [2210]. Between wave 4 and wave 5 this individual transitions from a de-facto relationship to marriage [2110], and transitioned into homeownership in the following wave [1110]. A large number of different transitioning patterns can be observed (there are 180 possible combinations to explain a single state using these four digits) and therefore the probability that two individuals follow exactly the same ten year trajectory is small.

Table 1: Four potential combined sequences of events over ten years. Digit 1= tenure status, digit 2=marital status, digit 3=employment status, 4=age group of youngest child.

	Wave-to-wave sequence
Person	2001-2002-2003-2004-2005-2006-2007-2008-2009-2010
1	5410-2210-2210-2210-2110-1110-1110-1110-1110-1110
2	2210-2210-2210-2210-2211-2211-2111-2111-1111-1111
3	2220-2210-2210-2210-2211-2211-2111-2111-1111-1111
4	5410-5410-5410-5410-5410-5410-5410-1210-1210-1110

3.2 Approach to Analysis

Sequence analysis is based on establishing dissimilarities between sequences. It provides information about which sequences are more similar to one another compared to others, by comparing every possible pair of sequences and calculating the ‘cost’ of transforming one sequence into another. The algorithm used to calculate the costs is referred to as Optimal Matching (OM) (Abbott & Tsay, 2000). OM allows three different operations for the transformation process, insertion and deletions (where a state is inserted or deleted) collectively referred to as *indel* operations, and substitutions or replacements, where one state is substituted by another. Every operation has a ‘cost’ assigned. By transforming one

sequence into another, the overall costs are calculated by summing each of the relevant substitution and *indel* costs. The smallest overall cost to transform one sequence into another is then referred to as the distance between two sequences.

The substitution costs for this analysis were defined as the inverted transition probabilities. Less likely transitions resulted in higher substitution costs, and more common transitions were assigned lower costs. *Indel* costs were set to 1.5, which leads to the algorithm favouring substitutions over insertions (Allison, 2009). When the distances were established in terms of costs, Ward's method for hierarchical clustering was used to group the most similar sequences together, reducing the data to a group of homogenous clusters (Kaufmann & Rousseeuw, 2005). The most frequent representative sequence for each cluster was extracted to characterise the most common sequence of life experiences of individuals within each cluster. A neighbourhood distance of 10% of the maximum theoretical dissimilarity between two sequences within one cluster was used in this research to extract the representative sequence for each cluster. The different clusters were further examined by exploring the transversal state frequencies, separately for each sequence channel.

4. Results

The wave to wave transition probabilities have shown a high probability of individuals staying in the same tenure between waves. Since the focus of this paper is to learn more about these people but to also investigate those who do change tenure and how this relates to changes in other life events, the sample was further classified and considered as two groups being individuals or stayers with stable tenure across all ten waves, and movers who undergo a transition between tenure types at least once during the ten waves of the survey. The 2,295 individuals in stable tenure types are comprised of 1,818 individuals being home owners, 309 individuals renting (private), 55 individuals renting (social), 5 individuals in other tenure and 108 individuals living with their parents for the entire period from 2001-2010. The stayers (mean age 36.9 years) are also characterised by being on average eight years older at wave one than the movers (mean age 28.9 years). The stayers tend to already have children (70.5%) compared to 38.7% of movers and are more likely to be married (66.7%) compared to 35.9% of movers.

Transition Probabilities

As our sample is now classified into two groups, the transition probabilities were produced separately for each group (Table 2). A comparison of transition probabilities for the demographic characteristics, indicates differences between stayers and movers. Staying married between consecutive waves is dominant in both groups, however, moving into a de facto relationship is more likely amongst the movers (previously never married: 0.11, previously separated/married/divorced: 0.09) than amongst the stayers (previously never married: 0.04, previously separated/married/divorced: 0.05). Staying in a de facto relationship is less likely in the mobile group (0.77) compared to the stable group (0.87), with individuals either transitioning into being married (0.13), separated (0.02) or never married (0.08). The transition probabilities for employment status are relatively equally distributed with a higher probability of individuals transitioning into the labour force amongst movers (0.35) compared to stayers (0.26). The transition probabilities related to age of youngest child in the household are very similar for stayers and movers: not having children in the household between two consecutive waves has the highest probability of 0.94 in both groups. Having older children (aged 6 to 18 years) in the household between two consecutive waves was also high (stable group 0.95; mobile group: 0.91) (Table 2).

Despite being defined as movers (having at least one tenure transition throughout all ten waves), the probability of staying in home ownership between two consecutive waves is still predominant with a 0.86 probability. This also concludes that not staying in home ownership, hence 'falling out' of home ownership between two consecutive waves has a probability of 0.14. Most between wave tenure transitions seem to have an 'upward' notion, such as transitioning from renting (private) to owning, 0.18, from renting (social) to renting (private), 0.17, from other tenure to renting (private), 0.30, or to owning, 0.23, and from living with parents to renting (private), 0.17 (Table 2).

The substitution costs (derived from the transition rates) are then used within the Optimal Matching algorithm to calculate the dissimilarity matrix between the multi-channel sequences of housing tenure status, marital status, employment status and age of youngest child in the household. This final matrix includes the 'distances' between every possible sequence, which relates to the similarity of the multi-channel sequences. The dissimilarity

matrix is then subject to a cluster analysis in order to group similar sequences together and define a typology for housing transitions and life events. Note this analysis was done separately for movers and stayers.

Table 2: Wave to wave transition probabilities for stable and mobile individuals.

OWN=owning; RTP=rent(private); RTS=rent(social); OTH=other tenure; PAR=living with parents.

MAR=married; DEF=de facto; SDW=separated/divorced/widowed; NM=never married and not de facto

EMP=employed; UNE=unemployed; NIL=not in the labour force

0-5=youngest child aged 0-5 years; 6-18=youngest child aged 6-18 years; > youngest child aged >18years.

