Final Report

Housing consumption patterns & earnings behaviour of income support recipients over time

authored by

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EXECUTIVE SUMMARY

This is the Final Report for a research project which has involved a complex and multi-faceted analysis of longitudinal administrative income support (IS) data. Conducted by the AHURI Queensland Research Centre, the study has been principally concerned with issues about patterns of housing consumption among people on IS. This includes the housing arrangements and circumstances of income support recipients (ISRs) over time, the possible relationships between changes in tenure, changes in income and other changes in the characteristics or circumstances of ISRs. The analysis has also been concerned about how these relationships and arrangements between housing and other factors might vary by discrete groups of recipients.

The origins and originality of this study lie in the opportunity to conduct retrospective longitudinal analyses which can track individual ISRs and groups of ISRs over time in ways not possible with more traditional cross-sectional or time series research. The housing consumption patterns of ISRs over time have received little attention in Australian research. Historically, tenures have been seen as being akin to rungs on a hierarchical housing ladder. Movements up the ladder have often been described as 'housing careers', with the key concern being about patterns involving progression from renting to homeownership. More recently, these notions of 'natural upward mobility' in the housing system have come under challenge. Demographic changes and growing household mobility suggest less uniformity and certainty in the housing system, with a growing sense of separation between housing tenure moves and other life-course events. At the same time, caution needs to be applied in making assumptions about what the housing consumption patterns among those on IS might be. For these reasons, Clapham's (2002) concept of 'housing pathways' has been seen as a helpful framework in describing how people – in this case, individuals and families on IS – act upon their changing needs and circumstances over time through changes in housing options and tenure transitions.

The research has involved considerable effort in conceptualising and problem-solving a range of theoretical, methodological, logistical and practical challenges associated with working with a large and complex set of data. The study has also required the testing and application of several quantitative longitudinal approaches. The data set used is a 1 per cent sample extraction from the Australian government's Longitudinal Data Set (LDS) which contains non-personal administrative information about a sample of individual ISRs in Australia over time. This was first constructed in 1995, and by 2003 the 1 per cent sample data set consisted of over 89,000 individuals, and approximately ten million observations over 226 discrete points in time. The main content of the LDS is derived from detailed questions about a range of issues such as IS histories, housing arrangements, household composition and earned/unearned income.

The nature of the data also allows for examination of movements on and off IS, and a number of 'true' longitudinal research approaches which are based on analysis of repeated observation data across a number of variables of interest, for the same individuals or cases at different points in time. A mix of methods have been employed to interrogate the data, including a range of longitudinal descriptive tenure analyses, which examine case-based point in time, aggregated time and summary transitions, and typical housing pathways; tenure Origin and Destination analyses, which are event-based; longitudinal tenure history analyses, which map the case-continuous patterns of tenure consumption; and several forms of longitudinal statistical analysis

including survival analysis (Cox's Proportional Hazard Model), and linear mixed and dynamic models.

This Final Report follows the earlier Positioning Paper (Seelig et al. 2005), and contains the main findings and outcomes of the research, presenting them thematically in terms of three main sets of issues. The first theme focuses on the housing pathways among ISRs – the patterns of general housing consumption and transitions (i.e. tenure moves and non-moves), by tenure over time. The second theme considers the relationships between housing pathways, earnings and other factors among ISRs. This includes the association of general housing consumption and transitions (i.e. tenure moves and non-moves) with other measurable factors, such as earnings, family structures and IS types. The third theme presents a specific case-study of how the findings in the first two themes can be observed in the particular context of public housing. It considers specific movements into, out of or continuous residence in public housing, and the relationships between these tenure moves (or non-moves), earnings and other factors.

Summary of outcomes

Housing pathways among ISRs (Chapter 3)

Traditional tenure analysis is nearly always based around either cross-sectional / point in time snapshots, or is concerned with trends constructed from several of these into a time series. Whilst important, they are restricted to aggregated patterns and cannot offer the capacity to track the same people (cases) over time. The study reveals there is a high level of stability within the tenure consumption patterns of ISRs: more than half did not move while on IS. ISRs are not congregated in just one or two tenures, but are spread out across a number of tenure types including outright homeownership (largest single tenure for ISRs).

However, the study also illustrates the diversity of housing pathways, and the highly complex history of multiple transitions that some ISRs undergo. The importance of the private rental market plays a 'gateway tenure' role, acting as a central bridge between other tenures in the housing pathways of ISRs. Rates of informal rental and other living arrangements were found to be much higher among ISRs than in the general population, and while these housing categories are often collapsed in general tenure analyses into 'other', their importance among those on IS has been demonstrated. Traditional 'housing careers' assumptions about linear tenure movements certainly need to give way to a more nuanced appreciation of the diversity of 'housing pathways', as this study has shown.

Relationships between housing pathways, earnings, and other factors (Chapter 4)

There is evidence that a relationship exists between earnings and tenure among ISRs, and it has been possible to measure the differential in changes in earned income during time on IS by separate tenure category and form of IS. Income generally appears to have the most consistent effect on exiting IS: the substantively largest effect is for disability pensioners, followed by sole parent IS recipients. The unemployment-type ISRs showed one of the smallest effects of income. Exits from IS are associated with specific tenures: public and private renters are less likely to leave than some others; purchasers and homeowners are the most likely to exit, and public renters are the least likely.

Through regression and other modelling, a close relationship between changes in earnings and their socio-demographic circumstances was identified, but only limited evidence was found indicating a statistical relationship between earnings change and

tenure change. These appear to occur independently of each other for some IS groups. This strongly suggests that tenure changes are related to a number of factors, and that earned income may not be a primary or substantial one. It should be noted that such modelling proved immensely complex, and some characteristics of the data set mean that limitations existed on modelling capacity. However, there are important differences in earned incomes across typical housing pathways in terms of changes in earned incomes where changes in tenure are observed.

The relationships identified between earned incomes, socio-demographic characteristics and tenures may contribute to a better understanding of the clients (current and potential) of State Housing Authorities, and of other housing consumers reliant on IS.

Relationships between public housing pathways, earnings and other factors (Chapter 5)

Given the policy context of this research, particular attention has been given to transitions into and out of public housing and private rental housing, and the association of these effects with earnings and other changes in circumstances. Analysis differences among IS categories has been useful for providing a better understanding of who the stayers in public tenancies are, who move in and out, where they move from/to, and what are the precursors.

One thing clear from this study is that there is complexity around ISRs and public housing. There is heterogeneity among public tenants, and tenants differ in characteristics and behaviour according to IS types. It is thus necessary to appreciate different pressures and factors driving needs and demands.

This study has also indicated that there is a problem with a 'revolving door' syndrome, that is, repeat moves into and out of public housing for some people. The importance of the private rental market as a source and exit point is also evident. Indeed, the study uncovered that familiarity with previous housing options seems in part to influence future tenure decisions.

Finally, and perhaps most significantly, this study points to some evidence of differences in incomes before and after moves into and out of public housing to/from private rental. Over moves from private rental to public housing, almost no increases in earnings were seen prior to exit from private rental, and modest increases following entry to public housing. However, for moves from public housing to private rental, significant increases in income were observed both prior to and following exit from public housing. The latter finding is moderated somewhat by other modelling for this study which indicated that, across all cases and destination tenures, exits from public housing were statistically associated with lower levels of earned income. The fact that these two situations can coexist highlights the problems of aggregating analysis across a heterogeneous population and collapsed tenure moves. What these two results suggest is that the relationships between incomes and tenure moves is a complex one, and in some cases one that is actually of little association.

Policy implications arising

The broad research and policy relevance of this study lies in its capacity to directly provide information about the tenure consumption patterns of ISRs, and to contribute materially to contemporary housing policy and broader social policy debates about how low-income people navigate the housing system, how factors such as earnings might impact on housing tenure and vice-versa, and whether public housing appears to act as a workforce disincentive. The study can be positioned at the intersection of three fields of broad social welfare policy, namely, housing assistance provision,

income-support provision, and labour force or economic participation. This research is therefore important in the context of housing assistance debates, welfare reform debates, public housing management challenges, and broader social and demographic phenomena.

There are several sets of more specific policy implications. The first relates to gaining a better understanding of ISR tenure consumption patterns. This study reveals, empirically, how ISRs navigate the housing system whilst on IS, and how tenure arrangements and changes can vary according to IS type and other factors. This study has highlighted that outright homeownership is the dominant tenure among ISRs, with rates not very dissimilar to the broader population. Private rental is also a critical tenure, effectively operating as the 'gateway' tenure in the pathways of ISRs in the Australian housing system.

A second set of implications lies in the opportunity to view how tenure and tenure changes are associated with incomes and income changes. Given its exploratory and experimental nature, this study has not sought to derive causality or to explain the patterns identified, but it does provide rich materials from which to develop cause-and-effect hypotheses and to test them empirically at some later stage. Critically, it would seem that the relationships between tenure moves and changes in incomes are not strong; other factors may be more important in driving changes in tenure.

A third group of policy relevant outcomes are connected to the more micro-analysis of public housing occupancy, associated pathways, and factors (IS types, earnings, and demographics) associated with exits from or re-entries to public housing. This potentially allows State Housing Authorities to better understand the characteristics of their present and prospective tenants, and some of the factors connected to movements into and out of public housing. Again, the relationships between tenure moves and changes in incomes are mixed, but it does appear that for some ISRs who move from public housing to private rental and vice-versa, incomes rise rather than fall. This is particularly so in the case of moves out of public housing, and raises important questions about the impacts of public housing as a stabilising tenure.

A final set of implications arises in the capacity to test out a range of methodological approaches to complex longitudinal administrative data.

1   INTRODUCTION

1.1   Background to the study

This Final Report is the concluding output of a research project conducted by the AHURI Queensland Research Centre, in collaboration with the University of Queensland Social Research Centre. The research has been designed around the quantitative analysis of longitudinal administrative income support (IS) data from the Australian government,[1] drawn from the Longitudinal Data Set (LDS),[2] which has been made available in the form of a 1 per cent sample extraction from the full LDS.

The study has been concerned with the 'housing pathways' and associated 'life circumstances' of income support recipients (ISRs), pursued through the analysis of data available in the LDS pertaining to their housing, earnings, IS arrangements and other characteristics. Its precise focuses are framed around specific research questions which are themselves situated within important housing policy contexts and challenges.

Methodologically, the study has been conducted as a quantitative research project, applying a range of cross-sectional and descriptive analysis, and more complex longitudinal analytical approaches, particularly linear mixed models and survival analysis (proportional hazard modelling).

A Positioning Paper for this study (Seelig et al. 2005) was released following the initial stages of the research. It contained a detailed discussion of the policy context, discussed a range of methodological and practical considerations, and established the main research frameworks to be applied. As that Positioning Paper indicated, the main research themes for this study are:

→ The housing arrangements and circumstances of ISRs over time;

→ The relationships between changes in tenure, changes in income, and changes in tenure and other changes in the characteristics or circumstances of ISRs;

→ How the relationships and arrangements between housing and other factors vary by discrete groups of ISRs.

Most research into housing transitions in the Australian context has historically focused upon the movement of households into (and, less frequently, out of) homeownership, or upon differences in the timing of transition to homeownership. A core, more or less linear pattern, described metaphorically as a 'housing ladder', is usually posited as a reference point for the investigation of housing mobility (Badcock, 1994; Flatau et al., 2004). This process sees households move progressively through new household formation, which may or may not involve an initial period in private rental accommodation, to first homeownership, and then gradual movement upwards through the housing market (or 'up the ladder') leading to outright ownership by the point of retirement (Kendig, 1984; Flatau et al., 2004; Short, 2005; Yates, 2002). Such transitions between stages have traditionally been linked to specific life-course events, such as entry to the workforce, marriage and having children, and incremental rises in income.

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[1] The LDS was previously owned by the Department of Family and Community Services (FaCS), but is now formally administered by the Department of Employment and Workplace Relations (DEWR), following a change of portfolio management arrangements within the Commonwealth government at the end of 2004.

[2] In this paper, this sample is referred to simply as the 'LDS'. See Section 1.2.1 for a brief overview of how the whole LDS and its 1 per cent sample is derived and structured.

Recently, this account has been questioned by several analysts who have argued that housing tenure patterns in Australia are less closely tied to key life-course events than they have been in the past (Maher, 1997; Winter and Stone, 1999). In particular, attention is focused on the fact that many households are finding it increasingly difficult to attain homeownership, at least until later in life than was previously the case (Flatau et al., 2004; Winter and Stone, 1999; Wood 1990; Yates, 1999, 2002), and that movement 'down the ladder' also occurs with some frequency (Flatau et al. 2004).

At the same time, research in both the fields of housing and poverty studies has documented the impacts of housing costs on low-income households, and has provided clear evidence that a linear model of (upward) housing mobility and security in homeownership does not adequately describe the experience of low-income households, especially those disengaged from economic activity through unemployment or family disruption. This body of literature provides ample evidence of patterns of vulnerability in which limited income opportunities arising from exclusion or withdrawal from the labour market, constrained opportunities for social mobility and limited access to housing are central aspects of disadvantage (Short, 2005; Travers and Richardson, 1993). In this pattern, housing mobility is more likely to be linked to limited income or income insecurity, and specifically to insecurity of tenure (Minnery et al., 2003; Short et al., 2003).

However, the processes underlying and shaping variable practices of housing mobility are not entirely clear. In part, this is because most research on housing mobility has relied upon 'snapshots' of transitions, or upon cross-sectional data which, though useful in planning policy responses to immediate concerns, is less helpful in revealing the housing, income and other personal and social factors that become cumulative, over time, in their influence upon future housing and economic outcomes (c.f. Yates, 2002). Such studies in Australia and elsewhere have at least served to draw attention to the complexities of household relations, to differences in individual and household capacities for housing and/or occupational mobility, and, more broadly, to the links between spatial and social mobility (Bradbury and Chalmers, 2003; Clapham, 2002; Kaufmann et al., 2004; Memmott et al., 2004; Flatau et al., 2004).

The Positioning Paper contains a more detailed background discussion of the housing policy and research background to the work, and it is strongly recommended that that earlier report is considered in conjunction with this Final Report.

1.1.1 Original array of research questions and themes

The original brief for this study included a total sixteen research questions, which were grouped into three key areas:

Group 1: Housing pathways and influential factors

1.1 What housing arrangements and circumstances, particularly tenure arrangements, do ISRs adopt over time, and how changeable are they?

1.2 Are ISRs' housing tenure patterns organised in terms of typical sequences that constitute 'housing trajectories'?

1.3 If so, how do such housing trajectories vary among IS types?

1.4 Is there a relationship between changes in tenure and changes in earnings?

1.5 Is there a relationship between changes in tenure and changes in other life circumstances? If so, which appear to be the driving factors, and which the resultant factors?

1.6   Are the connections between housing trajectories and movements on and off IS similar for different socio-demographic groups?

1.7   How do the housing trajectories of different socio-demographic groups, including those defined by family or household type, length of time on IS, Indigenous status, ethnicity and cultural background, differ?

Group 2: Duration in public housing

2.1   How long do people remain in public housing? Is this duration in public housing influenced by socio-demographic factors and other changes in income and life circumstances?

Group 3: Pathways in and out of public housing

3.1   What tenures do people move from when they enter public housing?

3.2   What tenure do people move to when they leave public housing?

3.3   How much spatial mobility is involved in such tenure changes?

3.4   Is entry to or exit from public housing associated with identifiable improvements or declines in earnings, and can these changes be explained with reference to housing factors, e.g. access to housing markets and/or regulation of public housing access?

3.5   If so, which appears to be the driving factor, and which the resultant factor – housing access/mobility or earnings?

3.6   How do public tenants on IS behave when they increase their earnings? Do they remain in public housing or do they exit to other tenures?

3.7   Is entry to or exit from public housing associated with identifiable changes in life circumstances, and can these changes be explained with reference to housing factors?

3.8   What is the pattern, over time, of the incidence of certain events (e.g. changes over the life course, changing household composition, illness etc.) and entry to/exit from public housing?

This original set of questions was framed around the kinds of priority issues which had been identified in an AHURI Research Agenda[3], and was also based on discussions held with representatives of the Department of Family and Community Services prior to the research proposal being submitted for funding. At that time, it was recognised that some aspects of the proposed study might be constrained, given the nature of the data (namely, that the LDS is an administrative data set which collects information required by Centrelink for social welfare payment assessment, rather than for social research purposes). In particular, two main restrictions were identified. Firstly, although from a research perspective movements on and off IS are of great interest, in practice we are unable to track people when they leave the IS system completely (through employment, for example). Secondly, while the relationships between

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[3] These were:
→   What housing arrangements and circumstances, particularly tenure arrangements, do ISRs adopt over time, and how changeable are they?
→   Are ISRs' housing tenure patterns organised in terms of typical sequences that constitute 'housing trajectories'?
→   How do the housing trajectories differ by specific groups of ISRs?
→   How long do people remain in public housing?
→   What tenures do people move from when they enter public housing?
→   What tenure do people move to when they leave public housing?

earnings, tenure and other factors is also of great research interest, there are likely to be some issues regarding the accurate reporting of 'earned' incomes (e.g. income from employment beyond the IS payment itself) which may impact on the overall reliability of these data.

The Positioning Paper provided discussion of these and a number of related issues concerning how the research would and could proceed. However, at the time of its production, the research team had only completed the initial data orientation process, and had not formally begun the process of deep exploration of the data.

1.1.2 Amendments to research questions

Further into the research phase, and following extensive work on organising and structuring the data sets, a project workshop was held to review whether all of the original research questions could be answered, and to confirm final plans for how they would be addressed.

In the main, this process indicated that the questions were largely answerable in some form or other. Two main changes (relatively minor to the overall schema) were made:

→ Question 3.4 originally had two parts: '(a) Is entry to or exit from public housing associated with identifiable improvements or declines in earnings, and (b) can these changes be explained with reference to housing factors e.g. access to housing markets and/or regulation of public housing access?'.

It was recognised that, in practice, the second part of this question would be almost impossible to answer in the context of the present study, as it would require external information and data which could not be readily incorporated into the LDS.[4] Accordingly, it was agreed that part (b) would be deleted, so that now Question 3.4 asks 'Is entry to or exit from public housing associated with identifiable improvements or declines in earnings?'

→ Question 3.5, which related back to Question 3.4, was originally worded 'If so, which appears to be the driving factor, and which the resultant factor – housing access/ mobility or earnings?'.

It was agreed that in light of the amendment to Question 3.4 above, this question needed to be reworded to ask 'What are the sequences and patterns associated with this?' (still relating to Question 3.4).

It was also recognised that Question 3.8 was effectively the same as Questions 3.5 to 3.7, so materials generated for these preceding questions would be used to address 3.8.

Finally, for Question 3.3 (spatial analysis), while state-level disaggregation was undertaken for several components of the study, technical and practical problems were encountered in undertaking other intended spatial aspects of the study. The intended construction of labour market areas proved to be more complex than anticipated, and the capacity to pursue fine level analysis was reduced when the main researcher providing advice on this aspect moved to a new position within a different university.

1.1.3 Thematic presentation of outcomes in this report

Although the above grouping of research questions was used for the conceptual and analytical stages of the study, a slightly different approach has been used in this Final

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[4] However, the research team agreed that this second part of the question could form the basis for future work.

Report to organise and present the main findings. Accordingly, the research results and outcomes are structured thematically around the following topics.

Housing pathways among ISRs

This first theme focuses on the patterns of general housing consumption and transitions (i.e. tenure moves and non-moves) among ISRs, by tenure over time. This covers the issues captured in Research Questions 1.1, 1.2 and 1.3.

Relationships between housing pathways, earnings and other factors among ISRs

This second theme considers the association of general housing consumption and transitions (i.e. tenure moves and non-moves) identified in Theme 1 with other measurable factors, such as earnings, family structures and IS types. This covers the issues captured in Research Questions 1.4, 1.5, 1.6 and 1.7.

Specific movements into, out of or continuous residence in public housing, and the relationships between these tenure moves (or non-moves), earnings and other factors.

This third theme presents a specific case-study of how the findings in Themes 1 and 2 can be observed in the context of public housing. This covers the issues captured in Research Questions 2.1, 3.1, 3.2, (3.3), 3.4, 3.5, 3.6, 3.7 and 3.8.

It is felt that this revised approach represents a more helpful mechanism for interpreting and communicating the various findings according to more discrete themes, which can be considered on their own or as a whole.

1.2 Project management

The original research project plan envisaged an eighteen month study period for proper data orientation and preparation, full data interrogation, and detailed analysis and interpretation of results, findings and policy implications.[5] The broad scope of the study project, and the level of complexity expected to be incurred in interrogating the data, required the research to be split into six key stages:

1. Examination of past research and data analysis relevant to the study, including policy and research materials relating to housing, IS types, workforce participation, household and tenure mobility, and also quantitative research methods and longitudinal data analysis approaches;

2. Initial orientation to the LDS, construction of environment for analysis and finalisation of research focus;

3. Primary level data interrogation and analysis (based around further descriptive analysis);

4. Secondary level data interrogation and analysis (involving regression and other techniques);

5. Final level data interrogation and analysis (more advanced longitudinal techniques);

6. Interpretation and policy analysis of results and consideration of findings and implications.

The Positioning Paper was produced following completion of the first two of these stages. The remaining stages have now also been completed, and this report duly is based on the analysis and interpretation of the results and outcomes, and formulates them in terms of key findings and related policy and research implications.

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[5] Due to technical and other reasons, the final stages of this study took longer than anticipated.