	Individuals with stable tenure					Individuals with changing tenure				
Tenure	OWN	RTP	RTS	OTH	PAR	OWN	RTP	RTS	OTH	PAR
OWN	1	0	0	0	0	0.86	0.10	0.00	0.03	0.01
RTP	0	1	0	0	0	0.18	0.73	0.02	0.05	0.02
RTS	0	0	1	0	0	0.07	0.17	0.72	0.03	0.01
OTH	0	0	0	1	0	0.23	0.30	0.02	0.43	0.02
PAR	0	0	0	0	1	0.08	0.17	0.01	0.02	0.72
Marital Status	MAR	DEF	SDW	NM		MAR	DEF	SDW	NM	
MAR	0.99	0.00	0.01	0.00		0.96	0.00	0.04	0.00	
DEF	0.08	0.87	0.01	0.03		0.13	0.77	0.02	0.08	
SDW	0.02	0.05	0.93	0.00		0.04	0.09	0.87	0.00	
NM	0.01	0.04	0.00	0.95		0.02	0.11	0.00	0.87	
Employment Status	EMP	UNE	NIL			EMP	UNE	NIL		
EMP	0.96	0.01	0.03			0.93	0.02	0.05		
UNE	0.50	0.26	0.24			0.52	0.27	0.21		
NIL	0.22	0.04	0.75			0.27	0.08	0.65		
Age of youngest child	No children	0-5	6-18	>18		No children	0-5	6-18	>18	
No children	0.94	0.04	0.01	0.01		0.94	0.05	0.01	0.00	
0-5	0.01	0.84	0.15	0.00		0.02	0.89	0.09	0.00	
6-18	0.02	0.01	0.95	0.03		0.04	0.02	0.91	0.03	
>18	0.20	0.00	0.00	0.79		0.26	0.00	0.00	0.74	

Multi-channel sequence analysis - Results Stayers

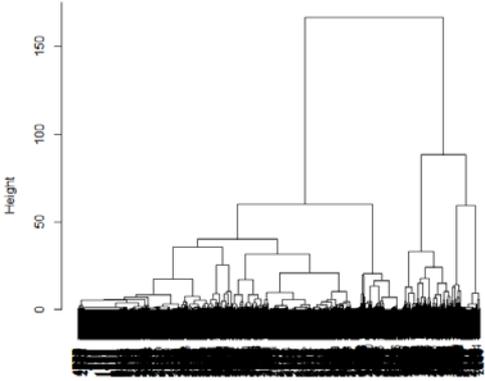
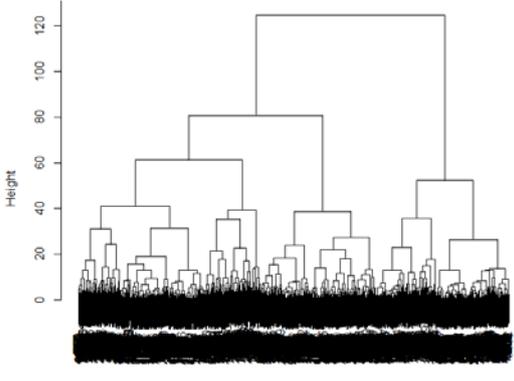
The results from the multi-channel sequence analysis followed by the cluster analysis for grouping similar multi-channel sequences (Table 3), identified two distinct clusters for the stayers (52.8%, n=2295), that are each represented by the following two multi-channel sequences: 1111-1111-1111-1112-1112-1112-1112-1112-1112 (79.4%, n=1823) and 5430-5430-5410-5410-5410-5410-5410-5410 (20.6%, n=472). For the remaining part of the paper sequences will be represented in the State Permanence Sequence (SPS) format for easier recognition of transitions; if a state does not change over a few waves, it will be stated only once followed by a number in brackets, which identifies how many waves the individual has been in this state for. Hence, the two representative sequences can be displayed as 1111(3)-1112(7) and 5430(2)-5410(8). The transitions are now apparent, the first sequence cluster represents individuals who are owning their home, are married, are employed and have children under the age of 5, transitioning to having children from ages 5 to 18 years as the children continue to grow older. The second sequence cluster identifies individuals living with their parents, are not married and not in a de facto relationship, not in the labour force and have no own children in the household. The transition occurring here is in the labour force status, changing from not being in the labour force, perhaps because of full-time study, to being employed.

Multi-channel sequence analysis – Results Movers

The results from the multi-channel sequence analysis and subsequent clustering procedure for the movers (Table 3), (47.2%, n=2050) identify three distinct groups. However to gain more in-depth information on housing transitions and interrelated life events, five clusters were investigated (Figure 1, Figure 2, Figure 3, Figure 4). The first representative sequence for cluster one was 2112(1)-1112(9). Identifying married individuals, employed, with children aged 5-18 transitioning from renting (private) into home ownership (29.3%, n=601) Individuals in this cluster are oldest at wave one (mean: 34.7years, SD 6.7). The representative sequence for the second cluster (n=282) was 2410(9)-1410(1), embodying individuals that have never been married and are not currently in a de facto relationship, are employed and have no children, transitioning from renting (private) into homeownership. The mean age in this cluster was 29.1 (SD 9.2). The third cluster is

represented by the sequence 2110(1)-1110(2)-1111(7) (n=554). This group is characterized by married individuals, employed with no children, transitioning into homeownership, followed by having children under the age of 5 a few waves later. The average age in this cluster is 27.6 years (SD 7.4). Cluster number four represents individuals that have never been married and are not currently in a de facto relationship, are employed and do not have children, moving out from their parents' home into a private rental. The representative sequence for this cluster is 5410(8)-2410(2) (n=350). This cluster embodies the youngest individuals (mean 19.0 years, SD 5.2). The fifth cluster, 2110(2)-2111(5)-1111(2) (n=263), characterizes individuals that start off as renting a private property, being married, employed and do not have children. These individuals first have children and then transition into homeownership later on. The mean age in this cluster is 31.7 years (SD 8.6).

Table 3: Dendrogram and representative sequences for each cluster, separated for stable and mobile individuals.

Stable	Mobile
Dendrogram	
<p>Dendrogram of agnes(x = mcdist, diss = T, method = "ward")</p>  <p>mcdist Agglomerative Coefficient = 1</p>	<p>Dendrogram of agnes(x = mcdist, diss = T, method = "ward")</p>  <p>mcdist Agglomerative Coefficient = 0.99</p>
Representative Sequences for each cluster	
<ol style="list-style-type: none"> 1. 1111-1111-1111-1112-1112-1112-1112-1112-1112-1112 (n=1823) 2. 5430-5430-5410-5410-5410-5410-5410-5410-5410 (n=472) 	<ol style="list-style-type: none"> 1. 2112-1112-1112-1112-1112-1112-1112-1112-1112-1112 (n=601) 2. 2410-2410-2410-2410-2410-2410-2410-2410-1410 (n=282) 3. 2110-1110-1110-1111-1111-1111-1111-1111-1111-1111 (n=554) 4. 5410-5410-5410-5410-5410-5410-5410-5410-2410-2410 (n=350) 5. 2110-2110-2111-2111-2111-2111-2111-2111-1111-1111 (n=263)

Transversal state frequency distributions of housing tenure states, marital status, employment status and age of youngest child in the household by cluster of movers

Transversal state frequency plots for every demographic variable within each cluster were produced, to visualize the trends of states across ten waves and understand the characteristics of each cluster.

Figure 5 shows that cluster three and cluster four are associated with the greatest change in the distribution of housing tenure states over ten waves. In cluster three, at wave one, there are 25.1% (n=139) homeowners and 46.8% (n=259) renters (private); these percentages reverse over time with 85.9% (n=476) homeowners and 8.7% (n=48) renters by wave ten. This group represents individuals that are transitioning into home ownership. Cluster four has the greatest proportion of individuals living with their parents at wave one (93.1%; n=326). This number steeply decreased to 10.0% (n=35) by wave ten, with 30.1% (n=105) homeowners and 48.7% (n=170) renters (private). Obviously, this cluster represents individuals moving out of the parents' home. The remaining clusters do not show a great change in housing tenure states distributions over time, however differ in their characteristics. Cluster one has consistently high rates of home owners, slightly increasing over time (wave one: 60.1%, n=361; wave ten: 72.1%, n=433). Cluster two and five show similar patterns, with a large and relatively stable proportion of renters (private) (cluster two, wave one: 47.9%, n=135; cluster five, wave one: 43.0%, n=113). Note that both clusters show an increase in renters (private), peaking around the middle of the survey, and again decreasing towards the end of the survey. Complementing this pattern for the same clusters, the proportion of home owners decreases in the first half of the survey, increasing again in the second half of the survey. This indicates that within the first half of the survey individuals are dropping out of home ownership. Cluster five has consistently highest rates of both renters (social) (wave one: 16.7%, n=44) and other tenure (wave one: 10.7%, n=28).

Further, the clusters were examined by the transversal state frequencies of marital status, shown in Figure 6. In cluster two, three and four changes in the distribution of marital status can be observed. Cluster two, which also shows consistently the greatest proportion of renters (private) at each time point, shows a decrease in the proportion of individuals never been married and not de facto from 60.3% (n=170) at wave one to 33.7% (n=95) at wave ten. At the same time, the proportion of individuals being married increases (wave 1: 12.8%, n=36; wave 10: 26.2%, n=74), whereas the proportion of individuals in a defacto relationship or being separated, divorced or widowed stays stable (defacto, wave one: 11.4%, n=32; separated/divorced/widowed, wave one: 15.6%, n=44). Cluster three, which showed a steady increase in the proportion of homeowners, also shows a

steady increase in married individuals (wave 1: 17.2%, n=95; wave10: 63.5%, n=361). In cluster four, which relates to individuals leaving their parental house, most individuals have never been married at wave one (98.6%, n=345). By wave ten, 44.6% (n=156) are in a relationship (14.6%, n=51 married; 30.0%, n=105 de facto). Cluster one and five show stable proportions of marital states across time, however cluster one has a higher proportion of individuals being married (wave one: 76.9%, n=462), compared to cluster five (wave one: 54.0%, n=142).

Employment status distributions were also examined by clusters and showed stable distribution of individuals being employed (around 75-90%), unemployed (around 4-10%) and not in the labour force (around 6-20%) for clusters one two and three, across all waves (Figure 7). Cluster four, relating to individuals leaving the parental house, and forming relationships, additionally show an increase of individuals being employed (wave one: 56.3%, n=197; wave ten: 86.6%, n=303). Cluster five, which shows consistently highest proportion of individuals in other tenure or rental (social), also have consistently the highest rate of individuals not being in the labour force (wave one: 36.9%, n=97; wave ten: 33.8%, n=89).

Next, the distributions of age of youngest child in the household were observed at each time point separately for each cluster (Figure 8). Cluster one, which is characterized by high proportions of home owners and married individuals, shows also a high proportion of individuals with children aged five and below (55.9%, n=336) and individuals with children aged 6-18 years (30.5%, n=183). This proportion was reversed by wave ten (individuals with children aged five and below: 19.3%, n=116; individuals with children aged 6-18 years: 54.6%, n=328). The main increase in individuals with children aged 6-18 years occurs in the first three quarters of the survey and is parallel to the increase in home owners. Cluster three, which has found to be related to individuals entering homeownership and getting married, shows a decrease in the proportion of individuals not having any children (wave one: 94.0%, n=350; wave ten: 47.1%, n=261); and a steep increase in the proportion of individuals with children aged 5 years and under (wave one: 2.9%, n=16; wave ten: 49.3%, n=273). Interestingly, the steep increase in the proportion of home owners (Figure 5) occurs relatively early on and towards the middle of the ten waves, whereas the steep increase of individuals having children aged five years and under, seems to occur from the middle of the survey towards the end. Cluster two and four consistently show high proportions of individuals with no children (cluster two, wave one: 78.7%, n=222; cluster four, wave one: 100.0%, n=0). In cluster four, the proportion of individuals with no children slightly decreases to 89.1% (n=312) by wave ten. Cluster five shows a relatively stable proportion of individuals with children aged 5 years and under

(wave one: 46.0%, n=121; wave ten: 39.9%, n=569) indicating the birth of children over the ten years.

The five clusters can be summarised as follows:

- Cluster one: oldest individuals (on average mid thirties), transitioning into home ownership with children aged 6 to 18 years. Most individuals in this cluster are employed and already married. The representative sequence indicates that these individuals transition into home ownership when married and have older children.
- Cluster two: aged on average around the late twenties, early thirties, mainly renters (private), some transitioning into homeownership, they are starting relationships but also include a constant proportion of individuals being separated, divorced or de-facto. The majority is employed and has no children. The representative sequence explains this cluster as individuals that have never been married with no children, transitioning into home ownership (out of renting (private))
- Cluster three: aged on average in the late twenties, this cluster incooperates the main transitions into homeownership in the first half of the survey, as well as the greatest increase in the proportion of individuals getting married over all. These individuals are mainly employed and show an increase of individuals with children aged five years and under in the second half of the survey. The representative sequence characterises this cluster as individuals first transitioning into homeownership, and then having a child. The individuals are already married by the time of the tenure transition.
- Cluster four: youngest individuals aged late teens, early twenties, leaving the parents' house and starting relationships in the last half of the survey. These individuals also start transitioning into the labour force. Most individuals have no children. The representative sequence summarises this cluster as individuals leaving their parents, moving into a private rental property.
- Cluster five: aged around thirty years, large proportion of renters (private), but also largest (compared to other clusters) group of individuals in renting (public) and other tenure. Proportion of individuals in homeownership increasing in the last third of the survey. Around half of the individuals are married with little change in the distribution of marital status over time. One third of individuals are not in the labour force at any point in time. The main increase of individuals with children aged five years and under occur during the first half of

the survey. Based on the representative sequence for this cluster, the characteristics of these individuals are being married and employed, and they first have a child and then enter home ownership.