1.3 Key concepts and issues raised in the Positioning Paper

1.3.1 Analytical considerations

The full LDS is a longitudinal database, compiled through fortnightly data transfers from the live data management systems used by Centrelink (the IS provider agency) for all IS program clients. From this massive database, customised samples of all client records from the main LDS are made available for research purposes. While larger extractions can be ordered, a standardised 1 per cent sample is readily available and has been previously used by AHURI and other researchers. This is the sample that has been made available by FaCS and is being used for the present study.

The LDS (1 per cent sample) used in this study covered data from 6 January 1993 to 5 September 2003. Selected confidentialised records were extracted from the overall database on the basis of each one-hundredth client (Centrelink 'customer') registered. As new clients came into contact with Centrelink, every one-hundredth new person was added to the LDS, maintaining its representative distribution. Data for each client in the sample is provided for every fortnight they were in receipt of an IS payment, even if these were spread over different blocks of time.

The LDS (1 per cent sample) as a whole comprises approximately 103,000 individual clients, connected to a total of almost 11,000,000 observations over 226 fortnights. For certain aspects of this study, the LDS data used will be filtered to include only those in receipt of specific groupings of IS payment types, but these still result in large numbers of cases and total observations. The parameters of the data set overall are structured around the administrative information required by Centrelink to assess eligibility for IS assistance, and while a wide range of variables pertaining to IS payments are captured in the LDS, only a select number of these variables for each customer will be used in this study. These include basic demographic information, including age, sex, country of birth, family structure, age and number of dependent children, plus homeownership and rent status, earned and unearned income, benefit type, postcode and amount of private rent paid. No identifying data are included in the LDS.

The LDS represents a powerful tool with which to analyse housing consumption patterns, and other characteristics and activities, among ISRs over time. It does have some limitations, such as a lack of variables covering certain issues, chiefly 'employment-type' variables, which might otherwise be of significant interest. Another limitation is 'data drop-out', in that once a person leaves the IS system, they also exit from the data set. However, the LDS does provide great potential in other ways due to the breadth of variables collected in the administration of IS payments, and also through the frequency of data reporting, and the overall size and length of the data set. Its use in the housing research field is also extremely underdeveloped.

1.3.2 Housing and income support policy

As has already been identified, the Positioning Paper highlighted that there is a complex set of relationships between housing consumption patterns and tenure changes, demographic and spatial characteristics and changes, and IS usage and earnings activities. Some of these are further explored in this report.

However, the phenomena examined empirically in this study have taken place in the contexts of various situational factors, social and economic conditions, and specific policy and program interventions. Although the Positioning Paper goes into greater detail about these, some critical components of certain housing and related policy is

worthy of reiteration here. Of greatest interest are the public housing and private rental contexts in which low-income people are commonly found.

The public housing system in Australia makes up a relatively small part of the housing system, dwarfed by both the owner occupied sector (home purchasers and outright owners) and by the private rental sector. At the last (2006) Census, roughly 5 per cent of all households lived in public housing, and the sector has hovered around this mark for the last thirty years. Demand for public housing is substantial and far exceeds supply capacity (Burke and Hulse 2003), and waiting times have grown to significant levels. In response, most State Housing Authorities are now developing or operating 'categorised', 'segmented' or prioritised waiting list systems which stream allocations according to the nature and urgency of the applicants' needs and their capacity to access alternative housing options (Productivity Commission 2005). Governments have also become more focused on whether those already in public housing require continuing assistance, and how new tenants might be encouraged or assisted to re-engage with the labour market and/or other forms of housing. The effects of public housing rent setting based on percentages of income have come under particular scrutiny at the national level, amid concerns that this and resultant high effective rates of IS assistance withdrawal may create disincentives to work or earn more.

By contrast, the private rental sector is now the de facto main provider of rental housing for lower-income households: more ISRs rent privately than through the public sector. However, the main form of assistance available to low-income renters is Commonwealth Rent Assistance, a demand-side support program which supplements the incomes of renters paying more than a minimum threshold of rent. This does not ensure affordability; it seeks only to meet a proportion of the rent costs, and there are maximum rates of assistance. It is also only available to those on IS.

A critical policy question relates to the interactions between the private rental and public housing sectors, and how ISRs move into and out of these two tenures, particularly from one to the other. There are concerns about repeated re-entry to public housing, known euphemistically as the 'revolving door' problem, and of tenure churning more generally.

1.3.3 Housing pathways

While this study is essentially empirical in nature, it is important to stress early on that it is not an econometric exercise. The research examines incomes and tenures, but it has not been based on tenure choice theory or associated modelling approaches. Critically, this study does not seek to explain housing consumption patterns. Rather it seeks to identify what the patterns of consumption are over time, and to explore the apparent associations which may exist between tenure (change) and other factors.

Alternative frameworks and disciplinary approaches, such as the theory of tenure choice, are often focused on explaining why some households become homeowners and others renters (usually focusing on a direct choice between these tenures). 'Tenure choice' as a model of housing tenure transitions is largely an econometric approach to seeking to understand housing decisions, based on the choices available between competing tenure options. A useful summary of the traditional modes of tenure choice analysis, and some prospective changes to them, is provided by Gyourko (2003) (see Wood et al. 2002 for an Australian example). In most cases, this is conceived as a two-way choice involving the larger tenures, and in housing systems like Australia's this means a choice between the home purchase and private rental tenures (historically, in the UK the binary was between public rental and purchase, suiting that housing system – see King 1980, for example). Most tenure choice models also apply a series of assumptions to the modelling. The Wood et al. (2002: 3)

analysis is a good example: 'It is assumed that market participants have perfect foresight; housing is homogeneous and supplied within a unitary housing market where there is a known and uniform rate of house price appreciation … the tenure choice decision is determined according to which tenure provides housing at the lowest after-tax cost'. Such analyses tend to hinge heavily on the role of taxation and earnings, and how housing services (the effects and outcomes from housing) are acquired and traded off via ownership versus renting decisions.

The present study differs fundamentally from such approaches, and they were not considered as useful frameworks for several reasons. Firstly, the present research is examining a very different population group to those normally studied; IS-based households are likely to have a different range of housing options, some possibly based on choice, and others strongly associated with constraints. Secondly, the data do not contain the necessary variables for causal modelling, and many of the traditional approaches are not particularly designed for longitudinal research. Thirdly, tenure choice theory is only one approach of analysis, is highly econometric and is not immune from critiques for being over-'economistic' (Ben-Shahar 2007). As Coolen et al. (2002) observe, 'Housing choice and tenure choice have been studied from many different theoretical perspectives and with a great variety of methodological approaches'. Finally, and perhaps most significantly, it was felt that, given the exploratory and experimental nature of this study, it would be premature to make significant assumptions about rational behaviour, and cause and effect hypotheses. Instead, this study is positioned as a preliminary examination of under-researched and under-utilised data within the traditions of empirical sociological inquiry, but it is hoped that it will provide the foundations for subsequent, hypothesis-based research to further explore the housing consumption patterns of those on IS.

Notwithstanding the empirical nature of the research, the concept of 'housing pathways' has been applied as a conceptual tool and framework for the analysis of housing arrangements and transitions over time and place. This takes into account critiques of earlier approaches developed around the notion of 'housing careers' which, it is argued, is particularly problematic as a way of conceptualising the housing experiences and housing histories of low-income households. In an important contribution to the theory and practice of analysing movements around the housing system, Clapham (2002) has developed the concept of 'housing pathways'. These are essentially 'patterns of interaction (practices) concerning house and home, over time and space' (Clapham 2002: 63). In stressing the dynamic nature of these interactions, Clapham states that '[t]he housing pathway of a household is the continually changing set of relationships and interactions, which it experiences over time in its consumption of housing' (2002: 64).

Using the pathways approach, housing consumption patterns, housing transitions, residential mobility, economic participation and other family-structure transitions can be conceptualised broadly, and analysed over time and across tenures.

1.3.4 Longitudinal analysis of income support data

The study is also located within the tradition of longitudinal data analysis methods, and offers an opportunity to acquire in-depth knowledge of how data from the Department of Family and Community Services LDS can be analysed. It was anticipated that this study may allow for the advancement of research methodologies and approaches for analysing large-scale longitudinal administrative data in a housing policy research and social science context. Different methods of longitudinal data analysis were reviewed from previous studies and assessed in the first stages of this project up to the point of producing the Positioning Paper. Chapter 2 and other parts of this report provide an outline of the methods used for the study.

1.4 Structure of the Final Report

Beyond this Introduction, this Final Report is organised as follows:

Chapter 2 reports on the methodological approaches adopted during this study, and also discusses some of the key data considerations which have been encountered. Much of this chapter is technical in nature, and its main purpose is to explain how the various components of the study have been undertaken, and how the data set being used both facilitated and delimited aspects of the analyses.

The following three chapters report on the main findings from the study, and have been structured in line with the three thematic areas outlined earlier. Chapter 3 presents the key research findings concerning housing pathways, including a general overview of those identified. Chapter 4 presents the key research findings concerning the relationships between the identified housing pathways and changes in earnings and other factors. Chapter 5 provides more detail on these two themes in the context of movements into, out of or continuous residence in public housing, and the relationships between these tenure moves or non-moves.

The Final Report concludes with Chapter 6 which attempts to highlight the overall conclusions about, and policy implications arising from, the research findings and outcomes, and also identifies issues and opportunities regarding future housing research and analysis using LDS.

2 METHODOLOGICAL AND DATA CONSIDERATIONS

The Positioning Paper has already discussed a range of significant considerations concerning the scale and complexity of working with a large administrative data set, and some of the more specific challenges in analysing the LDS. Items include defining the base population for the study, options for defining spells of time for the analysis, how to treat short absences from the data, and censoring cases at start and end of the data set. It also reviewed the methodological literature as it pertains to longitudinal and/or administrative data analysis, and how the limited number of previous longitudinal studies examining the LDS had been framed.

For reasons of space, these points are not repeated in detail here, and it is strongly recommended that the Positioning Paper be consulted with reference to such issues. However, this chapter does seek to highlight some of the most basic parameters (such as tenure and IS categorisations), in addition to discussing issues that have arisen since the main analytical phase of the study commenced.

2.1 Analytical parameters

One of the early tasks in preparing for the analyses concerned the management and sorting of LDS data. This included exclusion of variables that would not be used for this study, collapsing of key variable categories into broader meaningful categories, and construction of sub-sets of data to reduce the computational time of complex analyses. The Positioning Paper provided a detailed description of the main variables that would be used, and how the category levels for tenure, IS type and family type variables would be constructed. These are summarised in Appendix 1.

Analysis of the LDS presented certain contradictory problems: one the one hand, there were challenges with the size and complexity of the data which meant aspects of the analysis had to be broken up into component parts or simply restricted in scope; on the other hand, there were some limitations due to the administrative nature of the data which resulted in the absence of certain variables (such as address or dwelling moves) which could have enhanced an analysis of housing pathways. See the Positioning Paper for greater discussion of this type of limitation.

The sheer size of the data set, and the computing restrictions placed on the research process,[6] meant that it was not possible to implement the statistical analyses using the whole data set as a single entity. Separating these data into sub-sets assisted in focusing the research, and also provided a practical means of resolving computational problems. Separate data sets were created to represent each of the seven major IS types. Primarily, cases were grouped into one of these types on the basis of where a recipient spends the largest proportion of his/her time. For the small number of recipients where two or more IS types were of equal weight, persons were assigned to benefit types according to the following order of priority: U, A, S, W, D, P and O.

As well as sorting, filtering and restructuring the existing variables in the LDS, this study also required the development of new variables to facilitate some of the longitudinal analyses. The main forms that these have taken are of 'lag' variables and

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[6] The research team was required to run the data analyses from portable hard drives connected to a non-networked PC running SAS and Stata software locally (rather than on main frame computers, for example). The data were also not permitted to be left unattended. These restrictions led to significant computing time and capacity problems, particularly as programmed overnight or weekend computations were not possible.

'change' variables, so that the effects of previous circumstances and changes in key variables can be analysed.

A lagged tenure variable was constructed to represent an individual's tenure one month prior to a housing transition. This was considered important when analysing the relationship between earned income and tenure, as changes in income may be related to the present tenure as well as the previous tenure one month earlier. Lagged variables help to account for the temporal sequence of a possible cause and effect in this longitudinal data framework. Similarly, lagged income variables were created by lagging earned income by one month and three months, respectively.

The change in earned income from one time period to the next is essentially captured by including lagged income in a model for earned income. The effects of additional explanatory variables in the model, including selected housing and socio-demographic variables, can be interpreted as the effect on the change in earned income.

2.2   Methods and approaches

A distinction can be made between research approaches which are truly longitudinal and others which concern time-based repeated observations, potentially but not necessarily of the same cases or individuals. What might be termed as 'true' longitudinal research typically involves analysis of data which consist of repeated observations across a number of variables, for the same individuals or cases at different points in time. Such longitudinal designs for data collection are uniquely suited to the study of individual change over time and so are commonly used in medical, economic and social science research. Longitudinal research aims to exploit the unique possibilities of longitudinal data to investigate changes in relevant outcome variables, and to relate these to other variables of interest.

As foreshadowed in the Positioning Paper, a range of cross-sectional and descriptive longitudinal analysis, and more complex longitudinal approaches, including proportional hazard and linear mixed modelling, has been conducted. These various approaches have been used selectively, and sometimes in combination, to assist in addressing the study's research questions and themes.

Survival analysis has been conducted to examine housing pathways, with a particular focus on public tenant exits and when this exit event occurs. The event occurrence can vary with the individual's socioeconomic and demographic circumstances, and is also associated with other life events and changes such as marriage and having children. The analysis uses two principal functions:

→ Survivor functions representing the proportion of the sample that has not experienced the event (in this case, an exit from public housing) by a given point in time. Consequently, survivor functions are constrained to decline over time, and vary between 1 and 0;

→ The hazard function is the probability of experiencing the event at any given point in time, conditional on not having previously experienced the event. As with the survivor function it can vary between 0 and 1 over time, but can move both up and down over time.

To examine relationships between changes in income and changes in tenure, for example, two discrete approaches have been undertaken. First, descriptive analysis has been used to verify a range of housing circumstances with their socio-demographic profiles. Frequencies were calculated for all housing transitions by individual. This enabled the identification of all housing pathways which ISRs have undertaken, and in particular, the form of the most typical pathways. Crucially, this process highlighted a significant level of single tenure occupancy (i.e. where

individuals remained in just one tenure during their time in the LDS and did not undergo a tenure transition).

While the descriptive analysis is useful in providing an aggregated overview of housing pathways, statistical analyses were implemented using linear mixed models to assess tenure-income changes. The dependent variable was the logarithm of earned income of ISRs and was analysed as a continuous random variable, with observations repeated up to 226 times (once every fortnight while receiving IS) for each individual. The linear mixed model for each IS category included a random intercept to capture the variation in starting income across individuals in the data set. In practice, the linear mixed model was used to examine whether change in income is related to tenure transitions and other socio-demographic variables. Because of the large number of observations per ISR (subject), it is anticipated that the model will provide good estimates of the within-subject regression coefficients by pooling information across ISRs after accounting for the between-subject variation.

Prior to fitting the linear mixed model with random intercept, other modelling approaches were also investigated. For example, a marginal or population-averaged model using a generalised estimating equation (GEE) approach to account for correlation among repeated observations was implemented. The GEE methodology uses a working correlation structure to correct for the dependency of the observations within a subject over time. With this approach it is necessary to specify a form for the correlation matrix. Because the dimensions of the correlation matrix are large, the computation time required for estimating this model was considerable (up to four hours using SAS software for data from one IS group). After testing variations of each of these types of models, it was decided that the linear mixed model was more appropriate for analysing the LDS data as it produces estimates of effects within individual cases, as opposed to those effects between individuals or effects averaged over the whole population.

Analyses of change in earned income and public housing tenure were conducted for each of the seven IS groups, using variations of the models described above with varying correlation structures and sub-sets of independent variables. This process required a large amount of computational time and overall took several months to complete before the final model was selected. The various components of the LDS study can be positioned within a research schema, which is provided in Figure 2.1. Further explanation of how these components have been approached is provided in the relevant findings and outcomes sections of this report.

2.3   Reporting and presentation challenges

The analysis of the LDS presented a number of challenges due to the complexity and scale of the data, and because of certain methodological issues some of which existed a *priori* to the analytical phase and others which arose either during or a *posteriori* to particular forms of analysis. A second challenge lay in the fact that, in many cases, the analysis could be constructed and reported on across different levels of aggregation and disaggregation, including:

→ For all ISRs;

→ Across specific IS types;

→ Across specific housing tenures;

→ Nationally;

→ Across specific states and territories;

→ Various combinations of the above.

For a number of reasons (methodological, computational and practical), it has not been possible to do all of the analyses across these levels of aggregation and disaggregation. Nor is it possible to fully report on all of the analyses that have been conducted in these ways, so some selectivity is evident in the findings chapters which follow.

Figure 2.1: Schema for the analytical components of the study

Research Goal
To examine trends within, and relationships between changes in, tenure and changes in socioeconomic and demographic circumstances for income support recipients

Descriptive data analysis

Applied longitudinal data analysis

Aggregate analysis of housing pathways using frequencies
→ Tenure transition by origins and destinations
→ Origins and destinations of public tenants
→ Typical housing pathways appeared in ISRs by benefit types and states

Further analysis of typical housing pathways and their means of selected variables
→ Differences in means of selected socioeconomic and demographic factors by groups of typical housing pathways
→ Graphical illustration for typical housing pathways relating to entry and exit of private rental / public housing
→ Income changes over tenure changes analysis

Socioeconomic and demographic characteristics and entry and exit of public housing by benefit types
→ Changes in earned income
→ Changes in demographic characteristics
→ Other unchanged factors related to entry and exit of public housing (e.g sex, country of birth)

Further analysis of tenure duration associated with its entry and exit
→ Factors associated with duration of exiting public housing
→ Factors associated with duration of re-entering public housing
→ Factors associated with duration of remaining in a benefit support

Cross-tabulation analysis by tenure origin and destination

Frequencies of typical housing pathways

Means of its socioeconomic and demographic futures

Linear mixed model with random intercepts for recipients

Logistic regression model with random intercepts

Cox's Proportional Hazard Model

Trends, factors and issues among income support recipients, and their implications for housing policy

Over the next three chapters, the main findings of the study are presented, organised around the three central themes of the research outlined earlier.

3 KEY RESEARCH FINDINGS 1: HOUSING PATHWAYS AMONG INCOME SUPPORT RECIPIENTS

3.1 Introduction

Chapter 3 commences the process of reporting on the outcomes from this study of IS data. The key research findings considered here concern the housing pathways identified among ISRs: the patterns of general housing consumption and transitions by tenure over time (tenure moves and non-moves).

The specific issues examined include the aggregated tenure proportions for ISRs at points in time; the proportions who change tenures during observed time on IS; the range of tenure transitions; the main origins and destinations of tenure moves, and finally the patterns of housing consumption and tenure changes over time.[7]

Through a mixture of 'point in time' and 'over time' analyses, the general patterns of housing consumption and transition patterns for ISRs have been identified in the LDS. The tenure transition history of each individual ISR has been traced (89,291 in all) by every fortnightly observation.

Three main types of tenure analysis have been developed for this study:

→ Descriptive tenure analyses, which examine case-based point in time, aggregated time and summary transitions;

→ Tenure Origin and Destination analyses, which are event-based;

→ Longitudinal tenure history analyses, which map the case-continuous patterns of tenure consumption.

3.2 Housing pathways overview

Almost seven thousand separate housing pathways have been tracked through our analysis, including 32 of what might be termed 'typical' pathways, defined by those representing three-quarters of all pathways identified (and all involving more than 250 cases each)[8].

Of the ISRs studied, 57 per cent did not change tenure whilst on IS. Among those with no transition, the highest proportion are homeowners who account for 48.7 per cent of cases. Aged care was the lowest (0.83 per cent).

Those cases where only one tenure change while on IS was observed made up a further 22 per cent of the ISRs studied. Some 20 per cent of cases were observed to have been in multiple and often quite complex tenure transitions. Most tenure changes are of single or dual tenure transitions only (235 types of housing pathways). The longest identified housing pathway involved 34 discrete tenure transitions! Among the more complex patterns, there was a tendency to return to a 'past tenure'.

Considering the typical housing pathways experienced, private rental plays a significant role in continuing pathway to other housing tenures. Private rental is the 'gateway' tenure in the housing system for ISRs.

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[7] As with all time-related tenure analyses, movements within a tenure, such as private rental, are not captured. Tenure change should not therefore be seen as synonymous with dwelling change.

[8] Effectively representing 25,000 ISRs.

3.3 'Point in time' tenure analyses

There are two ways that the same data for cross-tabulations of housing tenure and IS type can be presented. The first concerns the 'tenure breakdown' of ISRs, aggregated as a whole or by individual IS type. The second concerns an analysis of types of ISRs that are identified within individual tenures.

In either case, the analysis here is based around a point in time, rather than being concerned with tenure transition (which is examined shortly). However, unlike traditional points in time which are set on a fixed date for all cases, the analysis is based on the last observation for each individual case. Given that ISRs move in and out of the IS system over the life of the data set, and the data set overall has grown over time, a last observation analysis gives a more accurate picture of aggregated tenure arrangements at time of exit from the system than one based on the first or last date in the data, or a randomly selected date in between.