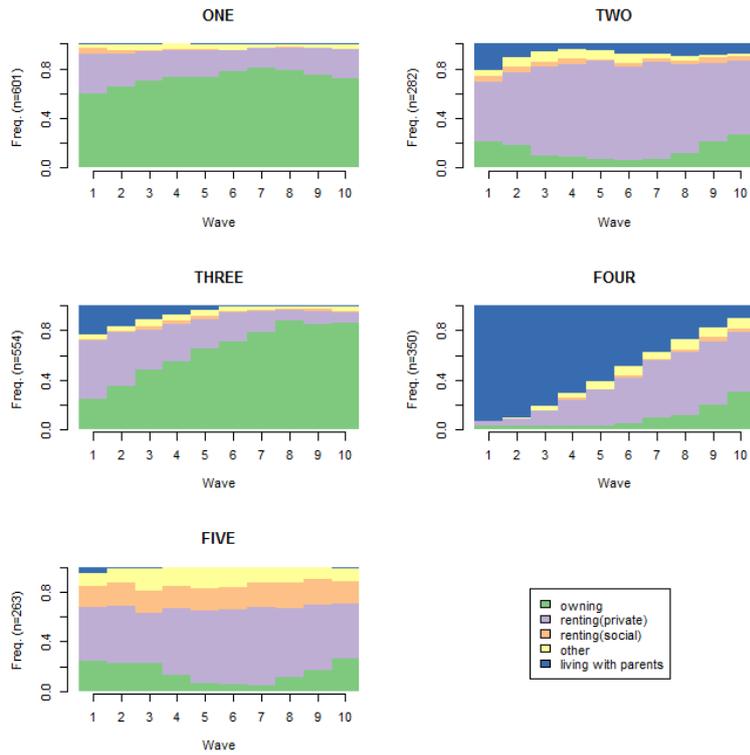


Figure 1: Transversal state frequencies of tenure type by clusters one to five for mobile individuals.

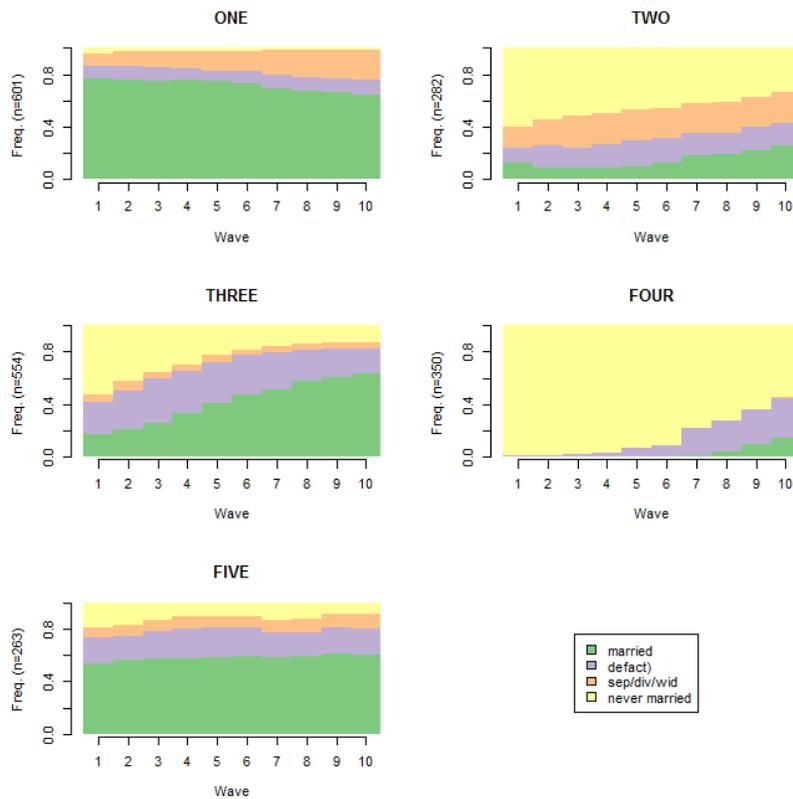


Figure 2: Transversal state frequencies for marital status by clusters one to five for mobile individuals.

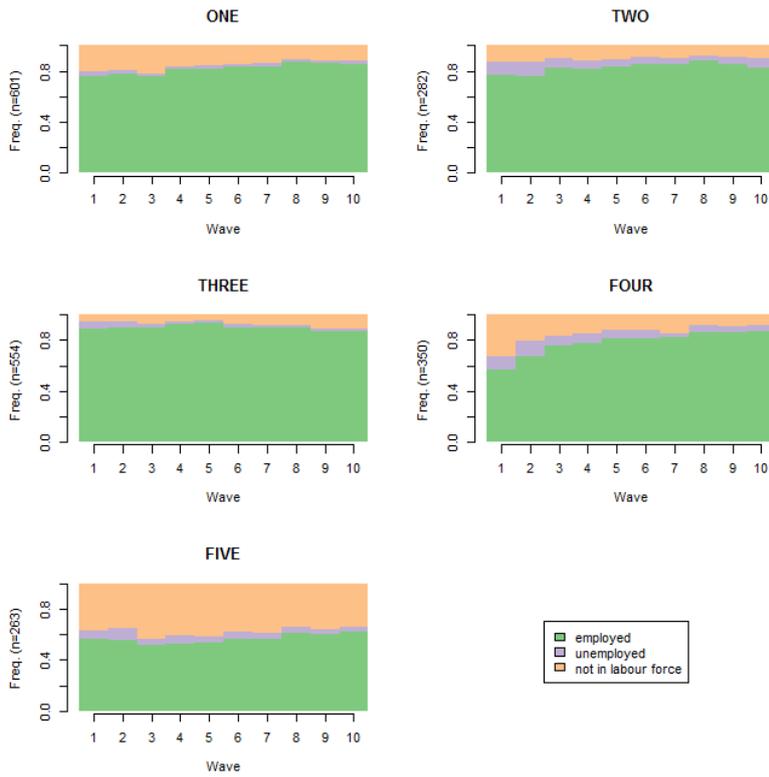


Figure 3: Transversal state frequencies for employment status by clusters one to five for mobile individuals.

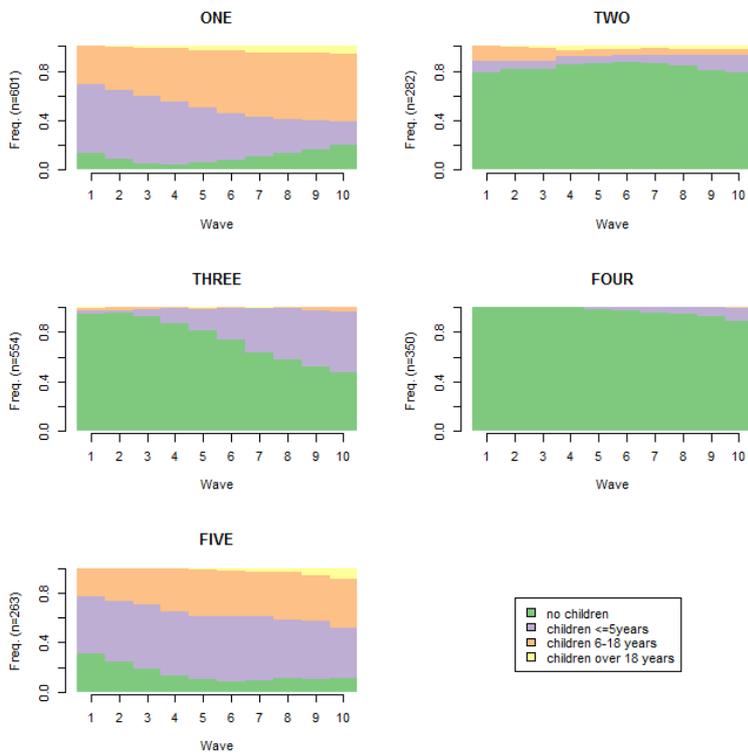


Figure 4: Transversals state frequencies for age group of youngest child by clusters one to five for mobile individuals.

Summary and conclusion

This research set out to answer the questions regarding main housing pathways and the interrelationships with other life events. The traditional interaction of life events and housing transitions as they were experienced in previous decades, getting married, having a child and then entering home ownership, have been challenged by the 'choice' theory, resulting in different life styles, life experiences and hence different pathways. The empirical analysis aimed to find evidence for this differentiation to develop a typology of housing pathways and life events for Australian families in childbearing age, with and without children.

In summary, the technique of multi-channel sequence analysis has helped in the identification of typical pathways of housing transitions, and other significant life-events. With the availability of ten waves of the HILDA survey, it was possible to examine a window of ten years of individual's housing transitions, acknowledging that a complete housing transition is three or four times longer than data was available for.

In terms of the housing pathways, the analysis revealed that over half of the individual's in the sample (52.8%) did not change housing tenure and 41.8% of all sequences were represented by stable home ownership. The most frequent sequences including a tenure change showed transitioning into home ownership, hence an 'upwards' notion.

The proportion of home owners increased strongest in the second half of the survey for individuals in the age group under 25 and throughout the survey period for the 25-29 year olds, hence individuals seem to enter home ownership in their 20ies and 30ies. Furthermore, individuals that are married at wave one were mostly home owners (81.2%), compared to 15.5% of home owners for individuals that have never been married at wave one; and individuals with young and older children at wave one show both high percentages in homeownership, 75.2% and 81.6% respectively, compared to 31.9% of home owners for individuals with no children at wave one. This suggests some kind of connectedness between housing tenure transitions and marriage and childbirth.

With regard to the interaction of housing transitions and life-events, five typologies were identified. Married individuals that enter home ownership first, and then have children (27.0%), as well as married individuals that already have children (aged five and under (12.8%), as well as aged 6-18 years old (29.3%)) and then enter home ownership. In all three scenarios marriage has preceded birth of child and transition to home ownership. The fourth typology is related to individuals leaving the parents' house, moving into a private rental property (17.1%), and the fifth cluster is represented by individuals transitioning into home ownership as never married and not de facto (13.8%). Although current research suggests a disconnectedness of entry into home ownership and other life events (Winter & Stone, 1999), this analysis suggests that the interrelation of housing pathways, in particular entry into home ownership and marriage and birth is still present, but the previously ordered sequences of these events have become less clear.

The housing pathways in Australia are undergoing change, and particularly entry into home ownership is of great concern. The majority of entries into home ownership still seem to be interrelated to marriage and child birth, however more in depth research is needed to further understand the relationship of the trigger life events in particular union formation and dissolution, and birth of the first and consecutive child and the transition into home ownership, which showed to be the most important housing transition for families with children under the age of eighteen and in childbearing age.

Data acknowledgement

This paper uses unit record data from the Household, Income, and Labour Dynamics in Australia (HILDA) Survey. The HILDA project was initiated and funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the author and should not be attributed to either FaHCSIA or the Melbourne Institute.

Appendices

Examining the 'top-ten' sequences for housing tenure status, marital status, employment status and age of youngest own child in the household

For each of the four variables of interest, the sequences were firstly examined separately, starting with the sequences for housing tenure status. For housing pathways over ten waves of data with five possible tenure states, and given that all tenure transitions are possible between waves, there are $5^{10} = 9,765,625$ possible unique sequences, with the five housing tenure states being: owning, renting (private), renting (social), other, and living with parents. Examining the sequences of housing tenure sequences for the 4,345 individuals in the analytic sample across ten waves of HILDA data showed that there are 876 unique sequences, with the most frequent sequence being 'owning the home' for all ten waves. The stable home ownership sequence explained 41.8% (n=1818) of all housing tenure experiences. Other sequences for which housing tenure did not change include renting their homes from a private landlord (7.2%, n=309), living with parents (2.5%, n=108) and social tenure (1.3%, n=55). More than half of the individuals (52.8%) did not change their tenure status over the period of ten waves. The remaining 'top ten' sequences start with one, two, three, four, six or eight waves of renting their home in the private sector and then transition into homeownership for the remaining waves (6.3%, n=270). Furthermore, 'owning' as the tenure state was the most frequent state at each time point, consistently increasing from 56% at wave one to 69% at wave ten. This trend can be explained by higher rates of home ownership with older age (Yates, 2007). A higher percentage of home owners in the sample at the end of the survey in 2010 compared to the beginning of the survey in 2001 suggests that individuals were transitioning into home ownership sometime throughout these ten years.

Focussing now on sequences of marital status across ten waves, there were 492 unique sequences explaining marital status transitions. The four most frequent sequences correspond to a consistent marital status throughout the ten waves, with 43.7% (n=1897) being married, 11.5% (n=499) have never been married and are not in a de facto relationship, 3.9% (n=171) being separated, divorced or widowed and 3.4% (n=148) are in a

de facto relationship for all ten waves. The remaining six most frequent sequences start with being in a de-facto relationship for one, two or four waves and then entering marriage (3.2%, n=134), being single for eight or nine waves and then transitioning into a de facto relationship (1.75%, n=76), and getting divorced between waves nine and ten (0.8%, n=36). The ten most frequent sequences for marital status explain 68.2% of all possible sequences for marital status.