The point in time tenure breakdown of ISRs provided in Table 3.1 suggests that for ISRs overall (all cases), some characteristics at last observation have some similarities with those of the broader population, while others differ significantly.

Table 3.1: Tenure of ISRs at last observation (all ISRs)

Tenure type (code)		Last observation	
		Frequency	Per cent
Homeowners	(H)	28,607	32.1
Private renters	(R)	22,294	25.0
Rent-free	(F)	11,012	12.4
Boarders/lodgers	(B)	7,565	8.5
Non-homeowners	(N)	5,826	6.5
Public renters	(G)	5,166	5.8
Purchasers	(P)	4,176	4.7
Aged care	(A)	3,244	3.6
Other rent	(O)	1,291	1.5
Total		89,181	100

At 32.1 per cent, the homeownership rates among ISRs are lower than for the whole of the population (39.7 per cent from 2001 Census[9]), but the difference is perhaps not as dramatic as might be expected. As Table 3.2 suggests, it is older people who are found in homeownership arrangements among ISRs: 52per cent were aged 65+, with a further 31 per cent in the 45-64 age group. The situation for home purchase, however, is quite different. Purchasers represented less than 5 per cent of all tenure arrangements, much lower the 25.8 per cent than in the background population. They are concentrated in the 25-54 age range, accounting for nearly 85 per cent of all purchasing ISRs.

Comparisons between ISRs and the whole population in terms of public and private rental arrangements suggest considerable similarity. ISRs renting publicly represented 5.8 per cent of all ISRs, close to the 4.5 per cent in the background population; ISRs renting privately represented 25 per cent of all ISRs, compared with 21.5 per cent in the background population. Public renter ISRs were relatively spread out across age categories, whereas three-quarters of private renting ISRs were under 45 years.

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[9] ABS (2002, Table B19).

Informal rental and other a arrangements among ISRS, some 30 per cent in total, were much higher than the respective sum of 'other tenure' (2.8 per cent) and 'not stated' (4.7 per cent) in the wider population. It should be noted that, as 81 per cent of 'non-homeowners' were under the age of 35, most of these are in fact living with their parents or other relatives.

Table 3.2: Tenure of ISRs by age group

| *Tenure* | *Age* | | | | | | *Total (%)* |
	15-24 (%)	*25-34 (%)*	*35-44 (%)*	*45-54 (%)*	*55-64 (%)*	*65+ (%)*	
Homeowners (H)	0.5	5.2	11.5	12.1	19.0	51.9	100
Purchasers (P)	3.2	28.2	36.2	19.9	8.7	3.8	100
Private renters (R)	24.1	30.5	20.4	10.7	6.1	8.2	100
Public renters (G)	5.3	15.2	20.6	16.7	14.7	27.6	100
Aged care (A)	0.0	0.2	0.3	0.9	2.6	96.1	100
Boarders (B)	35.8	27.1	11.5	6.7	3.7	15.2	100
Rent-free (F)	47.1	19.1	9.5	5.7	4.8	13.7	100
Other rent (O)	4.8	6.5	7.4	8.4	15.3	57.6	100
Non-homeowners (N)	68.7	12.5	5.5	2.9	2.1	8.3	100
All ISRs	20.1	17.1	14.3	10.1	10.2	28.3	100

Based on last observation and median age while on IS. Total n=89181

However, when specific types of ISRs are examined in terms of their tenure occupancy, quite different patterns of housing consumption emerge. Table 3.3 provides the tenure breakdowns for key groups. For example, more than a third (37.4 per cent) of those on unemployment-related IS were private renters, and few (2.9 per cent) were in public housing. Much lower levels of outright ownership were observed among this group compared to all ISRs, although the rate of home purchasers (5.4 per cent) was sightly higher. Almost a third of those on unemployment-related IS were in some informal arrangement, either rent-free (18.6 per cent) or boarding (14.1 per cent), and another 8.4 per cent were in the residual category of non-homeowner (presumably living in someone else's home).

In the case of sole parent-related ISRs, many more proportionally (12.9 per cent) were in public housing, and an even higher proportion (43.9 per cent) were private renters. Levels of outright ownership were lower than for all ISRs, but higher than for unemployment-related ISRs, and almost 10 per cent were home purchasers. Almost 16 per cent were in some informal arrangement, either rent-free, boarding or other rent.

Turning to disability-related ISRs, the analysis found that one-third were outright homeowners, 22 per cent private renters, 14.5 per cent public renters, and 20 per cent were living in informal arrangements (boarding 11.4 per cent and rent-free 9.8 per cent).

Student ISRs were the least likely to have any connection to owner occupation, and only a quarter of them were renting formally. More than a third were in informal arrangements, either boarding (8 per cent) or rent-free (29.9 per cent), and another third were classed as non-homeowner (believed to represent being in the family home or in another household's dwelling).

At the other end of the spectrum, age pension-related ISRs exhibited a high rate (60 per cent) of outright homeownership. Relatively few were renting privately (7 per cent) or publicly (5.7 per cent), and just under 12 per cent were in aged care housing.

Table 3.3: Tenure of ISRs by selected IS type at last observation

Tenure type	Per cent at last observation				
	Unemployed	Sole parent	Disability	Student	Age
Homeowners	12.4	15.9	33.7	1.7	60.1
Private renters	37.4	43.9	21.8	24.2	7.2
Rent-free	18.6	8.3	9.8	29.9	5.8
Boarders/lodgers	14.1	7.3	11.4	8.0	4.2
Non-homeowners	8.4	1.5	2.6	34.5	1.8
Public renters	2.9	12.9	14.5	0.6	5.7
Purchasers	5.4	9.8	3.1	1.1	0.7
Aged care	0.0	0.0	1.3	0.0	11.7
Other rent	0.8	0.4	1.7	0.1	2.9
Total	100	100	100	100	100

The second way that the relationship between tenures and IS types can be viewed in an aggregated tenure sense involves analysing the breakdown of IS types within each tenure (i.e. proportional analysis of the same data but on the other axis (in rows, rather than in columns)). Again, the analysis, shown in Table 3.4, is based on the last observation of each case, rather than a fixed point in time.

This illustrates, for example, that more than half of all ISRs in outright homeownership are in receipt of an age pension, and that those on unemployment-related IS make up a third of all home purchasers on IS, and almost one half each of all private renters, boarders and those living rent-free. ISRs in public housing are more of a 'mixed bag': a third are on age pensions, a quarter on disability-related IS, and there are about equal proportions of sole parents (17.3 per cent) and unemployment-related ISRs (16 per cent). Not unexpectedly, the 'aged care' tenure is almost exclusively made up of those on the age pension, but not exclusively so, as 3.3 per cent are on disability-related IS.

Table 3.4: breakdown of IS types within discrete tenures

IS type/tenure	Unemployment (%)	Age pension (%)	Disability (%)	Partner (%)	Sole parent (%)	Student (%)	Other (%)	Total (%)
Homeowner	12.4	56.0	9.7	11.9	3.9	0.4	5.7	100
Private renter	47.8	8.6	8.0	9.7	13.7	7.5	4.7	100
Rent-free	48.1	13.9	7.3	3.2	5.2	18.9	3.4	100
Boarder/lodger	53.3	14.7	12.6	1.3	6.7	7.3	4.4	100
Non-homeowner	41.2	8.4	3.7	2.1	1.8	41.1	1.8	100
Public renter	16.0	29.4	23.1	7.4	17.3	0.8	6.0	100
Purchaser	36.7	4.2	6.0	28.2	16.3	1.8	6.6	100
Aged care	0.0	96.2	3.3	0.1	0.1	0.0	0.3	100
Other rent	18.0	60.0	11.2	4.8	1.9	0.5	3.6	100
Total	32.0	29.9	9.2	8.7	7.8	7.8	4.6	100

3.4 Tenure Origin and Destination analyses

The first approach taken to move the analysis of housing consumption patterns away from traditional tenure tables, into a more time-based analysis, concerned the construction of an 'Origin and Destination' framework for looking at tenure changes over time. The tenure Origin and Destination analysis presented here is based on a count of all movements out of each tenure (the Origin), and a count of all movements into each tenure (the Destination). The analysis is thus event-based, rather than case-based – it provides an aggregated picture of flows to and from specific tenures, rather than presenting the movements of individual ISRs. Because it is based on tenure changes, those cases of ISRs who remained in one tenure have been excluded. The benefit of examining the net inflows and outflows for individual tenures is that it indicates which are connected to high or low levels of tenure transitions.

Origin and Destination tables are provided here for all transitions over the life of the LDS (Table 3.5), and then in Tables 3.6 to 3.8 for three key IS types (unemployment, sole parent and disability-related). Totals for the numbers of instances of transitions observed are provided in the header category column and row. The row percentages (shaded) represent the proportions of those ending up in any given tenure in the 'destination' tenure column on the left originated from tenure-wise. The column percentages (not shaded) indicate where those starting from any given tenure in the 'origin' tenure row at the top ended up tenure-wise.

For example, of all those who transited into the home purchase tenure, 47.1 per cent (1,382 instances) started in private rental, 3.56 per cent (104 instances) started in public housing, and so on. However, all those transiting into home purchase combined represented only 2,932 instances out of an overall total of 94,110. Meanwhile, of all those transiting out of the home purchase tenure, 45.7 per cent (678 instances) went to private renting, 26.8 per cent (398 instances) went into outright homeownership, and so forth. Total movement out of home purchase was only 1,486 instances out of the 94,110 total.

Table 3.5: Origin and destination of tenure changes of ISRs (all ISRs)

Destination	Origin									
	H 7,451 (%)	P 1,486 (%)	R 25,871 (%)	G 4,251 (%)	A 466 (%)	B 15,810 (%)	F 8,076 (%)	O 2,662 (%)	N 18,037 (%)	Totals 94,110 (%)
Homeowners (H) 4,577 (%)		26.8	7.4	3.4	42.8	2.5	4.4	7.4	3.0	4.9
		8.7	41.7	3.1	4.3	8.5	17.4	4.3	11.9	100
Home Purchasers (P) 2,932 (%)	10.3		5.3	2.4	0.0	1.3	1.6	1.1	0.9	3.1
	26.2		47.1	3.5	0.0	7.2	9.7	1.0	5.3	100
Private Renters (R) 29,014 (%)	35.7	45.7		45.4	12.5	53.5	39.0	43.2	39.0	30.8
	9.2	2.3		6.6	0.2	29.2	24.3	4.0	24.2	100
Public Renters (G) 5,319 (%)	1.2	1.3	11.2		2.2	5.7	2.8	4.4	4.3	5.7
	1.7	0.4	54.6		0.2	16.9	9.6	2.2	14.5	100
Aged Care (A) 3,313 (%)	18.4	0.3	1.1	4.0		5.3	1.4	10.9	0.6	3.5
	41.4	0.2	8.5	5.1		25.4	7.7	8.7	3.1	100
Boarders (B) 15,365 (%)	8.7	7.0	29.8	15.6	23.0		16.6	12.4	15.5	16.3
	4.2	0.7	50.1	4.3	0.7		19.5	2.1	18.2	100
Rent-free (F) 16,760 (%)	12.4	12.5	23.9	11.0	6.0	14.7		12.7	35.1	17.8
	5.5	1.1	36.8	2.8	0.2	13.8		2.0	37.8	100
Other Rent (O) 2,839 (%)	7.5	1.6	4.0	2.4	6.2	2.5	2.2		1.6	3.0
	19.6	0.8	36.4	3.6	1.0	14.2	14.1		10.3	100
Non-homeowners (N) 13,975 (%)	5.8	4.7	17.3	15.8	7.3	14.5	32.0	8.0		14.9
	3.1	0.5	32.1	4.8	0.2	16.4	41.3	1.5		100
Totals (%)	100	100	100	100	100	100	100	100	100	100
	7.9	1.6	27.5	4.5	0.5	16.8	19.2	2.8	19.2	100

Table 3.6: Origin and destination of tenure changes of ISRs (unemployment ISRs only)

Destination	Origin									
	H 1,481 (%)	P 489 (%)	R 13,019 (%)	G 1,216 (%)	A 3 (%)	B 8,860 (%)	F 9,593 (%)	O 1,118 (%)	N 9,894 (%)	Totals 45,673 (%)
Homeowners (H) 1,156 (%)		25.8	3.8	2.6	33.3	1.1	2.0	3.0	1.8	2.5
		10.9	42.9	2.8	0.1	8.7	16.5	2.9	15.2	100
Home Purchasers (P) 1,082 (%)	24.4		3.1	1.8	0.0	1.2	1.1	1.0	0.7	2.4
	33.4		37.5	2.0	0.0	9.6	10.2	1.0	6.3	100
Private Renters (R) 15,439 (%)	43.8	45.6		43.7	0.0	56.0	41.8	53.3	45.2	33.8
	4.2	1.4		3.4	0.0	32.1	26.0	3.9	29.0	100
Public Renters (G) 1,514 (%)	1.0	1.2	5.5		0.0	3.2	1.9	1.3	2.9	3.3
	1.0	0.4	47.7		0.0	18.9	11.8	1.0	19.2	100
Aged Care (A) 3 (%)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
	0.0	0.0	33.3	0.0		66.7	0.0	0.0	0.0	100
Boarders (B) 8,842 (%)	9.3	10.4	34.7	17.8	66.7		19.4	14.4	19.1	19.4
	1.6	0.6	51.2	2.5	0.0		21.1	1.8	21.3	100
Rent-free (F) 8,382 (%)	12.9	11.7	26.8	12.2	0.0	17.0		14.8	28.5	18.4
	2.3	0.7	41.7	1.8	0.0	18.0		2.0	33.6	100
Other Rent (O) 1,155 (%)	3.2	1.2	3.8	2.3	0.0	2.3	1.9		1.9	2.5
	4.2	0.5	43.3	2.4	0.0	17.7	15.8		16.0	100
Non-homeowners (N) 8,100 (%)	5.3	4.1	22.1	19.6	0.0	19.1	31.9	12.3		17.7
	1.0	0.2	35.5	2.9	0.0	20.9	37.8	1.7		
Totals (%)	100	100	100	100	100	100	100	100	100	100
	3.2	1.1	28.5	2.7	0.0	19.4	21.0	2.4	21.7	100

Table 3.7: Origin and destination of tenure changes of ISRs (sole parent ISRs only)

Destination	Origin									
	H 869 (%)	P 408 (%)	R 4,142 (%)	G 1,088 (%)	A 1 (%)	B 1,986 (%)	F 1,742 (%)	O 197 (%)	N 1,358 (%)	Totals 11,791 (%)
Homeowners (H) 483 (%)		10.3	6.5	1.6	100.0	2.3	3.7	0.5	3.3	4.1
		8.7	55.5	3.5	0.2	9.3	13.3	0.2	9.3	100
Home Purchasers (P) 618 (%)	11.7		8.5	2.7	0.0	2.4	3.9	0.5	1.4	5.2
	16.5		56.8	4.7	0.0	7.8	11.0	0.2	3.1	100
Private Renters (R) 1,417 (%)	66.4	64.0		56.6	0.0	64.7	54.0	62.4	43.2	37.2
	13.1	5.9		14.0	0.0	29.3	21.4	2.8	13.4	100
Public Renters (G) 1,514 (%)	1.5	1.0	20.4		0.0	11.9	6.7	10.2	13.4	12.0
	0.9	0.3	59.6		0.0	16.7	8.3	1.4	12.8	100
Aged Care (A) 2 (%)	0.0	0.0	0.0	0.0		0.1	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0		100	0.0	0.0	0.0	100
Boarders (B) 1,844 (%)	7.8	6.4	27.7	14.2	0.0		12.9	13.2	14.7	15.6
	3.7	1.4	62.1	8.4	0.0		12.2	1.4	10.8	100
Rent-free (F) 1,753 (%)	9.4	14.0	23.1	11.9	0.0	9.7		9.1	23.2	14.9
	4.7	3.3	54.6	7.4	0.0	11.0		1.0	18.0	100
Other Rent (O) 195 (%)	0.6	1.2	2.5	1.5	0.0	1.7	1.3		0.8	1.7
	2.6	2.6	52.8	8.2	0.0	16.9	11.3		5.6	100
Non-homeowners (N) 1,090 (%)	2.5	3.2	11.4	11.6	0.0	7.3	17.5	4.1		9.2
	2.0	1.2	43.3	11.6	0.0	13.2	28.0	0.7		100
Totals (%)	100	100	100	100	100	100	100	100	100	100
	7.4	3.5	35.1	9.2	0.0	16.8	14.8	1.7	11.5	100

Table 3.8: Origin and destination of tenure changes of ISRs (disability ISRs only)

Destination	Origin									
	H 657 (%)	P 134 (%)	R 2,749 (%)	G 681 (%)	A 45 (%)	B 1,649 (%)	F 1,672 (%)	O 366 (%)	N 1,312 (%)	Totals 9,265 (%)
Homeowners (H) 624 (%)		35.1	9.5	4.0	13.3	4.2	7.5	9.0	4.1	6.7
		7.5	42.0	4.3	1.0	11.1	20.2	5.3	8.7	100
Home Purchasers (P) 165 (%)	4.9		3.0	2.1	0.0	0.7	0.7	1.4	0.6	1.8
	19.4		50.3	8.5	0.0	7.3	6.7	3.0	4.8	100
Private Renters (R) 2,563 (%)	45.8	35.1		42.6	31.1	53.4	30.8	39.1	28.4	27.7
	11.7	1.8		11.3	0.5	34.3	20.1	5.6	14.6	100
Public Renters (G) 1,042 (%)	2.1	3.0	20.7		6.7	13.0	5.6	10.1	8.2	11.2
	1.3	0.4	54.6		0.3	20.5	8.9	3.6	10.4	100
Aged Care (A) 158 (%)	4.3	0.7	0.6	2.2		3.8	0.8	3.3	0.7	1.7
	17.7	0.6	10.8	9.5		39.9	8.2	7.6	5.7	100
Boarders (B) 1,557 (%)	11.1	7.5	31.1	18.9	33.3		16.1	14.5	11.7	16.8
	4.7	0.6	54.8	8.3	1.0		17.3	3.4	9.9	100
Rent-free (F) 1,582 (%)	13.7	10.4	19.4	12.0	6.7	13.5		16.7	43.9	17.1
	5.7	0.9	33.8	5.2	0.2	14.0		3.9	36.4	100
Other Rent (O) 404 (%)	9.9	3.0	5.7	3.2	2.2	3.8	3.8		2.3	4.4
	16.1	1.0	38.6	5.4	0.2	15.3	15.8		7.4	100
Non-homeowners (N) 1,170 (%)	8.2	5.2	10.0	15.0	6.7	7.7	34.7	6.0		12.6
	4.6	0.6	23.4	8.7	0.3	10.9	49.7	1.9		100
Totals (%)	100	100	100	100	100	100	100	100	100	100
	7.1	1.4	29.7	7.4	0.5	17.8	18.0	4.0	14.2	100

3.5 Longitudinal tenure history analyses

Finally, the third main form of housing pathways and tenure analysis has involved the longitudinal examination of the full tenure histories of individuals during their time on IS. This requires the tracking of each individual in terms of tenure occupancy and transition over time, and represents a rare opportunity to follow individuals (ISRs) as they navigate the housing system.

Each discrete pattern of tenure occupancy and transition has been separately identified and recorded, and this analysis exposed the diversity of housing pathways among ISRs. These ranged from high rates of stability on the one hand, to a highly complex history of multiple transitions on the other. As mentioned earlier, while 57 per cent of all ISRs observed did not undergo any change of tenure, and a further 23 per cent underwent only one tenure change while on IS, 20% have been in multiple tenure transitions. These are often quite complex, and in many cases highlight returns to past tenures.

In total, some 6,944 separate housing pathways have been identified. The vast majority (235 types) involve one or two tenure transitions only. The longest housing pathway that was identified consisted of 34 tenure transitions[10], although it is possible that some of these very long chains or strings of tenure changes are related to changes in reported tenure categories rather than actual tenure changes.

The highest ranking pathways are presented in the following tables. Table 3.9 shows the most common pathways for all ISRs, and Tables 3.10 to 3.12 show the most common pathways for three specific types (unemployment, disability and sole parent).

Identifying typical housing pathways

Tracing and enumerating individual patterns of tenure occupancy and changes over time identified a huge number of housing pathways in the LDS (145 pages of SAS output in all). In an effort to allow for the selection of what might be termed more 'typical' pathways, a cut-off point of 75% of all pathways was applied (arbitrarily) to the total list of pathways, to highlight the most frequent patterns of tenure occupancy and change. This approach reveals 32 of the more typical housing pathways, which are categorised into three types of tenure transition: (1) the nine non-transition groups, (2) 18 instances of single tenure transitions, and (3) five examples of multiple transitions. The 'Single transition' group are examined further as a core unit of analysis later in this report.