Summaries for employment status showed 712 unique sequences. Being employed consistently was the predominant sequence (54.5%, n=2366). This was followed by not being in the labour force for ten waves (3.6%, n=155). The remaining eight most frequent sequences can be explained as follows: 3.1% (n=134) of individuals were not in the labour force for one or two waves and then transitioned to being employed, 1.1% (n=47) were employed for nine waves, transitioning out of the labour force, 2.8% (n=121) were employed in the first wave followed by 1-3 waves of not being in the labour force and then taking up employment again. Finally, 1.0% (n=45) were unemployed in the first wave and employed in the last nine waves and 0.7% (n=31) were employed in the first wave, unemployed in the second wave and employed for the last eight waves. The sequences for employment status show more variability amongst the ten most frequent sequences compared to the sequences of other statuses. The ten most frequent sequences for employment status explain 66.8% of all possible sequences.

The sequences relating to age of youngest child in the household demonstrate the least number of unique sequences (312). Of all individuals in the sample 26.8% (n=1166) did not have children, 10.4% (n=451) had a youngest child aged 6-18 years and 3.2% (n=138) had a youngest child under the age of five throughout all ten waves. The remaining seven sequences within the 'top ten' account for 20% (n=866) and are characterised by individuals that had children that were growing up, hence these sequences start with individuals that had children under the age of 5 for varying numbers of waves, transitioning to having children aged 6-18 years old. The ten most frequent sequences explain 57.2% of the sequences related to age of youngest child in the household.

Transversal tenure state distribution plots

A useful way of examining sequences is by visualising the distribution of the state, in this case housing tenure status, at each wave. These plots are referred to as transversal state distribution plots (Gabadinho et al., 2011). Housing tenure status distributions are plotted by age group of the individual at wave one, marital status, employment status and the age of youngest child in the household. The transversal housing tenure states by age group in Figure 1 showed that the group corresponding to the largest percentage of individuals living with parents at wave one (59.9%) was in the age category of 25 years or less at wave 1. This percentage consistently decreased across the time span of ten waves to 12.9% at wave 10. As expected, this is also the group with the lowest proportion of home owners compared to all other age groups (wave 1: 10.6%; wave 10: 41.1%). The group aged 30-35 years at wave 1 continued to move into home ownership (wave 1: 42.5%; wave 10: 65.6%) and move out of the parental home (wave 1: 9.8%; wave 10: 2.5%) over the ten year period. Individuals renting their homes are equally represented at each time point for this age group (wave 1: 24.9%; wave 10: 26.9%). For the age groups 30 years and over, home ownership is the dominant tenure state at each wave, slowly increasing, but not as steeply as for the younger age groups (wave 1: 62.0%; wave 10: 71.8%).

Figure 2 shows transversal housing tenure states by marital status at wave one. Individuals legally married at wave one were dominantly home owners, with 81.2% owning their homes. This percentage was stable throughout the ten waves. On the contrary, home owners were only represented by 15.5% of individuals that were never married and not in a de facto relationship at wave one. The dominant housing tenure for this marital status at wave one was living with parents (52.2%). By wave ten, this trend is reversed; with only 13.0% of individuals living with their parents and 44.4% being home owners. Individuals who were in a de facto relationship or separated/divorced/widowed at wave one had a relatively stable proportion of approximately 50% in home ownership at each wave, and a 30%-40% of individuals renting in the private sector. The group of individuals that were separated, divorced or widowed at wave one were consistently the highest proportion of individuals renting in the public sector (wave 1: 9.9%; wave 10: 9.6%). Housing tenure pathways grouped by the individuals' employment status at wave one showed clear differences in the state distributions for individuals employed, unemployed or not in the labour force at wave

one. For individuals employed at wave one, the proportion of home owners increased from 61.4% at wave one to 74.3% at wave 10. A proportion of 23.2% and 44.8% of individuals unemployed or not in the labour force at wave one, respectively, were home owners. This percentage increased by roughly 10% in both groups by wave ten. The group of individuals that were unemployed at wave one show consistently the largest proportion of individuals renting in the private sector (wave 1: 35.0%; wave 10: 41.4%) and a consistent proportion of 8% renting in the public sector (Figure 3). Figure 4 shows that 31.9% of individuals with no children at wave one were in home ownership; this proportion increased to 56.6% at wave ten. The proportion of individuals renting in the private sector stayed stable at around 30% and the proportion of individuals living with their parents decreased from 32.8% at wave 1 to 8.5% at wave ten for individuals with no children at wave one. Individuals with children aged five and under and with children aged 6-18 years had a similar and stable tenure state distribution across all ten waves: at wave one 75.2% and 81.6% are home owners, 18.8% and 14.0% are renters (private), 3.5% and 2.6% are renters (social), 2.0% and 1.3% are in a another tenure, and 0.5% living with parents, for individuals with children aged five and under and for individuals with children aged 6-18 years respectively. Individuals with children older than 18 years are only represented by 6 individuals at wave one, however, at wave ten there are 281 individuals that have adult children in the household and the majority are home owners (84%).

In summary, almost half of the housing tenure sequences (48.1%) are home owners already and have been for the whole period from 2001 to 2010 or are transitioning sometime throughout this period into home ownership. Examining the transversal state frequencies of tenure status by various demographic characteristics show distinctive changes in the frequencies of tenure status over time particularly for individuals that are under the age of 30 at wave one, have never been married and are not in a de facto relationship, are either unemployed or not in the labour force and have no own children in the household.

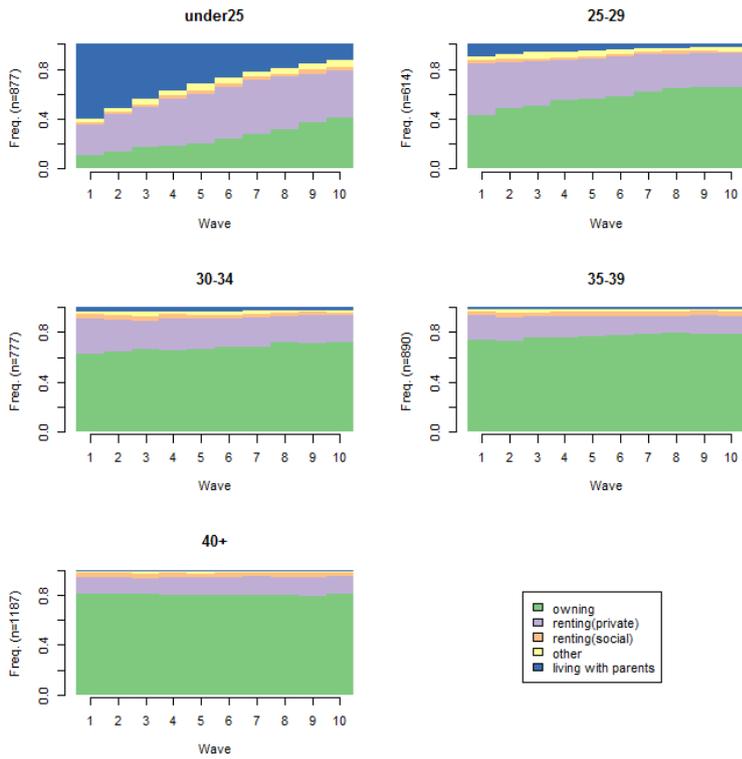


Figure 5: Transversal state frequencies of tenure status by age group at Wave 1.