Key for typical housing pathways

H   Homeowners

R   Private renters

F   Rent-free

B   Boarders/lodgers

N   Non-homeowners

G   Public renters

P   Purchasers

A   Aged care

O   Other rent

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[10] (R-N-B-R-N-R-N-R-B-N-R-B-R-B-R-B-R-O-B-R-B-R-B-F-B-R-B-R-B-R-B-R-B-R-F)

Table 3.9: Typical housing pathways of recipients (all ISRs)

Tenure pathway	Rank	Frequency	Per cent	Cumulative per cent
H	1	25,469	28.6	28.6
R	2	9,648	10.8	39.4
F	3	4,497	5.0	44.4
N	4	4,122	4.6	49.0
B	5	3,031	3.4	52.4
G	6	2,400	2.7	55.1
P	7	1,988	2.2	57.4
F-N-F	8	1,366	1.5	58.9
F-R	9	1,078	1.2	60.1
N-F	10	1,078	1.2	61.3
N-R	11	998	1.1	62.4
B-R	12	991	1.1	63.5
H-A	13	966	1.1	64.6
H-R	14	942	1.1	65.7
R-G	15	663	0.7	66.4
R-B	16	646	0.7	67.1
R-H	17	618	0.7	67.8
R-F	18	589	0.7	68.5
F-N	19	517	0.6	69.1
R-B-R	20	509	0.6	69.6
R-P	21	501	0.6	70.2
O	22	449	0.5	70.7
H-P	23	446	0.5	71.2
F-B	24	436	0.5	71.7
R-N-R	25	432	0.5	72.2
A	26	430	0.5	72.7
B-A	27	383	0.4	73.1
R-F-R	28	377	0.4	73.5
N-B	29	368	0.4	73.9
H-F	30	364	0.4	74.3
H-R-H	31	321	0.4	74.7
G-R	32	284	0.3	75.0

What Table 3.9 illustrates is that the first seven ranked pathways in fact involve no tenure change. For all the time that the majority of ISRs (57.4 per cent) spent on IS, they did not move tenures.[11] For the aggregated population of ISRs, the most frequent pathway that does involve a change in tenure is the Rent-free (F) – Non-homeowner (N) – Rent-free pattern. This only accounted for 1.5 per cent of all patterns of housing consumption.

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[11] This does not mean they did not move dwellings; they may for example have moved between two or more private rental dwellings, but they have remained within the same tenure.

The general pattern of relative tenure stability is also evident when the common housing pathways of ISRs are disaggregated into separate forms of IS. At the same time, the rankings of specific tenures varies according to the form of IS being examined. As Tables 3.10 to 3.12 illustrate, there are important differences in the dominant pathways according to the form of IS. For those on unemployment IS, for example, public housing (G) does not appear in the top ten tenures and transitions. For this group, private renting (R) is the largest single tenure of occupancy, and it also features prominently in the top tenure transitions. For those in receipt of disability or sole parent IS, however, public housing does appear in the higher rankings, but is still not a dominant tenure. For all three of these categories, homeownership (H) is listed first or second as the main occupancy tenure, and is also evident in tenure transitions.

Table 3.10: Top ten common housing pathways of unemployment ISRs

Tenure transitions	Rank	Frequency		Percent	
		Category	*Cumulative*	*Category*	*Cumulative*
R	1	4,612	4,612	16.32	16.32
H	2	3,236	7,848	11.45	27.77
F	3	2,093	9,941	7.41	35.18
B	4	1,527	11,468	5.40	40.58
N	5	879	12,347	3.11	43.69
P	6	830	13,177	2.94	46.63
FR	7	571	13,748	2.02	48.65
BR	8	554	14,302	1.96	50.61
NR	9	368	14,670	1.30	51.91
RB	10	352	15,022	1.25	53.16

Table 3.11: Top ten common housing pathways of disability ISRs

Tenure transitions	Rank	Frequency		Percent	
		Category	*Cumulative*	*Category*	*Cumulative*
H	1	2,557	2,557	31.74	31.74
R	2	564	3,121	7.00	38.74
G	3	474	3,595	5.88	44.62
B	4	371	3,966	4.60	49.22
FNF	5	237	4,203	2.94	52.16
F	6	157	4,360	1.95	54.11
RG	7	152	4,512	1.89	56
N	8	100	4,612	1.24	57.24
P	9	95	4,707	1.18	58.42
BR	10	88	4,795	1.09	59.51

Table 3.12: Top ten common housing pathways of sole parent ISRs

Tenure transitions	Rank	Frequency		Percent	
		Category	*Cumulative*	*Category*	*Cumulative*
R	1	1,026	1,026	14.03	14.03
H	2	926	1,952	12.66	26.69
G	3	390	2,342	5.33	32.02
P	4	248	2,590	3.39	35.41
HR	5	219	2,809	2.99	38.4
RG	6	141	2,950	1.93	40.33
BR	7	119	3,069	1.63	41.96
RP	8	111	3,180	1.52	43.48
B	9	101	3,281	1.38	44.86
RBR	10	93	3,374	1.27	46.13

3.6 Conceptualising the 'pathway function' of specific tenures

While the above Origin and Destination tables provide a summary of the net effects of movements between one tenure and another, the same form of analysis can be used to construct summary categories of tenures, based around the dominance of in-flow, out-flow or through-flow. These can be conceptualised as the 'pathway functions' of specific tenures.

Following the analysis of origin and destination tenure movements, it became apparent that some tenures could be considered 'terminating' tenures, because the flow into them far exceeded the flow out of them. Three main terminating tenures were identified: public rental, home purchase and aged care. In the case of aged care, there was actually no movement out; with the other terminating tenures, there was some movement out, but it was significantly less than the volume of transitions into each tenure.

Other tenures were identified as 'exchange' tenures because, unlike terminating tenures, the sum of flows into them was relatively similar in scale to the sum of flows out of them. For some, out-flows exceeded in-flows, and for others the opposite was the case. Finally, it became clear that while the private rental market could be included in the broad category of exchange tenures, the sector represented something more significant than this.

The movements shown in Figure 3.1 illustrate the common housing pathways of ISRs which involve only one tenure change. Based on earlier work by Seelig, the Positioning Paper for this study suggested a conceptual model of mobility around the Australian housing system, with the private rental sector at the centre. This theorised that the private rental market played a highly significant role in housing pathways and careers, and indeed should be seen as the central tenure in the Australian housing system.

The analysis subsequently conducted using the LDS, to identify the most common single tenure change housing pathways for ISRs, demonstrates empirically that private rental housing does indeed sit at the centre of the housing system, at least as far as tenure movements among a considerable number of ISRs are concerned. For this reason, it has been ascribed special status as the 'gateway' tenure, where the

vast majority of movements to and from every other tenure occurs through the private rental sector.

Figure 3.1: Summary of typical single tenure change housing pathways for ISRs

Gateway tenure: ◇   Exchange tenure: ☐   Terminating tenure: ○
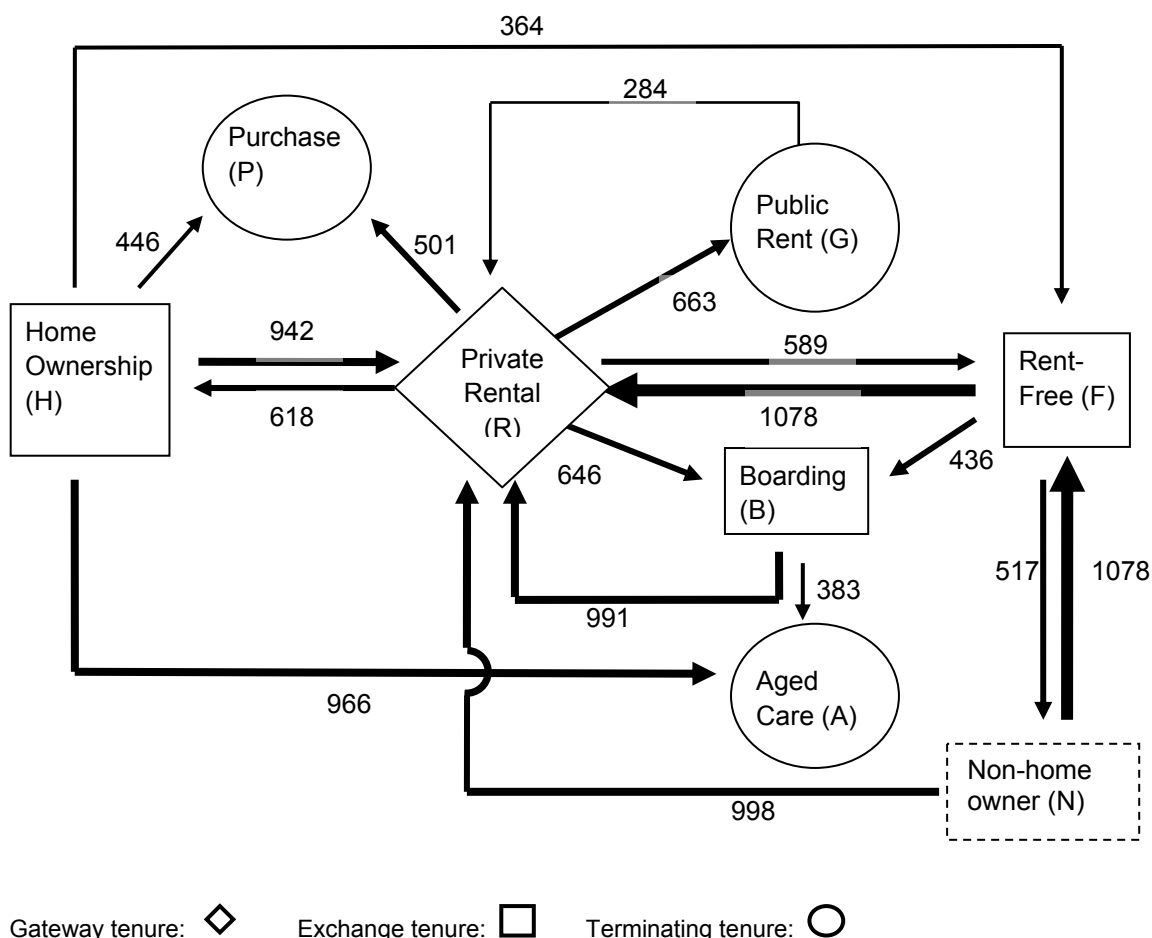
The summary analysis of housing pathways for ISRs reveals some interesting patterns of housing consumption and movements between tenures. Among those ISRs captured in this analysis, many homeowners moved into private rent while on IS. However, there are still relatively large numbers of movers from private rent to homeownership. Some individuals moved from being a private renter to being a home purchaser. Boarding is an interesting tenure in terms of housing pathways. Many of the ISRs in boarding housing arrangements moved from either private rent or rent-free but they are likely to move to either private rent or aged care, with a relatively small number moving back to rent-free. A majority of aged care residents moved from being a homeowner.

Movements into and out of public housing will be examined in more detail in Chapter 5, but two points are worth noting here: firstly, the role that the private rental market plays as the source of movements into public housing, and secondly, there is some movement back to private rental from public housing.

3.7   Mapping individual longitudinal housing pathways

Lastly, and perhaps most interesting of all, is the translation of the listing of all tenure transitions over time into a graphic form to illustrate the individual longitudinal housing pathways of ISRs. Using the full list of tenure transitions (excluding cases of non-transition) identified in the LDS, it is possible to map the pattern of movements into or

out of tenures, based around the eventual entry to or exit from one specific tenure. These can be developed around any of the tenure categories, and must be separated out into the sources of movements which end up in any given tenure, and the end points of the movements which commence from any given tenure. As the complete list of all relevant transitions may be extensive, it is sometimes necessary to apply cut-off points to determine how far down the chain of tenure transitions to map.

In the two examples that follow, mapping of the patterns of movements into and out of private rental has been constructed. With each map, it was not feasible to include every single transition, so cut-off points were used to limit the extent of the pathways mapped to where there were ten or more cases.

Figure 3.2 portrays longitudinally the tenure origins and pathways of cases that eventually entered private rental. In other words, it shows where those who moved in private rental at some point during the life of the LDS data came from tenure-wise. The significance of source tenures is denoted by size of circle: the larger the circle, the greater the number of cases (see key for details). Of note with the 'origins of entry' map is the importance of pathways which involve boarding, rent-free and non-homeowner tenures. The repeated appearance of private rental as people move into, out of and back into the tenure is also evident.

Similarly, Figure 3.3 portrays longitudinally the tenure destinations and pathways of cases that eventually exited from private rental. While many of the trends outlined above for entries can be seen in reverse for these exits, it should be noted that public housing is more significant in outbound movements from private rental than inbound transitions.

Key for longitudinal housing pathways

H Homeowners

R Private renters

F Rent-free

B Boarders/lodgers

N Non-homeowners

G Public renters

P Purchasers

A Aged care

O Other rent

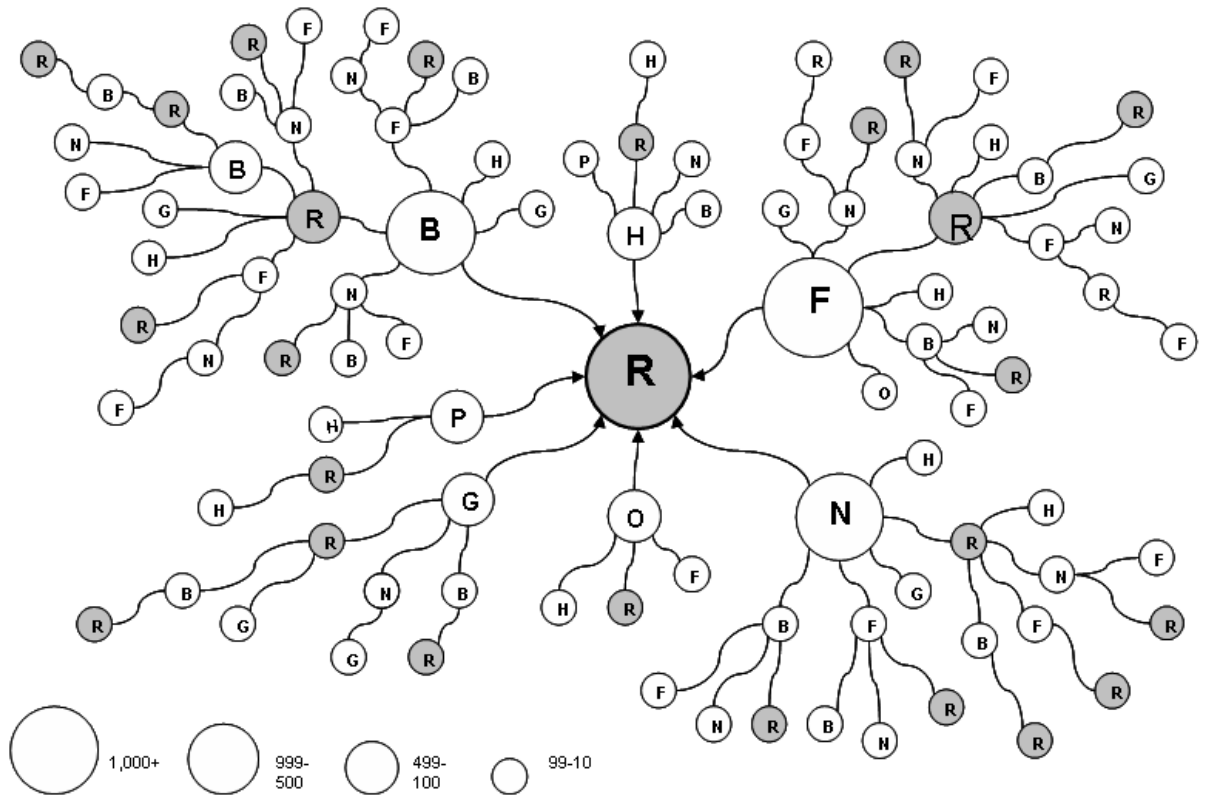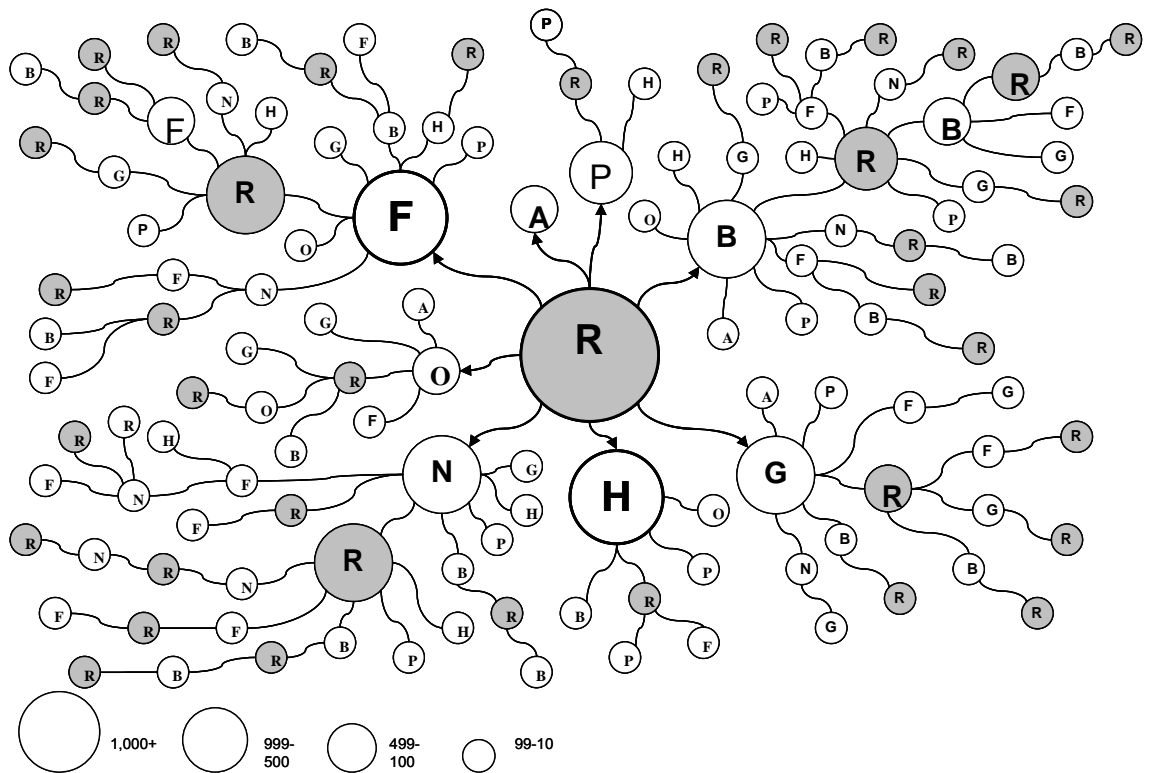**Figure 3.2: Mapping longitudinal origins of private rental entries**

Figure 3.3: Mapping longitudinal destinations of private rental exits

3.8   Summary

This chapter has presented the findings of the first of the three umbrella themes of this study, namely, the housing pathways of ISRs. Traditional tenure analysis is nearly always based around either cross-sectional / point in time snapshots, or is concerned with trends constructed from several of these into a time series. Whilst important, they are restricted to aggregated patterns; they do not offer the capacity to track the same people (cases) over time. The pathways identified in this chapter represent a new means of conceptualising and tracking the tenure consumption patterns of those on IS, including tenure movements over time.

Chapter 6 will examine the policy implications of what this analysis has revealed, but it is worth stressing three key points here. Firstly, there is a high level of stability within the tenure consumption patterns of ISRs: more than half did not move while on IS. Secondly, while the tenure tables of ISRs differ in many respects from those of the broader population, ISRs are not congregated in just one or two tenures. They are spread out across a number of tenure types. At a static point in time level of analysis, this chapter has highlighted the relative importance of outright homeownership (not purchase) among those on IS. Thus, one thing ISRs and the population as a whole have in common is that outright homeownership is the largest single tenure for both. While older recipients form a majority of these people (as they do in the background general population), age pension recipients are not solely responsible for the significance of homeownership. Lastly, other types of ISRs are present in this tenure too. The other important tenure is private rental, which is conceived here as the 'gateway tenure', acting as a central bridge between other tenures.

As well as developing comparable summary tenure tables for ISRs, the analyses presented here have been able to take advantage of the scale and longitudinal nature of the LDS to establish the movements of the same people through tenures over time. This is only possible in a case-continuous way through longitudinal data, but the approaches here in mapping moves into and out of given tenures is also an original contribution to better understanding origin and destination tenures for groups on IS.

4 KEY RESEARCH FINDINGS 2: RELATIONSHIPS BETWEEN HOUSING PATHWAYS, EARNINGS AND OTHER FACTORS

4.1 Introduction

Having considered the broad housing pathways among ISRs, Chapter 4 turns to how these may be associated with earnings patterns and other factors. The key research findings reported here concern the relationship between tenure and earnings, tenure change and changes in earnings, the relationship between tenure change and (changes in) other factors, relationships between time spent on IS and tenure changes and, finally, relationships between time spent on IS, earnings and other factors. As a rule, the analysis focuses on a range of tenures, including public housing. Among other things, Chapter 5 considers some of the same issues, but more specifically in terms of public housing occupancy.

Several different research approaches have been used for this component of the study, which are reported through the course of this chapter. Proportional hazard modelling has been used to examine the statistical relationships between duration of time on IS and individual characteristics. A dynamic linear regression model with random intercept was also used to assess the longitudinal relationships between certain events, including changes in incomes and their association with tenure changes, for ISRs across tenures. With these models, the estimated variance of the random intercept was very small and so the results reported here are from the dynamic linear regression models with a fixed intercept. The lagged dependent variable is included in the regression models to capture the dynamic nature of the data, or in other words, the large effects of state dependence. Other, less complex approaches were also applied to the specific issue of whether changes in tenure and net changes in income were linked. Furthermore, descriptive analysis of typical housing pathways, and how they are associated with specific demographic or other characteristics, are reported in Appendix 2.

4.2 Relationship between tenure and earnings (non-IS income)

Before undertaking any analysis, the variable for earned income was adjusted using annual Consumer Price Index data, to be converted into the base year 1995 dollar values. Therefore any observed changes in earned income over time are in real terms. The mean fortnightly income reported in Table 4.1 was calculated from both the last recorded fortnightly income of all individuals within a given tenure, and also mean earnings across all observations.

There appears to be a strong association between 'static' tenure and levels of earned income, that is, earnings beyond IS payments. Across all ISRs remaining in just one tenure (in most cases, the vast majority of each tenure category) and for the last observation of earnings, home purchasers reported the highest mean earned income ($141 per fortnight). Private renters had the second highest level of earned income ($106 per fortnight). Public renters earned considerably less ($56), but this was still more than homeowners, who earned only $50 per fortnight. The lowest rate of earnings, not surprisingly, was found amongst those in aged care (virtually nothing). Mean earnings across all observations were lower in all cases (as some ISRs, for example, those on age IS, see incomes decline over time and they appear for longer than others in the data), but the relativities between tenures are the same.

Table 4.1: Average (mean) real fortnightly earnings among non-transitional ISRs, last observation and all observations

Tenure	Mean fortnightly earned income (last observation)	Mean fortnightly earned income (all observations)	Frequency
Homeowner (H)	$50.45	$21.18	25,060
Private Renter (R)	$105.71	$56.99	9,458
Rent-free (F)	$67.45	$52.08	4,497
Boarders/lodgers (B)	$63.06	$28.25	4,122
Public Renter (G)	$56.34	$24.55	3,031
Home Purchaser (P)	$141.07	$86.56	2,400
Other (O)	$24.36	$12.44	1,988
Aged care (A)	$0.10	$0.46	449
Non-homeowner (N)	$64.81	$42.84	430

Note: incomes adjusted to 1995 $s

However, when different IS types are examined separately across tenures, greater variation appears, as shown in Table 4.2. This table also illustrates the changes in income which occur between first and last observation for three example IS types: unemployment, sole parent and disability.

Table 4.2: Average (mean) real fortnightly earnings among non-transitional ISRs, first, last and all observations

	Unemployment			Sole Parent			Disability		
	First	Last	All	First	Last	All	First	Last	All
Homeowner	$51.60	$171.15	$97.39	$162.33	$252.26	$156.67	$23.63	$17.51	$14.98
Private Rental	$35.25	$104.56	$68.22	$222.39	$167.00	$110.20	$20.28	$33.08	$21.33
Rent-free	$29.51	$80.26	$65.65	$131.32	$192.21	$128.64	$24.26	$42.92	$22.51
Boarding	$36.01	$80.31	$56.13	$81.25	$190.87	$109.48	$11.91	$24.06	$16.63
Non-homeowner	$30.13	$72.65	$45.30	$43.79	$91.21	$98.37	$19.02	$34.17	$22.85
Public Rental	$46.24	$129.62	$61.81	$67.60	$134.19	$73.44	$24.10	$13.27	$11.34
Purchaser	$42.20	$169.43	$116.66	$169.00	$276.01	$216.42	$39.00	$32.08	$13.08
Other	$50.43	$133.61	$75.32	$61.00	$162.34	$169.85	$1.30	$9.13	$23.46

Note: incomes adjusted to 1995 $s

4.3 Relationship between tenure and other socio-demographic characteristics

Within the non-transition housing pathways several key features were observed. With reference to Table 4.3, those who live in rent-free (51.8 per cent), boarding (50.3 per cent) and private rental (48.7 per cent) tenures have relatively higher reliance on unemployment IS, while those in public housing (12.0 per cent) and homeownership (11.5 per cent) have less. Family structure and mean age by tenure are consistent with what might be expected from life-course studies. These studies explain that families adjust their housing to the housing needs that are generated by shifts in

family composition. Single person are an important family type for ISRs, which accounted for more than half of those in private rental and public housing, and around 90 per cent of in more informal tenures (F, B, N). Over half (54.7 per cent) of homeowner ISRs were couples. Couples only and couples with children (CWC) represented about one-third each of those in home purchase. Sole parents were a relatively minor family form in all tenures, the highest rates being recorded in public rental (12.9 per cent), home purchase (12.3 per cent) and private rental (10.7 per cent).

There is some variation in the proportion of Australian born ISRs, ranging from 65 per cent to 80 per cent across the nine non-transition housing pathways. Higher proportions of Indigenous people (ATSI) were in public rental (3.7 per cent) and rent-free tenure (3.2 per cent), but the overall percentages of populations in these tenures who were Indigenous was still very small.

Table 4.3: Percentages of individuals in each category at last observation

	IS (Total : 100%)		Family structure (Total : 100%)			
	Unemployed IS (%)	*Other IS (%)*	*Couple (%)*	*Single (%)*	*Sole P't (%)*	*CWC (%)*
Homeowners	11.5	88.5	54.7	31.5	3.3	10.4
Private renters	48.7	51.3	18.6	54.1	10.7	16.6
Rent-free	51.8	48.2	5.9	89.0	2.0	3.1
Boarders/lodgers	50.3	49.7	3.5	92.0	3.2	1.3
Non-homeowners	36.3	63.7	3.8	94.0	0.8	1.4
Public renters	12.0	88.0	25.8	51.9	12.9	9.5
Purchasers	40.8	59.2	33.8	18.5	12.3	35.5
Aged care	0.0	100.0	9.1	90.9	0.0	0.0
Other rent	12.7	87.3	30.3	66.2	1.1	2.5

	Sex	ATSI	Country of birth (Total ISRs : 100%)			Age (years)
	Fem (%)	*ATSI (%)*	*Aus (%)*	*NESB (%)*	*ESB (%)*	*Mean age*
Homeowners	55.9	1.2	65.5	20.8	13.7	63.2
Private renters	51.3	1.2	66.2	22.2	11.6	39.2
Rent-free	47.2	3.2	79.7	16.4	3.9	26.5
Boarders/lodgers	46.4	2.2	77.9	14.5	7.6	40.7
Non-homeowners	47.2	1.9	78.4	17.7	3.9	23.5
Public renters	66.7	3.7	65.5	22.2	12.3	58.0
Purchasers	52.7	0.4	67.0	22.4	10.6	42.3
Aged care	74.9	0	80.0	8.1	11.9	85.1
Other rent	58.6	0.5	75.1	6.4	18.5	70.6

Further outcomes of this analysis, examining typical characteristics of ISRs over specific single tenure transitions, are provided in Appendix 2.

4.4 LDS proportional hazard analysis: duration of income support receipt

Proportional hazard (survival analysis) modelling essentially analyses the duration of time until an event, e.g. exit from public housing, occurs. The survivor function represents the proportion of sample that has not experienced the event by a given time, while the hazard function is the probability of experiencing the event at any given point in time

The following section reports on the outcomes of proportional hazard modelling on duration of IS receipt. This analysis is contextualised by an initial finding from the data that exits from the IS system are related to specific IS types: those on unemployment type IS transited into and out of the IS system most frequently. These people had the highest mean number of spells on IS (2.41), but the lowest mean time on IS (288 days). This was also the only IS type where individuals spent more spells off IS than on it.

Table 4.4: Summary statistics for number of recipient spells by IS type at last observation

IS type	Mean number of spells	Mean duration (days)	
		On IS	Off IS
Age	1.12	4,445	228
Disability	1.53	2,501	243
Unemployment	2.41	288	326
Sole parent	2.12	1,075	298
Student	1.61	352	207
Partner allowance	1.92	654	350
Other	1.87	655	336
Total	1.79	1,273	316

The goal in conducting this proportional hazard modelling on the receipt of IS was to assess the efficacy of various socioeconomic characteristics as predictors of exit from IS. Of particular interest was examining the possibility that the relationships between the outcome (duration on IS) and predictors may only exist for some types of ISRs, or that the relationships might be of variable strength.

Proportional hazards models fit a baseline hazard function to describe the odds of the outcome occurring in any given time period, which is not forced to fit any parametric form. The effects of predictors are constrained to be proportionally constant over time. The absolute size of the predicted effect will depend on the value of the baseline hazard function at different times. For a good description of discrete time proportional hazards models, see Singer and Willett (2003, chs 10-12).

For the analysis, discrete time proportional hazards models were developed, which allowed selected predictor variables to be time-varying. Cases were divided into sub-groups defined by the 'main' form of IS (i.e. the modal category for each person) that they received, as discussed in Chapter 2. This dealt with movement of cases between different administrative categories over time, while allowing for the separation of IS types. As a consequence of this analytic strategy, it was also necessary to control for other IS types within the 'main' categories. These coefficients simply adjust for the possibility that, in any given fortnight, an individual may be receiving a form of IS which is not their 'main' form.

The models presented here include several socioeconomic variables: income, age, sex, family type, tenure type and place of birth. As elsewhere in this study, income is the log of fortnightly income from non-IS sources. Age is included simply as years, and women are represented by a dummy variable. Family type was operationalised as a cross-classification of partner status and the number of dependent children fifteen years or under. Categories were defined by whether or not a partner was present and if there were zero, one or multiple children under the recipients' care. Tenure is the same typology presented previously, with homeowners as the reference category. Lastly, place of birth is included via two dummy variables that contrast persons born overseas in English-speaking and non-English-speaking countries with those born in Australia.

The results of the proportional hazard modelling on exits from IS are shown in Table 4.5.

Income generally appears to have the most consistent effect on exiting IS. The analyses showed a significant positive effect for every IS group except students, indicating (as would be expected) that persons with higher market incomes are generally more likely to exit from IS. The substantively largest effect is for disability pensioners (0.21), followed by sole parent benefit recipients. Interestingly, the smallest effect of income (excepting students) is for the unemployment group (0.05), representing only a quarter of the disability coefficient.

Age displays mixed positive and negative effects, although the predominant pattern is for older persons to be less likely to exit, net of other factors (consequently older persons tend to spend longer periods of time on benefits). This was the case for unemployed, disability, partner and other benefit categories. Age does not emerge as a significant factor in the sole parents model. Students and age pensioners, however, appear to become more likely to exit as they age. This is an unremarkable finding in the case of students, but is puzzling for age pensioners. The likely explanation is that the positive relationship is spurious, representing unrecorded deaths (recorded deaths are treated as right censored). This finding should as a consequence be treated with considerable caution.

Women appear to be less likely to exit IS in most cases, with the sole exception of age recipients. Significant negative effects were found for all other IS groups. The influence of sex was most pronounced in the partner (-0.33) and other (-0.37) categories, and smallest for unemployment (-0.07) and students (-0.07).

Table 4.5: Exiting income support: regression coefficients from discrete time proportional hazards models by main income support type

IS type	Unemployed	Aged	Disability	Sing. Pnt	Student	Partner	Other
Log of income	**0.05**	**0.11**	**0.21**	**0.14**	0.00	**0.08**	**0.07**
Age	**-0.02**	**0.02**	**-0.02**	0.00	**0.03**	**-0.02**	**-0.04**
Female	**-0.07**	**0.13**	**-0.24**	**-0.28**	**-0.07**	**-0.33**	**-0.37**
Family structure (Reference: single – no children)							
Single – one child	-0.13	1.07	-0.14	**-1.07**	**-1.34**	-0.39	0.29
Single – multi children	-0.26	-10.00	-0.62	**-1.27**	-1.46	-0.39	**0.59**
Couple – no children	0.03	-0.03	**-0.17**	0.25	-0.03	**-0.40**	**-0.24**
Couple – one child	-0.04	-0.11	0.07	**0.23**	-0.28	0.00	**-0.19**
Couple – multi children	-0.05	0.76	-0.03	**0.30**	**-0.50**	-0.04	**-0.21**
Benefit type (Reference: 'main' benefit for each model)							
Unemployed		**2.12**	**1.40**	-0.03	**1.84**	**0.44**	0.04
Age	**-1.25**		-0.05	-1.60	*	**-2.06**	**-0.68**
Disability	**-1.46**	-0.17		**-0.90**	-9.63	-0.75	-0.26
Sole parent	**-0.45**	-0.22	**1.91**		**1.64**	0.12	**-0.96**
Student	**-0.88**	*	**1.09**	-0.62		-0.31	**-1.10**
Partner	0.12	**1.71**	**1.88**	-0.18	**1.08**		-0.10
Other	**0.27**	**2.00**	**1.88**	-0.44	1.69	0.30	
Tenure type (Reference: homeowners)							
Purchasers	**0.25**	0.13	0.14	0.09	**0.45**	**0.21**	0.18
Private renters	**-0.14**	-0.10	0.00	-0.09	**0.68**	**-0.17**	-0.02
Public renters	**-0.57**	-0.33	-0.27	**-0.34**	0.17	**-0.41**	**-0.37**
Boarders	**-0.14**	**-0.46**	-0.19	-0.14	**0.73**	**-0.24**	0.12
Rent-free	**-0.08**	0.12	**-0.24**	**0.16**	**0.71**	-0.04	-0.15
Other renters	**-0.18**	-0.51	-0.02	-0.41	0.18	0.14	-0.45
Aged care	0.22	-0.31	-0.11	-8.85	*	-6.35	0.18
Non-homeowners	**-0.08**	**0.60**	-0.26	0.03	**0.72**	-0.13	-0.06
Place of birth (Reference: born in Australia)							
English-speaking migrants	**0.18**	0.07	0.11	**0.13**	-0.01	**0.10**	0.06
Non-English-speaking migrants	-0.02	-0.08	0.01	**0.13**	**-0.20**	**-0.18**	**-0.19**
N	26,767	6,348	4,257	5,713	9,231	7,001	3,258
Event	23,987	1,210	1,387	4,061	6,804	5,343	2,096
Censored	2,780	5,138	2,870	1,652	2,427	1,658	1,162
Percent Censored	10.39	80.94	67.42	28.92	26.29	23.68	35.67

Results are from discrete time proportional hazards models. Bolded coefficients indicate significance at the 0.05 level or better. All predictors are time-varying, excepting place of birth and sex.

*: These contrasts were dropped from analysis due to the lack of observations in this category.

Family structure has quite variable effects across different IS types. For the unemployed and age recipients, no significant differences were identified from the reference category of single with no children. For disability pensioners (-0.17) and partner allowance (-0.40), couples with no children are significantly less likely to exit.

For the student category, having children means being less likely to exit from IS, although the differences are only significant for sole parents with one child and couples with multiple children. Sole parent IS recipients appear least likely to exit while they are sole parents, and most likely to exit when in a couple (see below for the correct interpretation of this). Persons in the 'other benefit' category are significantly more likely to exit IS while single with multiple children, and least likely to do so while in a couple.

There are some obvious issues with the interpretation of (for example) results for a person who is in the partner allowance category but falls into the single family type. The explanation lies with the classification of individuals by 'main' IS type, which still allows for variability over time in which particular payment is received. Being single is probably an indication that the individual is not receiving partner benefits at that point in time, even though that is the main IS they receive.

For IS type, the results seem to indicate that persons on unemployment, sole parent, partner and 'other' IS are the most likely to exit IS (although this is after controlling for family type). Disability and age pensioners are, unsurprisingly, substantially less likely to exit IS at any given time point.

Turning to tenure, purchasers are in every case more likely than the reference category of homeowners to exit from IS, although the effect is only significant for the unemployed, partner and student groups. Private renters are less likely to leave in the unemployed and partner groups, but more likely to do so for students. Public renters are significantly less likely to exit IS than homeowners in the unemployed, sole parent, partner and 'other' IS groups. Leaving aside the relationship aged care (accommodation) and age care-based IS recipients, this is generally the largest negative effect found for tenure. The broad pattern seems to be that purchasers and homeowners are most likely to exit IS, and public renters least likely. This pattern is reversed in the student group, where homeowners appear to be least likely to leave. For the student group, boarders, private renters, rent-free and non-homeowners appear most likely to exit.

Finally, migrants from an English-speaking country are significantly more likely to exit IS than the Australian born in the unemployed, sole parent and partner IS groups. Migrants from non-English-speaking backgrounds, on the other hand, are significantly less likely to leave in the student, partner and 'other' categories, but more likely to do so in the sole parent group.

4.5   Linear mixed regression model for analysis of income

The models used in this study examined the complicated relationship between changes in earned income, tenure transitions and other life circumstances. In order to avoid the inflationary effect on earned income we used a numeric measure of income after standardising the values using the Annual Consumer Price Index from ABS (dollars expressed in 1995 terms). The modelling results show relative influence on changes in earned income. Using a lagged tenure variable, this measure also provides a significant statistical interpretation with respect to tenure transitions.

As discussed in Chapter 2, linear mixed models were used to investigate the statistical relationships between changes in incomes and other changes in individual attributes recorded in the LDS. The dependent variable was the logarithm of earned income of ISRs and was analysed as a continuous random variable with observations repeated up to 226 times (once every fortnight while receiving IS). Income was transformed using the logarithm to correct for positive skewness. In preliminary modelling. The linear mixed model for each IS category included a random intercept

to capture the spurious variation in starting income for each individual in the data set. The independent variables examined in this part of the study were:

→ Customer age (age);

→ Squared customer age (age2);

→ Family structure (family): couple, couple with children, single and sole parent;

→ Sex (sex): male and female;

→ Experience in tenure change (move);

→ Present tenure status (tenure);

→ Lagged tenure status by 1 month (lagten1);

→ Country of birth (cob): English-speaking and non-English-speaking countries;

→ Aboriginal/ Torres Strait Islander/ South Sea Islander (ATSII): yes/no.

A variable for age squared was included in the model to capture the trend in decreasing levels of earned income with age. Variables lagged by one month were created to examine a relationship between change in income and tenure transition. In our model, the value of the dependent variable of log income at time point t is related not only to the value of the explanatory variables and lagged tenure at time point t-1, but also to the value of the dependent variable at t-1 in the presence of state dependence. The random intercept in the model measures the amount of spurious or unexplained dependence in the data after accounting for state dependence over time and the effects of other variables included in the model. Several dummy variables were created as time independent variables, for example, 'sex', 'cob' and 'ATSI'.

Statistical results

The following analysis of the longitudinal income data consists of a series of dynamic linear regression models by the predefined benefit types. The variances of the random intercepts in the linear mixed models were very small and so the results from the dynamic linear regression models with fixed intercepts are included in Table 4.6. Six of the explanatory variables in the model have categorical responses. For these variables, the reference categories in the model are: private rent (tenure and lagged tenure), single (family structure in unemployment, age pension, disability, student and other IS groups), sole parent with one child (family structure for sole parent), couple with one child (family structure for partners allowance IS group), male (sex), English-speaking country (cob) and non-Aboriginal Torres Strait Islander/ South Sea Islander. Tables 4.6a and 4.6b provide the detailed results.

As expected, the lagged variable for log income is highly significant, indicating the strong presence of state dependence. That is, an individual's income in any fortnight is largely dependent on their income in the previous time period. The effects of additional variables can be interpreted as being associated with a change in income. The effect of age on a change in earned income is significant across all IS groups. With the exception of those in the 'aged' group, change in income rises for younger ISRs but then declines after a certain age is reached.

For all IS groups, family structure has a significant association with changes in earned income. For those with unemployment related IS, any change in earned income is greater for couples than for single persons, but is lower for couples with one child compared to single persons. For those with disability IS, a change in income is lower for sole parents with multiple children compared to single persons. Parents on the sole parent benefit experience smaller changes in income if they have multiple children. For partner ISRs, sole parents and couples without children were likely to

earn more than couples with children. Women experienced higher income changes than men if they received IS for unemployment, being a sole parent or a student. ISRs from a non-English-speaking background received smaller changes in income than those with an English-speaking background.