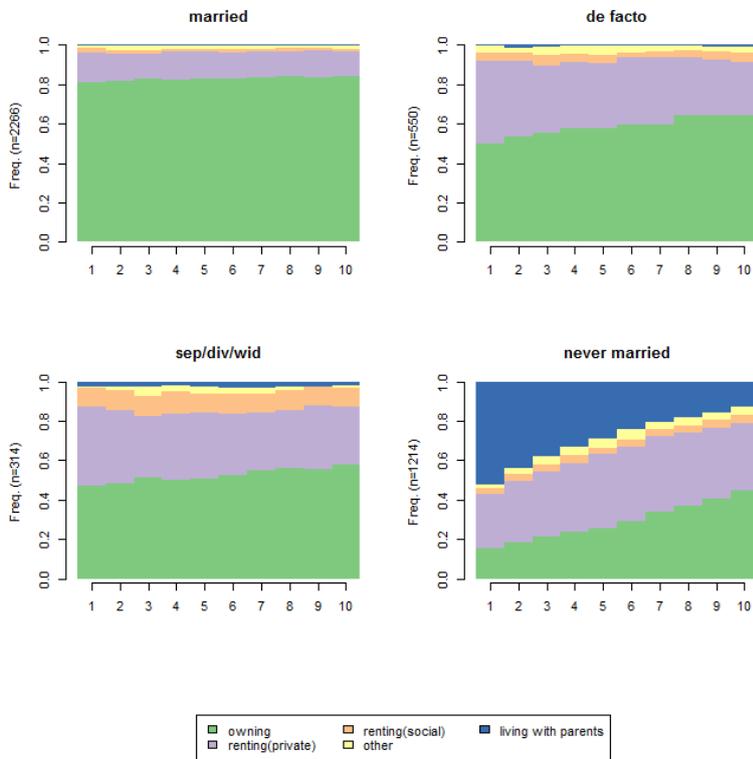


Figure 6: Transversal state frequencies of tenure status by marital status at Wave 1.

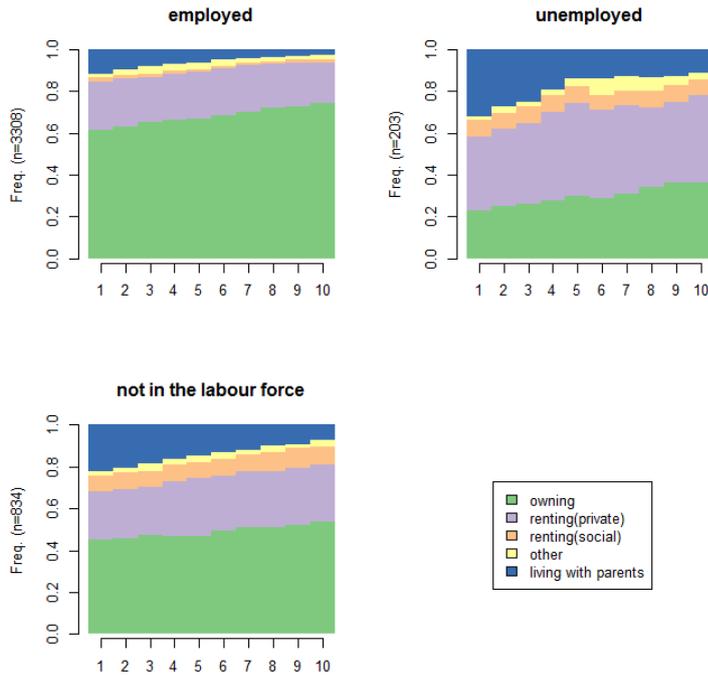


Figure 7: Transversal state frequencies of tenure status by employment status at Wave 1.

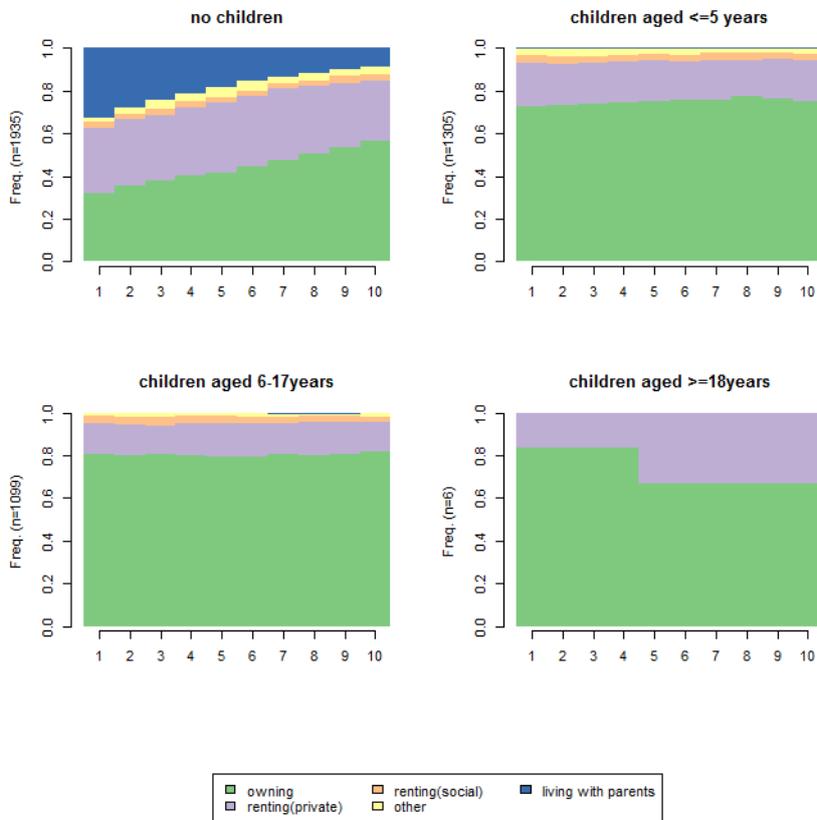


Figure 8: Transversal state frequencies of tenure status by age of youngest child at Wave 1.