Table 4.6: Coefficient estimates from the dynamic linear regression model for income changes with housing transitions: 1995 to 2003 (Dependent variable Inc. is log earned income in dollars + 1)

	Unemployment	Age	Disability	Sole Parent	Partner	Student	Other
Intercept	**-0.134** (0.014)	**0.161** (0.008)	**0.041** (0.005)	**-0.151** (0.010)	**-0.097** (0.013)	**-0.580** (0.041)	0.030 (0.018)
Lag Inc.	**0.696** (0.001)	**0.966** (0.0001)	**0.949** (0.0003)	**0.935** (0.0004)	**0.904** (0.0005)	**0.820** (0.001)	**0.883** (0.001)
Age	**0.018** (0.0006)	**-0.004** (0.0002)	0.0002 (0.0002)	**0.012** (0.001)	**0.012** (0.001)	**0.049** (0.002)	**0.004** (0.001)
Age Sq.	**-0.00023** (8.688E-6)	**0.000023** (1.362E-6)	**-0.00001** (2.315E-6)	**-0.00013** (6.511E-6)	-0.00015 **(5.788E-6)**	**-0.001** (0.000030)	**-0.00005** (6.352E-6)
Tenure	**Reference is private rental**						
Aged	-0.162 (0.392)	-0.009 (0.005)	-0.023 (0.030)	0.006 (0.347)	0.012 (0.231)	NA	-0.053 (0.166)
Boarding	**-0.062** (0.013)	-0.007 (0.005)	-0.008 (0.008)	**-0.046** (0.014)	**0.060** (0.027)	**-0.073** (0.031)	**-0.064** (0.029)
Rent-free	**-0.028** (0.013)	**-0.013** (0.005)	-0.006 (0.008)	**-0.050** (0.015)	**0.064** (0.019)	**-0.090** (0.027)	**-0.098** (0.027)
Public	-0.035 (0.029)	0.006 (0.006)	-0.007 (0.010)	**-0.061** (0.017)	**0.065** (0.028)	-0.056 (0.128)	-0.024 (0.041)
Owner	0.032 (0.032)	-0.0002 (0.004)	**-0.023** (0.0116)	-0.023 (0.023)	**-0.070** (0.021)	0.127 (0.120)	-0.050 (0.033)
NHO	0.006 (0.013)	**-0.017** (0.005)	-0.014 (0.009)	**-0.037** (0.016)	0.037 (0.021)	**-0.079** (0.027)	-0.046 (0.031)
Other rent	-0.037 (0.033)	-0.011 (0.006)	**-0.037** (0.015)	**-0.117** (0.041)	0.016 (0.041)	0.244 (0.147)	-0.113 (0.067)
Purchaser	**-0.120** (0.039)	0.012 (0.016)	0.029 (0.023)	-0.047 (0.026)	-0.032 (0.025)	-0.217 (0.146)	**0.215** (0.059)
Lag Tenure	**Reference is private rental**						
Aged	0.036 (0.394)	0.007 (0.005)	0.013 (0.030)	0.036 (0.352)	-0.028 (0.233)	NA	0.064 (0.168)
Boarding	0.021 (0.013)	0.006 (0.005)	0.008 (0.008)	**0.030** (0.014)	**-0.055** (0.027)	0.001 (0.031)	0.056 (0.030)
Rent-free	**0.033** (0.013)	**0.012** (0.005)	0.004 (0.008)	**0.045** (0.015)	**-0.059** (0.019)	**0.076** (0.027)	**0.095** (0.027)
Public	-0.005 (0.029)	-0.008 (0.006)	0.003 (0.010)	0.023 (0.017)	**-0.077** (0.028)	-0.013 (0.129)	0.012 (0.041)
Owner	**0.060** (0.032)	-0.0002 (0.004)	0.022 (0.012)	**0.069** (0.023)	**0.082** (0.021)	-0.176 (0.120)	**0.065** (0.033)
NHO	-0.019 (0.013)	**0.015** (0.005)	0.012 (0.009)	**0.034** (0.016)	-0.039 (0.021)	0.027 (0.027)	0.048 (0.031)
Other rent	-0.002 (0.033	0.009 (0.006)	**0.031** (0.015)	**0.088** (0.041)	-0.024 (0.041)	-0.276 (0.147)	0.076 (0.067)
Purchaser	**0.253** (0.040)	-0.009 (0.015)	-0.023 (0.023)	**0.115** (0.026)	0.049 (0.025)	0.220 (0.147)	**-0.167** (0.059)
Family Structure	**Reference is sole parent with one child**						
CMC	**0.158** (0.009)	0.001 (0.005)	-0.001 (0.003)	**-0.1153** (0.005)	**-0.082** (0.007)	-0.006 (0.038)	**-0.045** (0.010)
CNC	**0.146** (0.009)	0.001 (0.003)	0.002 (0.003)	**-0.1046** (0.011)	**-0.068** (0.008)	**0.159** (0.034)	**-0.061** 0.010
CSC	**0.107** (0.010)	0.011 (0.004)	-0.004 (0.004)	**-0.101** (0.007)	**-0.069** (0.008)	0.071 (0.040)	**-0.040** (0.011)
SMC	0.004 (0.017)	0.011 (0.006)	**-0.013** (0.005)	**-0.02560** (0.002)	**-0.047** (0.009)	0.051 (0.074)	-0.025 (0.018)
SNC	**0.068** (0.008)	0.002 (0.003)	-0.001 (0.003)	**-0.08267** (0.004)	**-0.056** (0.009)	**0.168** (0.032)	**-0.060** (0. 010)
Female	**0.118** (0.003)	-0.002 (0.0002)	-0.001 (0.001)	**0.04574** (0.004)	-0.004 (0.004)	**0.071** (0.004)	**0.014** (0.003)
NESB	**-0.076** (0.003)	-0.003 (0.0002)	**-0.009** (0.001)	**-0.01747** (0.002)	**-0.022** (0.002)	**-0.123** (0.005)	**-0.030** (0.003)
ATSI	**-0.079** (0.005)	-0.004 (0.002)	**-0.012** (0.002)	**0.01587** (0.003)	**0.016** (0.005)	-0.050 (0.032)	**0.019** (0.009)

Tenure transition influence

After controlling for socio-demographic and income unit variables, the impact of tenure transition on changes in earned income was also assessed. To do this, two variables associated with housing transitions were included in the model: present tenure and tenure in the previous month. The influence of tenure change on change in income varied across IS groups.

For those on unemployment IS, current homeowners experienced a higher change in income relative to those in private rent. Previous tenure did not significantly relate to change in income.

For the aged group (where 60 per cent were homeowners, 12 per cent in aged care and 6 per cent private renters), transition from purchaser and non-homeowner/rent-free to homeowner, aged care and private renter was positively associated with change in income.

For those on disability IS (34 per cent homeowners, 22 per cent private renters, 15 per cent public housing), transition from rent-free to homeowner, private renter and public housing was associated with negative change in earned income.

For sole parent ISRs (44 per cent private renters, 16 per cent homeowners, 13 per cent public housing), change in tenure was not significantly associated with a change in income. However, current tenure of homeowner was positively associated with change in income, and current tenure of public housing was negatively associated with change in income when compared to private renting.

For students (35 per cent non-homeowners, 30 per cent rent-free, 24 per cent private renters), change in tenure from rent-free to private rent was associated with a greater change in income. Change from rent-free to boarding was associated with a smaller change in income. A current tenure of boarding and rent-free was also associated with a smaller change in income relative to private renting, regardless of previous tenure.

The analysis described above identified statistical relationships between changes in incomes and changes in tenure and other socio-demographic variables. It should be noted that 57 per cent of ISRs have never changed their tenure for the entire period of the LDS. Also, a wide range of variation in earned income is unlikely, given that the cases are people on IS, and a significant increase in income effectively means cases exit from the data set, and therefore the associations identified are relevant for the main housing pathways specific to each IS group.

4.6   Multiple regression model for analysis of tenure

Table 4.7 presents the results from a multinomial regression model, with a simplified tenure classification as the outcome variable. Aged care, other rental, 'non-homeowners' and rent-free are collapsed together as 'other'. Homeowners, public renters, purchasers and private renters remain as separate categories.

As predictors, the model includes a one fortnight lag of tenure, log of earned income accompanied by a one fortnight lag of income, age, age squared, family structure, sex, and dummy variables for non-English-speaking background and Aboriginals and Torres Strait Islanders.

Lagged tenure shows mainly unsurprising results. The large coefficients along the diagonal from top left to bottom right of the lag tenure block represent the stability of tenure from fortnight to fortnight. A person who is a private renter one fortnight is much more likely to remain a private renter the following fortnight, and this is the case with all of our tenure groups.

Table 4.7: Regression coefficients from the multinomial logit analysis of tenure type

	Board vs. Own	Public rent vs. Own	Other vs. Own	Purchaser vs. Own	Private rent vs. Own
Lag tenure (reference is owner)					
Board	**6.0452**	**0.6565**	**0.8353**	0.0645	**0.9668**
	(0.0290)	(0.0446)	(0.0289)	(0.0543)	(0.0283)
Public rent	**0.6087**	**8.2028**	**0.5925**	-0.0917	**0.6199**
	(0.0461)	(0.0404)	(0.0391)	(0.0711)	(0.0375)
Other	**0.9005**	**0.3465**	**5.5016**	-0.0255	**0.8976**
	(0.0236)	(0.0362)	(0.0186)	(0.0368)	(0.0193)
Purchaser	**-1.0338**	**-1.8416**	**-0.7084**	**6.2182**	**-0.7290**
	(0.0560)	(0.1081)	(0.0392)	(0.0313)	(0.0362)
Private rent	**0.7810**	**0.5971**	**0.6215**	**0.1625**	**5.1837**
	(0.0222)	(0.0323)	(0.0187)	(0.0301)	(0.0170)
Log income	0.0126	0.0235	**0.0314**	**0.1906**	**0.1112**
	(0.00841)	(0.0137)	(0.00747)	(0.0103)	(0.00709)
Lag of Log income	**-0.1398**	**-0.1860**	**-0.1233**	**-0.2142**	**-0.1955**
	(0.00838)	(0.0137)	(0.00745)	(0.0103)	(0.00708)
Age	**-0.3080**	**-0.1894**	**-0.3512**	**-0.0653**	**-0.2603**
	(0.00234)	(0.00343)	(0.00211)	(0.00445)	(0.00215)
Age Square	**0.00230**	**0.00133**	**0.00278**	8.818E-6	**0.00179**
	(0.000021)	(0.000032)	(0.000019)	(0.000043)	(0.000020)
Family structure (reference is single with one child)					
Couple, multiple children	**-2.0487**	**-0.9644**	**-1.2283**	**-0.1881**	**-1.0249**
	(0.0352)	(0.0360)	(0.0253)	(0.0315)	(0.0226)
Couple, no children	**-0.1655**	**-0.3155**	**0.2939**	**-0.2010**	**-0.0901**
	(0.0232)	(0.0276)	(0.0175)	(0.0270)	(0.0166)
Couple, one child	**-1.4389**	**-0.6480**	**-0.9418**	**0.1786**	**-0.6279**
	(0.0423)	(0.0485)	(0.0317)	(0.0403)	(0.0293)
Single, multiple children	**0.3965**	**0.5050**	-0.0147	**0.2233**	**0.2159**
	(0.0357)	(0.0400)	(0.0315)	(0.0399)	(0.0286)
Single, no child	**2.0680**	**0.6637**	**1.5871**	**-0.2035**	**0.9913**
	(0.0187)	(0.0234)	(0.0161)	(0.0265)	(0.0154)
Female	**-0.1510**	**-0.0547**	**-0.0900**	**-0.0339**	**-0.0826**
	(0.00842)	(0.0118)	(0.00719)	(0.0126)	(0.00708)
NESB	**0.1946**	**0.1063**	**0.1169**	0.0132	**0.0739**
	(0.00969)	(0.0134)	(0.00817)	(0.0140)	(0.00799)
ATSI	**0.6259**	**0.6763**	**0.5522**	-0.000292	**0.3428**
	(0.0260)	(0.0309)	(0.0246)	(0.0396)	(0.0243)

The off-diagonal coefficients are much more interesting, as they may be viewed in a sense as representing the odds of certain transitions, relative to the reference of a move into homeownership. Boarders, for instance, appear more likely to move to public rental, private rental or 'other' tenures than into homeownership, given that a move occurs. Public and private renters also appear to tend to be more likely to move into boarding or an alternative form of rental rather than into homeownership. Private renters are also somewhat more likely to become purchasers than homeowners.

The only group to show a somewhat contrasting pattern are purchasers, who are more likely to move into homeownership than any other tenure when a move occurs.

Income, the second main predictor in the model, has large effects on tenure, which are mostly taken up in the coefficients for the lagged terms. Higher earned incomes uniformly increase the odds of being in homeownership relative to any other tenure. There are, however, some contrasting effects apparent in the coefficients for current earned income. Controlling for lag income, higher current incomes appear to increase the odds of being in the 'other', purchaser and private rental categories. While this appears initially contradictory, it is probably best understood as a consequence of the varying age and lifecycle profiles of these groups. In short, homeowners have higher incomes, but the income of purchasers, private renters and to a lesser extent the 'other' group grow faster while on IS.

Age also appears to increase the odds of homeownership relative to the other tenures, although typically at a declining rate. This is particularly true of the contrasts between homeownership and boarding and homeownership and 'other', and least true of the owner/purchaser contrast.

Being in a couple with multiple children increases the odds of being homeowners by a significant amount relative to single persons with one child. This is most pronounced for the boarder/owner contrast and least so for the owner/purchaser contrast, the remaining coefficients falling somewhere between. Couples with one child present a similar pattern, although less pronounced and with the exception that they are more likely to be purchasers than homeowners. The coefficients for couples with no children are much smaller. They are less likely to be homeowners than in the 'other' group, relative to singles with one child, and more likely to be homeowners than boarders, renters and purchasers, relative to singles with one child.

Single persons with multiple children have higher odds than singles with one child of being boarders, renters or purchasers, and lower odds of being in the 'other' group. Singles with no children have higher odds of being renters, boarders and 'other' tenure occupants, again relative to the same reference group.

Being a woman seems to increase the odds of being in homeownership relative to men, for all tenure pairs. These effects are, however, of relatively trivial magnitude compared to many of the other variables in the model, with the largest coefficient being -0.15 for the boarder/owner contrast.

Lastly, persons of non-English-speaking background and Aboriginals and Torres Strait Islanders display similar patterns, with both groups having significantly lower odds of being in homeownership or purchasing than the reference of non-Indigenous Australians. The differences are much more pronounced for Aboriginals and Torres Strait Islanders, with the estimated coefficients in the order of three to six times larger than for NESB migrants.

4.7 Changes in earned incomes connected with changes in tenure

The following analyses examine what happens to incomes during a stay in one tenure alone (see Table 4.2), versus a move from one tenure to a different tenure (Table 4.8). The approach used here concerns calculating the mean level of earned income (beyond the base IS payment applicable) at different points in time, connected to events for each case rather than calendar times. Thus, the analysis considers average earnings at the first and last observation for each case, which is then in turn averaged out across all cases. The mean income for all observations per case is then calculated, and averaged out for all cases in aggregate. This can be done for one or more tenures, in essence capturing what happens to ISRs' earned income over the length of their time in particular tenure/s.

Once again, this proved to be a time consuming but insightful form of analysis, requiring the longitudinal study of each ISR's earning patterns at certain events and in sum. Obviously there are also a large number of potential permutations with such an analysis. In the interests of brevity, just a few possible examples will be highlighted here.

Changes in incomes over tenure changes involving public housing were monitored and it appears the housing pathway of 'R-P' is connected to the highest amount of earned income ($164 per fortnight). The lowest earned income relates to the housing pathway of 'B-A', showing almost no earned income. There is a strong relationship between tenure and earned income. In particular, the gateway tenure of private rental as a destination seems to be associated with higher earned income. Aged care, boarding and public housing as destination tenures show relatively lower earned income associations.

Earned income changes over occupancy and tenure changes between private rental and public housing are considered in detail in Chapter 5.

Table 4.8: Changes in earnings over single tenure transition

Tenure transition	Tot_Obs	First tenure			Second tenure		Total
		Avg_First	Avg all	Avg_last	Avg all	Avg_last	Avg all
F-B	22,905	$ 19.61	$ 33.79	$ 43.72	$ 36.10	$ 67.20	$ 35.30
F-R	62,045	$ 40.66	$ 56.25	$ 63.66	$ 77.40	$ 104.40	$ 72.10
B-R	78,134	$ 34.74	$ 37.07	$ 59.62	$ 68.20	$ 106.41	$ 56.58
R-F	43,905	$ 50.62	$ 62.41	$ 80.61	$ 73.60	$ 84.80	$ 65.56
R-B	58,827	$ 25.91	$ 45.67	$ 66.81	$ 56.00	$ 83.58	$ 49.71
R-P	47,133	$ 52.76	$ 76.47	$ 137.77	$ 136.20	$ 198.72	$ 102.75
R-G	118,252	$ 21.16	$ 22.79	$ 28.84	$ 23.10	$ 52.97	$ 23.00
R-H	72,620	$ 46.90	$ 67.63	$ 88.43	$ 77.10	$ 117.56	$ 73.17
G-R	41,561	$ 37.00	$ 33.82	$ 86.19	$ 82.30	$ 164.32	$ 57.83
P-H	19,835	$ 43.39	$ 59.52	$ 97.43	$ 66.90	$ 112.52	$ 64.21
H-R	115,754	$ 42.93	$ 35.37	$ 70.23	$ 77.10	$ 123.65	$ 56.60
H-F	58,394	$ 22.07	$ 15.51	$ 28.45	$ 14.10	$ 35.47	$ 14.94
H-A	163,397	$ 1.57	$ 1.24	$ 0.82	$ 0.30	$ 1.63	$ 0.99
B-A	59,088	$ 0.33	$ 0.29	$ 0.07	$ 0.10	$ 0.07	$ 0.19
N-F	67,740	$ 37.30	$ 43.46	$ 52.30	$ 60.40	$ 85.68	$ 53.57
N-R	62,554	$ 28.38	$ 50.22	$ 51.53	$ 73.60	$ 97.55	$ 65.01
F-N	30,585	$ 28.10	$ 33.36	$ 49.66	$ 44.00	$ 84.34	$ 39.58
H-P	38,932	$ 47.24	$ 111.55	$ 206.08	$ 159.10	$ 264.31	$ 131.64
N-B	20,840	$ 22.01	$ 31.19	$ 41.33	$ 45.80	$ 60.32	$ 38.14

4.8   Summary of findings

Chapter 6 will examine the policy implications of this part of the study, and what the outcomes of the various approaches to examine how housing pathways, earnings, socio-demographics and other factors among ISRs relate might mean.

In summary, there is evidence that a relationship exists between earnings and tenure among ISRs on a static basis, and it has been possible to measure the differential in

changes in earned income during time on IS by separate tenure category and form of IS.

Income generally appears to have the most consistent effect on exiting IS. The substantively largest effect is for disability pensioners, followed by sole parent IS recipients. The unemployment-type ISRs showed one of the smallest effects of income. Exits from IS are associated with specific tenures: Public and private renters are less likely to leave IS than some others, purchasers and homeowners are the most likely to exit, and public renters are the least likely.

Through regression and other modelling, a close relationship between changes in income and socio-demographic circumstances was identified, and although no evidence was found indicating a strong statistical relationship between earnings change and tenure change, the analysis did identify some association between changes in income and tenure. For the age IS group, for example, transition from purchaser and non-homeowner to homeowner, aged care and private renter was associated with a higher change in income. For students, transition from rent-free to private rental was associated with a higher change in income; transition from rent-free to boarding was associated with a lower change in income compared to private renter.

In other cases, as far as it is possible to ascertain from the modelling that has been undertaken, tenure change and income change appear to occur independently of each other. It should be noted that such modelling proved immensely complex, and some characteristics of the data set meant that limitations existed in modelling capacity.

Changes in earnings as they have occurred among ISRs who did move tenure have been tracked and analysed. This indicated a mix of trends, and highlighted that there are important differences in earned incomes across typical housing pathways. The question of whether it would appear that tenure changes into and out of public housing act as a disincentive to increase earnings (i.e. to work) will be explored in the next chapter which looks specifically at outcomes from the study as they pertain to public housing.

5 THEME 3: RELATIONSHIPS BETWEEN PUBLIC HOUSING PATHWAYS, EARNINGS AND OTHER FACTORS

5.1 Introduction

In this chapter, analyses outlined in Chapters 3 and 4 are reconsidered with a specific focus on public housing. Through the course of this study, the longitudinal housing pathways of those ISRs resident in public housing have been tracked and mapped graphically, along with an analysis of entries and exits around public housing.

This provides an opportunity to separately discuss the relationships between these tenure moves (or non-moves), earnings and other factors. Accordingly, this chapter examines a range of issues, including length of time in public housing and the factors that impact on this, what tenures people have come from when entering public housing and when leaving public housing to other tenures, and crucially whether entry into or exit from public housing is related to changes in earnings.

5.2 Housing pathways into and out of public housing

This section provides an outline of the typical housing pathways into and out of public housing for all ISRs, and the most common for specific IS types. For almost all entry tenures, an exit to private rental is the most common option. The proportion exiting to private rental (among the major entry groups) ranges from 41 per cent for former boarders, up to 57 per cent for those who were renting privately prior to their stint in public housing. There is also a clear tendency for persons to return to their previous tenure type after exiting public housing, and this is apparent for every tenure type excepting aged care.

Although it is far from the dominant pattern, there is also a relative increase in the numbers of people who are owners or renters after exiting from public housing. However, all told, exits to ownership or purchase only amount to approximately 4%. Beyond this there are no easily discernable patterns for the major entry groups: most row percentages are close to the marginal distribution, with the exception of returning to the previous tenure.

A graphical illustration of individual housing pathways shows the dynamic of housing pathways with public housing. The major housing pathways as an origin of public housing are 'G-R' (661 persons), 'G-R-G' (154), 'G-B' (141), 'G-A' (134), and 'G-F' (104). Typical housing pathways in the destination of public housing are 'R-G' (663 persons), 'B-G' (104), 'N-G' (84), 'G-R-G' (74) and 'B-R-G' (55). Typical housing pathways in multiple transition are found in 'G-R-G' (154), 'G-N-G' (89), 'G-F-R' (52), 'G-B-R' (51) and 'G-R-F-R' (50). It is interesting that a number of people who left public housing are likely to go back to public housing, either at the middle of a housing pathway or at the end of the pathway. These pathways are 'G-N-G' (89), 'G-R-G-R' (41), 'G-B-G' (39), 'G-F-G' (32) and 'G-B-R-G' (13). An important housing pattern shows shifts between boarding, private rental and public housing. For example, over 10 individual cases of the repeated patterns are found in such a long housing pathway of 'B-R-B-R-G', 'R-B-R-B-G' and 'R-G-R-G'.

Table 5.1: Top ten typical housing pathways associated with public housing of recipients (all ISR types in tenure)

Tenure transitions	Rank	Frequency		Percent	
		Category	Cumulative	Category	Cumulative
G	1	2400	2400	29.87	29.87
RG	2	663	3063	8.25	38.12
GR	3	284	3347	3.53	41.66
RGR	4	127	3474	1.58	43.24
GA	5	110	3584	1.37	44.60
BG	6	104	3688	1.29	45.90
NG	7	84	3772	1.05	46.94
GRG	8	74	3846	0.92	47.87
GNG	9	66	3912	0.82	48.69
GH	10	65	3977	0.81	49.50

Table 5.2: Most common housing pathways associated with public housing: unemployment recipients in tenure

Tenure transitions	Rank	Frequency		Percent	
		Category	Cumulative	Category	Cumulative
G	1	305	305	16.78	16.78
RG	2	101	406	5.56	22.34
GR	3	69	475	3.80	26.14
NG	4	28	503	1.54	27.68
RGR	5	27	530	1.49	29.17

**Table 5.3: Most common housing pathways associated with public housing: disability recipients in tenure**

Tenure transitions	Rank	Frequency		Percent	
		Category	Cumulative	Category	Cumulative
G	1	474	474	30.19	30.19
RG	2	152	626	9.68	39.87
GR	3	33	659	2.10	41.97
BG	4	31	690	1.97	43.94
GR	5	21	711	1.34	45.28

Table 5.4: Most common housing pathways associated with public housing: sole parents recipients in tenure

Tenure transitions	Rank	Frequency		Percent	
		Category	Cumulative	Category	Cumulative
G	1	390	390	21.76	21.76
RG	2	141	531	7.87	29.63
GR	3	90	621	5.02	34.65
RGR	4	47	668	2.62	37.27
GRG	5	22	690	1.23	38.5

An origin/destination diagram can be used to show the tenures occupied prior to entering and after leaving public housing. To qualify for inclusion, a person must enter public housing after the beginning of data collection and have a corresponding exit to another tenure. Individuals can contribute multiple observations, although in practice there are likely to be very few persons who do so. As is apparent from Figure 5.1, the large majority of summary transitions both in and out of public housing involve private renting boarding, and non-homeowner arrangements.

Figure 5.1: Summary of ISR transitions into and out of public housing
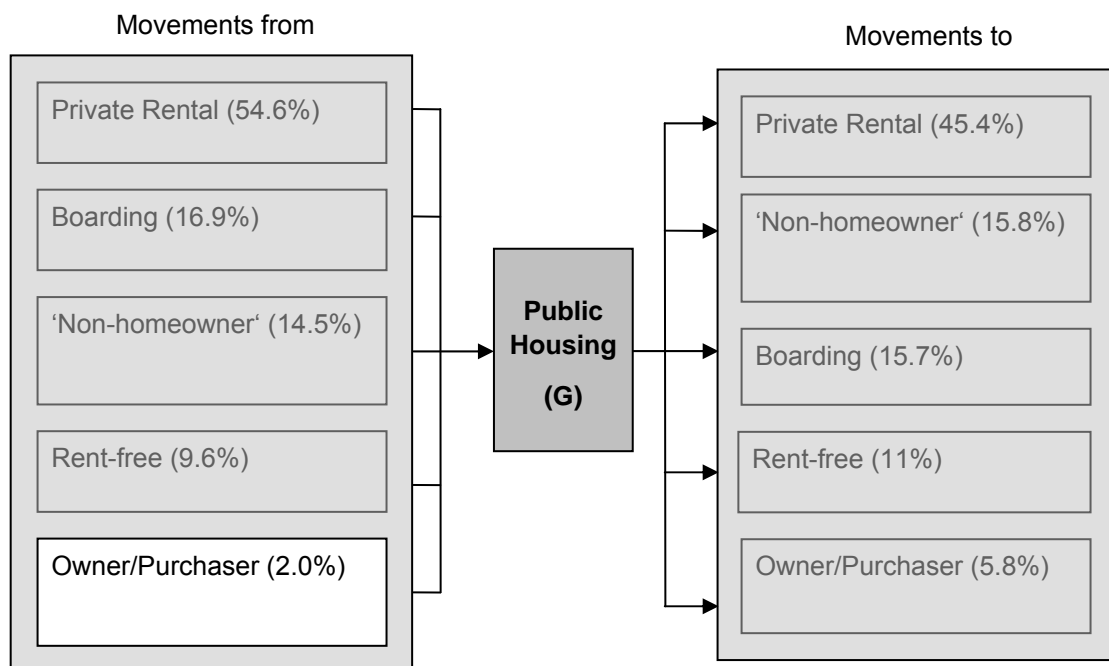
5.3 Mapping individual housing pathways into and out of public housing

As discussed in Chapter 4, the tracking of full housing pathways based around individual tenures has enabled those pathways to be mapped graphically as well. The individual pathways into and out of private rental have already been provided, but a similar exercise has also been conducted for housing pathways into and out of public housing. As was the case with the private rental mapping exercise, it was not really feasible to include every single transition into and out of public housing, but a lower cut-off point of three or more cases has been used in this instance. In total, 71 types of housing pathways have been captured through this analysis.

Figures 5.2 and 5.3 illustrate respectively the source tenures and movements of people who eventually move into public housing, and the destination tenures and movements of people who eventually move out of public housing. Once again, there is a significant level of complexity of such transitions. The movements out of public housing also clearly show repeat patterns of entry to and exit from public rental, which represents evidence of 'tenure churning' or the 'revolving door' syndrome in public housing.

5.4 General observations about public housing occupancy

The median duration in public housing is just over 90 fortnights (or about 3.5 years). Over the full span of the data, 'survival' is 0.3613, which implies that after 8.7 years

(the length of the data set), 36 per cent of public housing tenants (excluding left censored) remained in public housing. Length of time in public housing seems associated with age, whether on unemployment IS, and whether someone is a migrant from a non-English-speaking background. It is also associated with discrete family types, and there are also major differences in the length of stay between different forms of IS type.

Unemployment and sole parent recipients tend to have relatively shorter stays in public housing relative to disability and age pension recipients. Over the duration of the LDS, we only expect 33 per cent of age pension recipients to exit from public housing. Disability pension recipients have a median stay of 180 to 185 fortnights, sole parent benefits 65 to 70 and unemployment benefits 35 to 40 fortnights. There is very little gender difference in length of public housing occupancy, but family type is statistically significant. Families with children spend a much shorter time in public housing than those without children. 56 per cent of childless couples are still in public housing after this period of residence. Single persons are the next longest stayers, with a median stay in public housing between 125 and 130 fortnights. Sole parents and couples with children have median stays in public housing of 70 to 75 and 50 to 55 fortnights respectively. Age is also highly significant, with younger ISRs likely to spend less time in public housing.

Length of time on IS was not a major influence on whether people entered or exited from public housing. However, the longer someone who has exited from public housing is on IS, the more likely they are to re-enter public housing. 30% of all cases who exited from public housing but remained on IS subsequently re-entered public housing. Being on unemployment IS made it more likely to re-enter, but also more likely to have exited from public housing in the first place. Those on unemployment IS in public housing were actually the least likely to exit IS. Reduced propensity to re-enter public housing was linked to increased earnings, rising age and being from an English-speaking background. ISRs with higher earnings are less likely to exit from public housing and also less likely to re-enter, but income reduces the odds of re-entering by about twice as much as it reduces the odds of exiting.

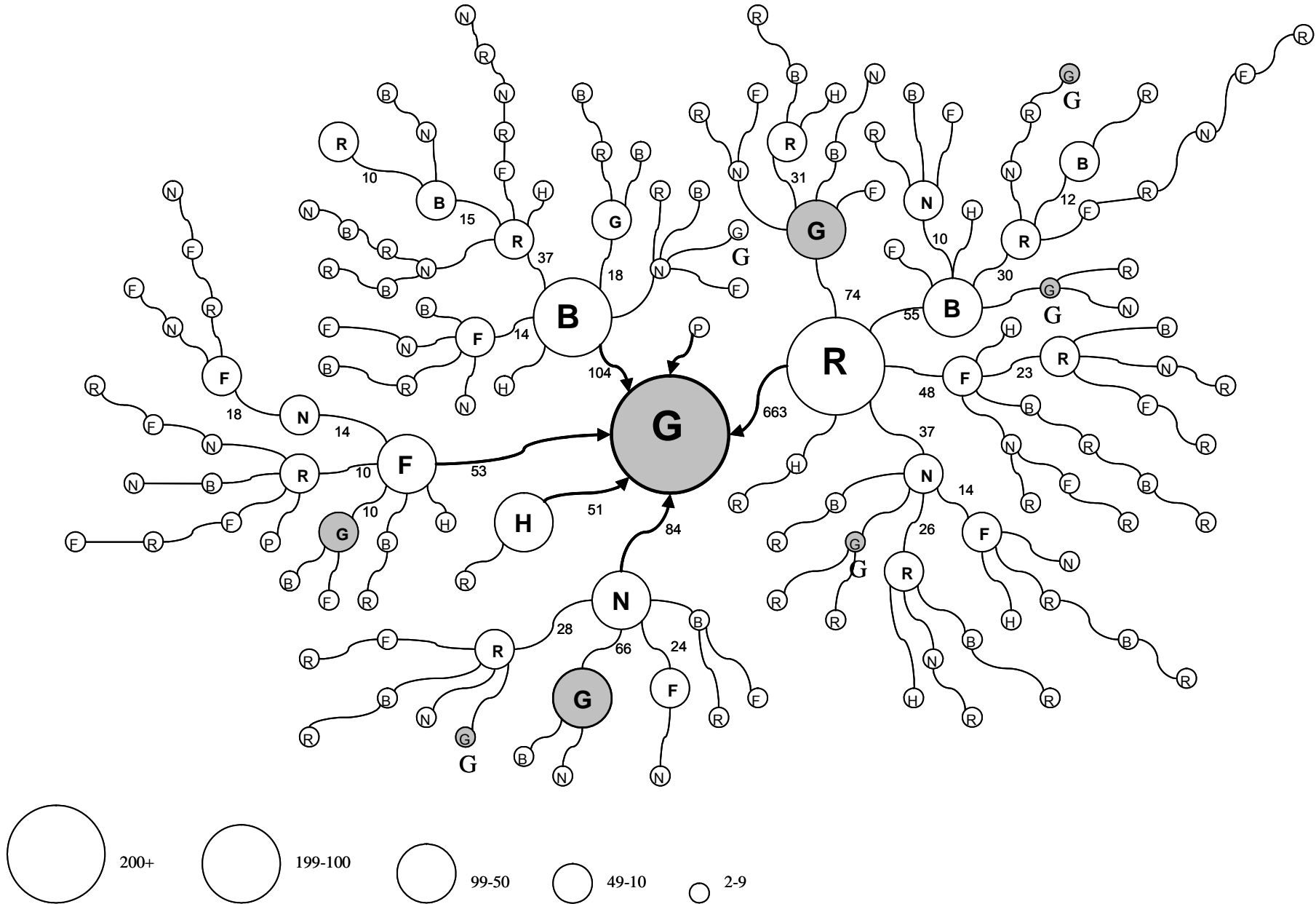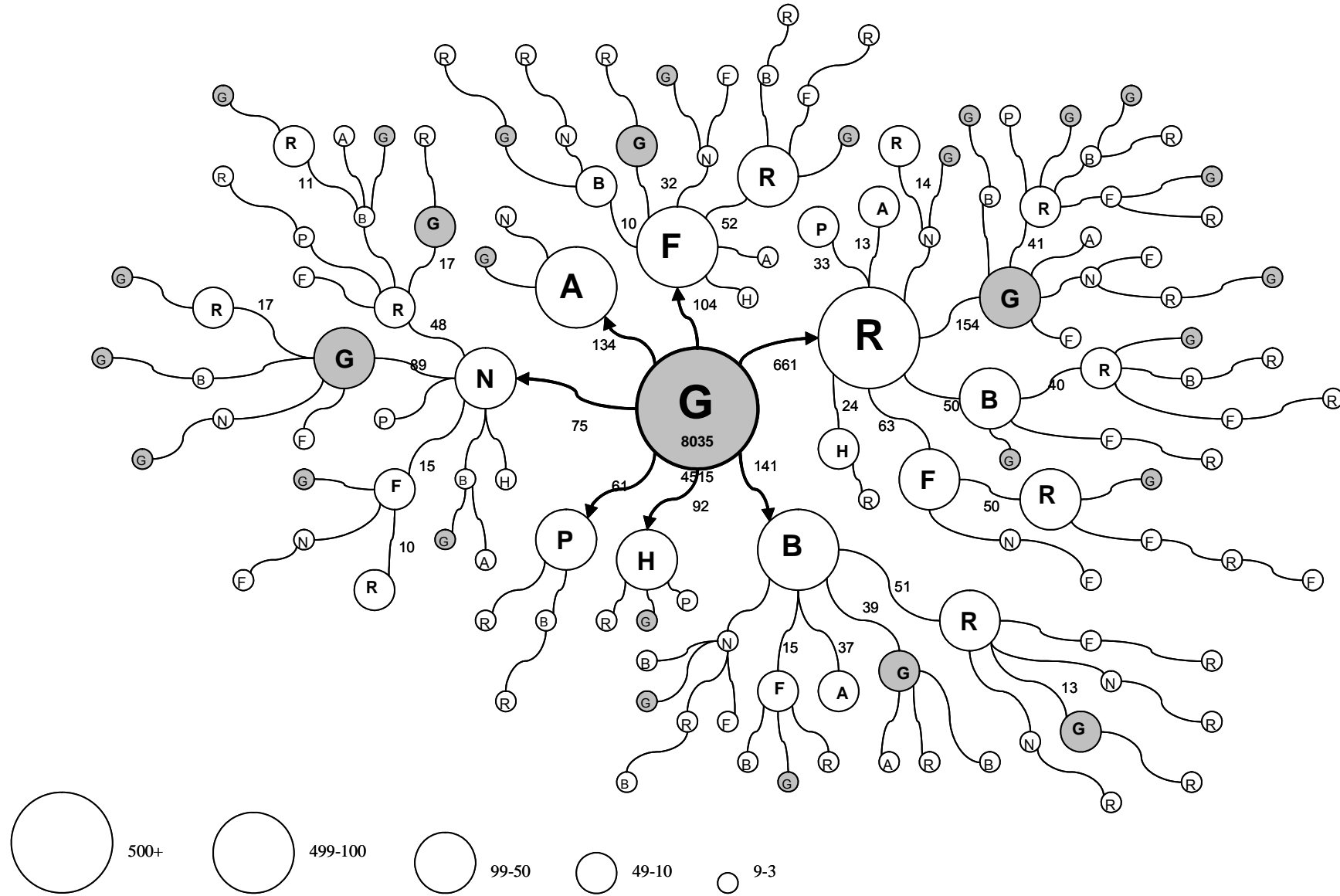**Figure 5.2: Mapping individual housing pathways: origins of public housing entries**

200+ 199-100 99-50 49-10 2-9

Figure 5.3: Mapping individual housing pathways: destinations of public housing exits

5.5 LDS proportional hazard analysis: exiting and re-entering public housing

The following section reports on proportional hazard modelling around exiting and re-entering public housing, to explore the factors affecting duration in public housing. While the statistical technique used is the same as for the proportional hazard modelling reported in Chapter 4, a number of analytical changes were adopted. Most noticeably, the analysis is no longer divided into 'main' IS types. This is due to the rather mundane consideration that there are an insufficient number of cases where individuals either enter or exit from public housing while under observation, which makes disaggregation by IS type statistically unwieldy. Consequently, IS type is controlled for by a set of dummy variables, with the partner form as the reference category.

Income, age, sex, family type and place of birth are all included in unchanged form from the analysis of exiting IS. A variable measuring the proportion of time spent on IS was added as an additional predictor. This variable ranges from 0 to 1, and is simply the number of fortnights in receipt of benefit divided by the number of fortnights from the time the individual enters the risk set to event occurrence or the end of observation. Given that tenure is the response variable in the analysis, the tenure dummies were removed from the model.

Exiting from public housing means simply that a person changes their tenure away from public renting. Re-entry is in effect the reverse, with the additional condition that a person must previously have exited. The important thing to note here is that our analysis does not include all persons who are in public housing. To avoid left-censoring (where the beginning of a relevant state is not observed, hence the duration of that state is also unknown), only persons who enter public housing while under observation in the LDS are included. Similarly, to be included in the re-entry analysis, an individual must exit from public housing during the period of observation, at which point they become 'at risk' of re-entering public housing.

Table 5.5 presents the results from the discrete time proportional hazards model for exiting from and returning to public housing. Logged income has a significantly negative effect on both the probability of exiting and re-entering. This indicates, firstly, that persons with relatively higher earned incomes are less likely to exit from public housing. In other words, lower earned income is statistically associated with a greater propensity to remain in public housing, suggesting that this tenure change and its connection with relative levels of earned income is more complex than might be assumed. Possible explanations include the high rates of 'zero' earned income values among those exiting public housing, and the likelihood that exits are driven primarily by factors other than earned incomes and/or that those on relatively higher earnings are actually better able to sustain their public tenancy. Secondly, this analysis also indicates that persons with relatively higher earned incomes are less likely to re-enter public housing. This is perhaps more intuitive and, when comparing the effect sizes between these two results, the models show that income reduces the log-odds of re-entering public housing by about twice as much as it reduces the log-odds of exiting (-0.074 compared to -0.037).

Age has a similar effect, although it is three times larger for exiting (-0.033) than re-entering (-0.010) public housing. Sex fails to reach statistical significance in either case. The proportion of time spent on IS over the period of observation has no effect on the likelihood of exiting from public housing, although this may be due to the lack of variation. In both groups, substantially more than half of the respondents spent the entire observation period in receipt of benefits. Regardless, for those re-entering

public housing, the proportion of time an individual spends on benefits is a very strong predictive factor (1.73). This implies that persons spending more time on IS are much more likely to return to public housing.

Table 5.5: Exiting and re-entering public housing: regression coefficients from the discrete time proportional hazard models

	Exiting public housing	*Re-entering public housing*
Log of income	**-0.037**	**-0.074**
Age	**-0.033**	**-0.010**
Female	-0.10	-0.06
Proportion of time on income support	0.03	**1.73**
Family Structure (Reference: single no children)		
Single – one child	0.09	0.19
Single – multiple children	-0.14	0.18
Couple – no children	**-0.29**	-0.15
Couple – one child	-0.10	-0.28
Couple – multiple children	**-0.24**	0.04
IS type (Reference: partner benefits)		
Unemployment	0.37	**0.33**
Age	0.10	-0.16
Disability	**-0.30**	0.12
Sole Parent	-0.16	0.08
Student	-0.11	0.04
Other	-0.05	**0.47**
Place of birth (Reference: born in Australia)		
English-speaking migrants	0.04	**-0.31**
Non-English-speaking migrants	**-0.32**	-0.03
N	4449	3520
Event	2082	1041
Censored	2367	2479
Percent Censored	53.20	70.43

Results are from discrete time proportional hazards models.

Bolded coefficients indicate significance at the 0.05 level or better.

All predictors are time-varying, excepting place of birth, sex and proportion of time on benefits.

Family structure does not appear to have major effects on the probability of either exiting from or returning to public housing. The only significant coefficients are for couples with no children (-0.29) and couples with multiple children (-0.24), which both indicate a lower likelihood of exiting from public housing, relative to the reference group of single persons with no children.

In terms of different types of IS, disability recipients are significantly less likely to exit public housing than the reference category of partner IS. Unemployment (0.33) and 'other' (0.47) recipients are significantly more likely to re-enter public housing.

Lastly, place of birth appears to have contrasting effects. Migrants from an English-speaking country are significantly less likely to re-enter public housing once they leave it (-0.31). Migrants from a non-English-speaking background are less likely to leave public housing (-0.32), relative to the Australian born.

5.6 Logistic mixed regression model of public housing occupancy

Table 5.6 examines the relationship between movement in and out of public housing and selected socio-demographic variables. The dependent variable is the variable indicating whether an ISR is in the public housing tenure or not. Because the outcome for this variable is binary, a logistic mixed regression model with a random intercept is appropriate. A lagged tenure variable is included as an independent variable to capture change in tenure and the statistical effects of the selected variables on this change. Very high regression coefficients are estimated for the 'lag of public' (lagged public housing) variable which is consistent with the findings that public tenants are unlikely to switch to other housing tenures. That is, if a person is in a public housing tenure in the previous month, then they are highly likely to remain there. After controlling for the previous tenure, the effects of other variables in the model can be interpreted in association with a change in tenure. As with the linear mixed regression model for earned income in Chapter 4, the variances of the random intercepts were very small, so these estimates have not been included.

Table 5.6: In or 'not in' public housing: regression coefficients for the logistic regression model

Dependent variable: tenure in public housing Yes/No	Unemployed	Sole parent	Age	Disability	Student	Other	Partners
Age	0.037**	-0.004	0.118*	0.067***	-0.179*	0.016	-0.061**
Age-squared	-0.0003	0.00008	-0.001**	-0.0007***	0.003*	-0.00007	0.0006*
Log income	-0.057***	-0.098***	-0.011	-0.007	-0.117*	-0.082	-0.048
Lag of public tenure	10.341***	9.979***	13.619***	11.161***	11.728***	11.617***	11.7445***
Family structure							
Single	-	-0.162	-	-	-	-	-
Couple/multi children	1.137***	-0.356*	0.553	0.219	1.274	0.446**	0.167
Couple/one child	0.977***	-0.252	0.641	-0.008	3.169***	-0.075	0.137
Couple/no child	0.649***	0.114*	-0.459***	-0.374***	1.218**	-0.155	0.457
Sole/multi children	1.489***	-0.270**	0.572	0.469*	0.0005	1.079	0.658*
Sole/one child	1.213***	-	0.281	0.287	1.115	0.562	0.014
Sex							
Male	-	-	-	-	-	-	-
Female	0.169**	0.117	-0.09	0.119*	-0.185	-0.122	0.262
Country of birth							
English-speaking	-	-	-	-	-	-	-
Non-English-speaking	0.016	0.056	0.159*	0.007	0.225	0.288*	0.12
ATSI							
No	-	-	-	-	-	-	-
Yes	0.631***	0.525***	1.248***	0.667***	2.614***	1.657***	0.662**
Constant	-7.814***	-5.629***	-10.340***	-7.535***	-5.946***	-7.282***	-5.959***

*** p<0.001 ** p<0.01 * p<0.05

The impact of age varies according to IS types. For instance, those in receipt of age and disability IS are more likely to enter public housing as they age but this eventually declines, while those on partner IS are likely to exit public housing as they age. Those on unemployment benefits are more likely to enter public housing as they age. The magnitude of earned income is significant in explaining occupancy in or not in public housing for the IS groups of unemployment, sole parent and student. For those on sole parent, unemployment and student IS, earned income is negatively related to movement into public housing.