References

- Abbott, A. (1983). Sequences of Social Events: Concepts and Methods for the Analysis of Order in Social Processes. *Historical Methods*, 16, 129-204.
- Abbott, A., & Tsay, A. (2000). Sequence analysis and optimal matching methods in sociology - Review and prospect. *Sociological Methods & Research*, 29(1), 3-33.
- Allison, P. (2009). Sequence Analysis and Optimal Matching Gechniques for Social Science Data. In A. H. Bryman, Melissa A. (Ed.), *Handbook of Data Analysis*. London/GB: Sage Publications Ltd.
- Badcock, B., & Beer, A. (2000). *Home Truths*. Melbourne: Melbourne University Press.
- Baizan, P., Aassve, A., & Billari, F. C. (2004). The interrelations Between cohabitation, marriage and first birth in Germany and Sweden.
- Beer, A., & Faulkner, D. (2009). *21st century housing careers and Australia's housing future*.
- Beer, A., Paris, C., Faulkner, D., & Clower, T. (2011). *Housing Transitions through the life course: The Policy Press*.
- Boyle, P. J., Kulu, H., Cooke, T., Gayle, V., & Mulder, C. H. (2008). Moving and union dissolution. *Demography*, 45(1), 209-222.
- Clapham, D. (2005). *The meaning of housing - A pathway approach: The Policy Press*.
- Clark, W. A. V., Deurloo, M. C., & Dieleman, F. M. (2003). Housing Careers in the United States, 1968-93: Modelling the Sequencing of Housing States. *Urban Studies*, 40(1), 143-160.
- Clark, W. A. V., & Huang, Y. (2003). The life course and residential mobility in British housing markets. *Environment and Planning A*, 35, 323-339.
- Elder, G. H., Jr. (1978). Approaches to social change and the family. *American Journal of Sociology*, 84, S1-S38.
- Elder, G. H., Jr. (1985). *Life course dynamics: trajectories and transitions, 1968-1980*. Ithaca, NY: Cornell University Press.
- Elder, G. H., Jr. (2003). The Emergence and Development of Life Course Theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the Life Course* (pp. 3-19): Kluwer Academic/Plenum Publishers, New York.
- Feijten. (2002). The Timing of Household Events and Housing Events in the Netherlands - A longitudinal Perspective.
- Gauthier, J.-A., Widmer, E. D., Bucher, P., & Notredame, C. (2010). Multichannel sequence analysis applied to Social Science data. *Sociological Methodology*, 40(1), 1-38.
- George, L. K. (1993). Sociological Perspectives on Life Transition. *Annual Review of Sociology*, 19, 353-373.
- Giddens, A. (1991). *Modernity and self identity: Self and society in the late modern age*: Cambridge: Polity Press.
- Ginsburg, C. S., Fiona; Richter, Linda M.; Norris, Shane A. (2010). Modelling Residential Mobility: Factors Associated with the Movement of Children in Greater Johannesburg, South Africa. *Population, Space and Place*, 17, 611-626.
- Harley, C., & Mortimer, J. T. (2000). *Social status and mental health in young adulthood: The mediating role of the transition to adulthood*.
- Hogan, D. P., & Astone, N. M. (1986). The Transition to Adulthood. *Annual Review of Sociology*, 12, 109-130.
- Hunt, S. (2005). *The Life Course: A Sociological Introduction*: Palgrave Macmillan.
- Kaufmann, L., & Rousseeuw, P. J. (2005). *Finding Groups in Data*. Hoboken: John Wiley & Sons.
- Kendig, F. (1982). Will a Home Still Be a House. *Institutional Investor*, 16, 89-91.
- Kendig, H. (1981). Buying and Renting: Household Moves in Adelaide. *Australian Institute of Urban Studies, Canberra*.

- Kendig, H. L. (1984). Housing Careers, Life-Cycle and Residential-Mobility - Implications for the Housing-Market. *Urban Studies*, 21(3), 271-283.
- Kulu, H. (2005). Migration and fertility: Competing hypotheses re-examined. *European Journal of Population-Revue Europeenne De Demographie*, 21(1), 51-87.
- Kulu, H., & Milewski, N. (2007). Family change and migration in the life course: An introduction. *Demographic Research*, 17, 567-590.
- McDonald, P., & Merlo, R. (2002). *Housing and its association with other life outcomes*.
- McLeod, P. B., & Ellis, J. R. (1982). Housing Consumption Over the Family Life Cycle: an Empirical Analysis. *Urban Studies*, 19, 177-185.
- Michielin, F., & Mulder, C. H. (2008). Family events and the residential mobility of couples. *Environment and Planning A*, 40, 2770-2790.
- Mulder, C. H. (2006). Home-ownership and family formation. *Journal of Housing and the Built Environment*, 21(3), 281-298.
- Mulder, C. H., & Lauster, N. T. (2010). Housing and Family: An Introduction. *Housing Studies*, 25(4), 433-440.
- Neugarten, B. L., & Danan, N. (1973). Sociological perspectives on the life cycle. In P.B. Baltes & K.W. Scheie (Eds.), *Life-span developmental psychology: Personality and socialization*. New York: Academic Press., 53-69.
- Payne, J., & Payne, G. (1977). Housing pathways and stratification: a study of life changes in the housing market. *Journal of Social Policy*, 23, 125-156.
- Pollock, G. (2007). Holistic trajectories: a study of combined employment, housing and family careers by using multiple-sequence analysis. *Journal of the Royal Statistical Society Series a-Statistics in Society*, 170, 167-183.
- Rossi, P. H. (1955). *Why families move*: The Free Press, Glencoe, Illinois.
- Stovel, K., & Boland, M. (2004). Residential Trajectories: Using Optimal Alignment to Reveal the Structure of Residential Mobility. *Sociological Methods & Research*, 32(4), 559-598.
- Winter, I., & Stone, W. (1999). Home Ownership: Off Course? In J. Yates & M. Wulff (Eds.), *Australia's Housing Choices* (pp. 43-52). Brisbane: The University of Queensland Press.
- Wooden, M., & Watson, N. (2001). *The Household, Income and Labour Dynamics in Australia (HILDA) Survey: An Introduction to the Proposed Survey Design and Plan*: The University of Melbourne, Department of Family and Community Services.
- Yates, J. (2007). *Has the great Australian dream ended*. Paper presented at the Centre for Public Policy Conference 21-22 February, Jasper Hotel, 489 Elizabeth Street, Melbourne.
- Yates, J., & Bradbury, B. (2010). Home ownership as a (crumbling) fourth pillar of social insurance in Australia. *Journal of Housing and the Built Environment*, 25(2), 193-211. doi: 10.1007/s10901-010-9187-4