Family structure has a high impact on movement into public housing for the unemployment IS group. As expected, all family types are more likely to move into public housing than single people, with sole parents being more likely to undergo this transition than couples. For those on a disability IS, a couple family is much less likely to move into public housing than a single person. Students are much more likely to move into public housing if they are in a couple relationship than if single, particularly if they have a child. Women are more likely to enter public housing than men if they are receiving unemployment or disability IS, and individuals of non-English-speaking background are more likely to move into public housing if they receive age IS. Across all IS types, ISRs of ATSI (Aboriginal, Torres Strait Islander or South Sea Islander) origins are more likely to enter public housing.

5.7   Changes in incomes connected with moves into and out of public housing

As already outlined in Section 4.6, it is possible to conduct an analysis of what happens to mean earned incomes over tenure moves involving public housing to reveal whether incomes change and, if they do, in which direction. Unlike the earlier modelling which looked at average trends in the true longitudinal sense, this descriptive analysis compares averages in mean real earnings between first and last observation, but does not track individual change over time.

The following analysis provides a detailed examination of the work reported in Section 4.6, focusing very specifically on earnings during occupancy in public housing and private rental separately, and then during interaction between these two tenures. Given that most housing policy interest in this area lies with public housing and private rental separately, and the interaction between these two tenures, the relationships between incomes and these specific tenures will be examined in some depth. The analysis has also been broken down into the broad patterns for all ISRs, and four key groups of ISRs, namely those on unemployment, age, disability and sole parent-related forms of IS.

Table 5.7: Income changes (real) when no tenure changes (private rent and public housing interchanges only) for ISRs

Tenure	Mean fortnightly earned income (first observation)	Mean fortnightly earned income (last observations)
Private renter (R)	$98.14	$105.71
Public renter (G)	$57.35	$56.34

Note: incomes adjusted to 1995 $s

5.7.1   Residence in public housing only

All ISRs – Average real fortnightly earned income fell very marginally from $57.35 at first observations to an average of $56.34 at last observations.

Unemployment ISRs – Real fortnightly earned income rose from an average of $46.24 at first observations to an average of $129.62 at last observations (i.e. earnings more than doubled).

Sole parent ISRs – Real fortnightly earned income rose from an average of $67.60 at first observations to an average of $134.19 at last observations (i.e. earnings more than doubled).

Age ISRs – Real fortnightly earned income fell from an average of $9.82 at first observations to an average of $2.60 at last observations.

Disability ISRs – Real fortnightly earned income fell from an average of $24.10 at first observations to an average of $13.27 at last observations.

5.7.2   Residence in private rental only

All ISRs – Real fortnightly earned income marginally increased from an average of $98.14 at first observations to an average of $105.71 at last observations.

Unemployment ISRs – Real fortnightly earned income increased from an average of $35.25 at first observations to an average of $104.56 at last observations (i.e. earnings trebled).

Sole parent ISRs – Real fortnightly earned income decreased from an average of $222.39 at first observations to an average of $167.00 at last observations (i.e. earnings declined by 25 per cent).

Disability ISRs – Real fortnightly earned income increased from an average of $20.28 at first observations to an average of $33.08 at last observations (i.e. earnings rose by 63 per cent).

Age ISRs – Real fortnightly earned income decreased from an average of $39.18 at first observations to an average of $12.06 at last observations (i.e. earnings declined by 70 per cent).

5.7.3   Moves from private rental to public housing

All ISRs – Real fortnightly earned income fell very marginally from an average of $21.29 during stay in private rental to an average of $20.20 in public housing. Real earnings increased slightly prior to exit from private rental, rising from an average of $20.70 at first observation to $26.53 at last observation. Post entry into public housing, earnings then continued to increase, to an average of $44.17 (a rise of 60 per cent) at last observation. However, of all the tenure transitions observed, this represented the second lowest (and negative) shift in average earnings during each tenure duration, and one of the lowest increases in 'first to last' observations across the whole tenure transition period.

Unemployment – Real fortnightly earned income rose marginally from an average of $44.54 during stay in private rental to an average of $50.60 in public housing. Real earnings more than doubled prior to exit from private rental (rising from an average of $26.23 at first observation to $58.08 at last observation). Post entry into public housing, earnings then continued to increase, to an average of $68.32 (a rise of 18 per cent) at last observation.

Sole parent – Real fortnightly earned income fell marginally from an average of $43.63 during stay in private rental to an average of $41.10 in public housing. Prior to exit from private rental, real earnings declined from an average of $74.31 at first observation to $60.01 at last observation. However, post entry into public housing, earnings increased, to an average of $109.03 (a rise of 81 per cent) at last observation.

Disability – Real fortnightly earned income rose from an average of $6.10 during stay in private rental to an average of $10.80 in public housing. Prior to exit from private rental, real earnings increased from an average of $6.26 at first observation to $9.92 at last observation. Post entry into public housing, earnings continued to increase, to an average of $12.83 at last observation.

Age – Real fortnightly earned income fell from an average of $5.68 during stay in private rental to an average of $2.60 in public housing. Prior to exit from private rental, real earnings declined from an average of $6.91 at first observation to $5.17 at last observation. Post entry into public housing, earnings continued to fall, to an average of $2.26 at last observation.

5.7.4 Moves from public housing to private rental

All ISRs – Real fortnightly earned income increased from an average of $31.69 during stay in public housing to an average of $71.40 in private rental (i.e. earnings doubled over this tenure transition). Real earnings increased significantly prior to exit from public housing, rising from an average of $36.45 at first observation to $79.09 at last observation. Post entry into private rental housing, earnings then continued to increase significantly to an average of $138.06 at last observation. Of all the tenure transitions observed, this represented the second highest shift in average earnings during each tenure duration, and the third highest increases in 'first to last' observations across the whole tenure transition period.

Unemployment − Real fortnightly earned income increased from an average of $41.74 during stay in public housing to an average of $99.00 in private rental (i.e. earnings more than doubled (137 per cent) over this tenure transition). Real earnings increased significantly prior to exit from public housing, rising from an average of just $1.95 at first observation to $93.76 at last observation (a massive relative increase of 4,700 per cent!). Post entry into private rental housing, earnings then continued to increase significantly to an average of $244.54 at last observation. Of all the tenure transitions observed, this represented the most dramatic increase in income whilst in public housing, and the highest increase in 'first to last' observations across the whole tenure transition period.

Sole parent – Real fortnightly earned income increased from an average of $62.97 during stay in public housing to an average of $122.10 in private rental (i.e. earnings doubled over this tenure transition). Real earnings increased significantly prior to exit from public housing, rising from an average of $114.26 at first observation to $158.29 at last observation. Post entry into private rental housing, earnings then continued to increase to an average of $206.47 at last observation. Of all the tenure transitions observed, this represented the highest increase in income whilst in public housing in dollar terms, and the third highest increase in 'first to last' observations across the whole tenure transition period.

Disability – Real fortnightly earned income increased from an average of $5.45 during stay in public housing to an average of $13.90 in private rental (i.e. low earning levels but in relative terms they nearly tripled over this tenure transition). Prior to exit from public housing, real earnings increased from $0 (no income) at first observation to $21.72 at last observation. Post entry into private rental housing, earnings then continued to increase to an average of $39.57 at last observation.

Age – Real fortnightly earned income fell from an average of just $1.53 during stay in public housing to an average of $1.20 in private rental. No effective change in income was observed prior to exit from public housing (first to last observation), but real earnings rose from $0 (no income) to $1.09 at last observation post entry into private rental housing.

Table 5.8: Income changes over tenure changes (private rent and public housing interchanges only) for ISRs

	First tenure ($s)			Second tenure ($s)		Total ($s)
	Avg_First	*Avg all*	*Avg_last*	*Avg all*	*Avg_last*	*Avg total*
Unemployment						
R-G	26.23	44.54	58.08	50.6	68.32	47.77
G-R	1.95	41.74	93.76	99.0	244.54	76.78
Sole parent						
R-G	74.31	43.63	60.1	41.1	109.03	42.08
G-R	114.26	62.97	158.29	122.1	206.47	91.75
Age						
R-G	6.91	5.68	5.17	2.6	2.26	3.6
G-R	0	1.53	0	1.2	1.09	1.36
Disability						
R-G	6.26	6.1	9.92	10.8	12.83	8.98
G-R	0	5.45	21.72	13.9	39.57	9.56
Parental						
R-G	2.47	7.04	10.24	22.0	39.91	16
G-R	35.34	11.01	42.97	65.5	33.5	39.76
Student						
R-G	0	10.47	0	39.7	47.49	28.94
G-R	0	0	0	0.0	0	0
Other						
R-G	0	34.57	12.27	6.1	33.29	17.14
G-R	0	54.78	79.22	82.4	132.53	71.77
All ISRs						
R-G	20.70		26.53		44.17	
G-R	36.45		79.09		138.06	

Note: incomes adjusted to 1995 $s

5.8   Summary of findings

This chapter has sought to draw together various strands of the research, and to focus specifically on public housing as a tenure category in the data. The housing pathways outlined earlier have been explored in terms of movements into and out of public housing, and also what such movements, or residence without transitions might be related to in terms of socio-demographic and other characteristics of those on IS.

As with some of the modelling in Chapter 4, the analysis here of earned income and certain tenure shifts around exit from or re-entry to public housing indicate a more complex set of relationships than might be anticipated. In particular, there appears to be an inverse relationship between levels of earned income and propensity to exit from public housing: such exits statistically are linked to lower rates of earned income, not higher levels. What this indicates perhaps is that exits from public housing in practice are not driven primary or even substantially by (changes in) earned income levels, and that other factors dominate.

One other highly significant finding about income and tenures, from a different form of analysis, suggests that for those recipients who do experience a shift from private

rental to public housing, almost no increases in earnings were seen prior to exit from private rental, and modest increases following entry to public housing. However, for those who undergo the tenure change of public housing to private rental, significant increases in income were observed both prior to and following exit from public housing. This indicates that the earnings of those who exit from public housing and enter private rental are greater than those who are only in private rental. This could be a tenure effect, in part at least, and/or it could be about the characteristics and circumstances of those who make this tenure transition. Whichever explanation, the results are interesting in light of arguments about public housing being a disincentive for workforce participation, which would hold that earned income is constrained under income related rent conditions in public housing, and that this situation creates a disincentive to work (and earn) more.

6 OVERALL CONCLUSIONS ABOUT THE RESEARCH AND POLICY IMPLICATIONS ARISING FROM THE FINDINGS AND OUTCOMES

6.1 Overview of the policy relevance of the findings

The relevance of this research lies in its capacity to directly provide information about the tenure consumption patterns of ISRs, and to contribute materially to contemporary debates about housing policy and broader social policy. The study can be positioned at the intersection of three fields of broad social welfare policy, namely, housing assistance provision, income-support provision, and labour force or 'economic' participation. This research is therefore important in the context of housing assistance debates, welfare reform debates, public housing management challenges and broader social and demographic phenomena. The present study complements aspects of the first two AHURI National Research Ventures currently underway, which are examining relationships between housing assistance and economic participation (NRV1), and contemporary Australian housing careers (NRV2).

The examination of the housing arrangements and circumstances of ISRs over time through this study has assisted in identifying empirically some of the dynamic 'housing pathways' of different groups of ISRs. Analysis of the relationships between changes in tenure, changes in incomes and other changes identifiable in the LDS also has the potential to assist in identifying some of the factors associated with housing transitions, including access to public housing, transitions to or from employment, changes in earnings and other changes in life circumstances.

Historically, Australians have viewed tenure changes in terms of an upward trajectory, from family home, through private renting (as a temporary option), to a first home purchase and eventually onto a fully owned home, mortgage free. Tenure moves were commonly associated with lifecycle events – leaving school and getting a job might be connected to leaving home (and not coming back); first home purchase was aligned with family formation – marriage, children and so forth. Low-income households might alternatively move into public housing, and remain there as a long-term option. This sort of description is an oversimplification, but it highlights that tenure moves were seen as generally hierarchical and limited in direction to standardised patterns. The last decade or two has been a time of considerable shifts in these patterns.

Household mobility in the general population suggests less uniformity and certainty in the housing system today. There is a growing separation or 'disconnectedness' between housing careers and other life-course events (Winter and Stone 1999). 'Housing careers and tenure arrangements are becoming more complex at the same time as the life cycle sequence of household structure is less predictable' (Maher 1997: 5). Where we used to speak of 'housing careers', it is now more useful to think in terms of 'housing pathways' (Clapham 2002), which involves a more nuanced, and less homogenous and normative, set of expectations about housing consumption patterns. The concept of housing pathways better describes how people act upon their changing needs and circumstances over time through changes in housing options and tenure transitions (shaped by choices and constraints).

Increasing evidence of complexities in the housing system presents a clear challenge to gain a more informed understanding of how households move around the system, in particular between tenures. This is no less so for the population who are in receipt of IS; indeed, perhaps the imperative is stronger given that such people are often on the lowest incomes and/or vulnerable in other ways in the Australian housing system.

Critical policy questions regarding the housing pathways concern why tenure movements occur, and how they may be linked to influential factors. For example, how are tenure movements associated with changes in incomes? How are they linked to changes in other circumstances (social, economic, personal)? What are the drivers behind the housing pathways of ISRs? Are they about tenure 'choices', constraints or other decisions? It has really only been possible here to start to examine some of these critical questions. Others cannot be answered alone with the data available here, but this study provides a useful foundation to designing and conducting further studies of ISRs and their housing and related experiences.

Nevertheless, the LDS has provided a rich source of data that, when treated longitudinally and within an analytically sophisticated framework of open enquiry, have revealed the patterns of tenure consumption over time among ISRs, and have opened the door to a closer examination of the principal dynamics of the housing pathways of low-income people. This study has proved (as anticipated) to be a complex, time consuming and otherwise challenging project. Given its broad remit, it would be impossible to highlight every potential policy issue which might arise from the myriad outcomes from the work. Instead, the following attempts to point to, but not in any depth, some of the main items that may be of policy interest.

6.2 Heterogeneity and complexity of housing consumption patterns among income support recipients

The housingconsumption patterns of ISRs identified in this study illustrate the diversity of housing pathways – ranging from high rates of stability on the one hand, to a highly complex history of multiple transitions on the other.

The static tenure breakdown of ISRs suggest some characteristics which have similarities with those of the broader population, while others differ significantly. Private rental and homeownership rates among ISRs were surprisingly close to whole of population, whereas home purchase was much lower. Informal rental and other arrangements were much higher, and while these are often collapsed in general tenure analyses into 'other', their importance among ISRs has been demonstrated. More dynamic, time based analyses indicate that most ISRs do not change tenures, or undergo only limited movements, whilst on IS. At the same time, the more elaborate set of tenure changes that some ISRs undergo can also been seen.

In summary, traditional 'housing careers' assumptions about linear tenure movements certainly need to give way to a more nuanced appreciation of the diversity of 'housing pathways', as this study has shown. In this regard, ISRs are clearly not a homogenous population in terms of housing pathways; clear differences in tenure by IS type are evident through this study.

Lastly, the importance of the private rental market within the ISR population, and the need to understand both its role and potential avenues of intervention to secure specific housing outcomes, has also been thrown into relief through this work.

6.3 The relationships between tenure, earnings and other factors for ISRs in general

The relationships identified between earned incomes, socio-demographic characteristics and tenures may contribute to a better understanding of the clients (current and potential) of State Housing Authorities, and of other housing consumers reliant on IS.

The apparent relationships between housing pathways and earnings are not straightforward. A stronger relationship between changes in earnings and changes in tenures might have been expected but, for a variety of reasons, this was not found.

Among ISRs in general, there is some evidence of association between changes in tenure and changes in earnings, but other factors may be more important in determining income. However, the study did find some evidence of income changes associated with tenure changes, where tenure changes occurred. Overall, it is more likely that tenure is generally a symbol rather than a cause of income inequalities, but low-income households may become trapped in specific tenures.

6.4   Public housing-related pathways and associated factors

Given the policy context of this research is related in part to questions about where people come from when they enter public housing, where they exit to, and what such tenure transitions might be associated with, particular attention has been given to tenure shifts into and out of public housing and private rental housing, and the relationship between these changes and those regarding earnings and other changes in circumstances.

Expressions of concern, in all jurisdictions, that the form of direct public housing provision in Australia, with income-based rents and reasonable tenure security, creates 'workforce disincentives' hinge upon three specific issues: first, how rent is calculated in public housing, and what effect this may have on incentives to increase earnings through employment; second, whether public housing is locationally aligned with employment opportunities; and third, how tenure security and lack of dwelling transfer opportunities in public housing may discourage movement to other locations or out of the tenure altogether. Precisely whether and how specific tenancy conditions, such as rent formulae and tenure security, work vis-à-vis incentives to increase income and then leave public housing is a complex issue in research as well as practice contexts.

One thing clear from this study is that there is complexity around ISRs and public housing. Public tenants are not a homogenous population when it comes to housing pathways, and differ in characteristics and behaviour according to IS types. Analysis differences among IS categories has been useful for providing a better understanding of who the stayers in public tenancies are, who move in and out, where they move from/to, and what are the precursors. It is thus necessary to appreciate different pressures and factors driving needs and demands.

This study has also indicated that there is a problem with a 'revolving door' syndrome of repeat moves into and out of public housing in some cases. The importance of the private rental market as a source and exit point is also evident. Indeed, the study uncovered that familiarity with previous housing options seems in part to influence future tenure decisions.

Finally, and perhaps most significantly, this study points to some evidence of differences in incomes before and after moves into and out of public housing to/from private rental. Indications from the analysis here are that, for some groups who remain on IS, a move from private rental to public housing does not seem to lead to a decrease in earnings, although positive changes are relatively small. Meanwhile, for some ISR groups, a move from public housing to private rental leads to quite significant increases in earnings. This suggests that public housing is not necessarily acting as a work disincentive, at least not in all circumstances, and adds up to strongly suggesting that a clear signal that effective rates of IS assistance withdrawal (tapering) are not necessarily all that counts in shaping earnings and employment for

ISRs in public housing. Given that earned income appears to rise with duration on IS, in both public and private rental tenures, it may be, for example, that public housing as a stabilising instrument.

Fundamentally, however, this study suggests that changes in housing tenure are not merely a function of income, and that changes in earnings do not have a simple relationship with tenure changes. The situation for those on IS is more complex than this, and the analyses of these factors need to allow for and explore disaggregated patterns and outcomes. Finally, as mentioned earlier, if further analysis of these relationships is pursued, it may be necessary to build further studies around the LDS, but also seeking to utilise other data which might shed light on some of the other reasons for changing tenures and incomes.

6.5   Future housing research and analysis using the LDS

Longitudinal analysis of the LDS data has provided a rare opportunity to study in depth the housing consumption behaviour over time in a case-continuous way. The LDS has represented a powerful tool with which to analyse housing consumption patterns, and other characteristics and activities, among ISRs over time. The LDS does have some limitations, but it does provide great potential in other ways due to the breadth of variables collected in the administration of IS payments, and also through the frequency of data reporting, and the overall size and length of the data set. Its use in the housing research field is also extremely underdeveloped, until now at least!

While the more complex statistical analysis trialled in this study was in the main unable to answer parts of the research questions, because of the difficulties in modelling lags in time between phenomena such as income changes and tenure changes, some of the more descriptive but still longitudinal analysis has helped establish the foundations for gaining considerable insights into housing pathways and how they might relate to other factors.

Associated with this, the study has also provided an chance to acquire in-depth knowledge of how LDS data can be analysed longitudinally, and this might allow for the advancement of research methodologies and approaches for analysing large-scale longitudinal administrative data sets in a housing policy research and broader social science context. It is certainly clear to the research team that more analysis could be undertaken around housing pathways and income changes, and we hope that such opportunities will be able to taken up by a range of housing and other researchers in the future.

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Yates, J 1999, 'Decomposing Australia's Home Ownership Trends, 1975-1994'. In: J Yates & M Wulff, (eds.), Australia's Housing Choices, University of Queensland Press, Brisbane, pp. 27-42.

Yates, J 2002, *A spatial analysis of trends in housing markets and changing patterns of household structure and income*. AHURI, Melbourne.

APPENDICES

Appendix 1: Tenure and income support type categories

Table A1.1: Operational tenure classification

Tenure name	New code	Description	LDS categories	Classification process
Home Owner	H	Outright homeowners not renting and not in aged care	HOM, JNT, PAR, LIF, SRH, OTH	(home_own_cd) Where rent type is '_'
Home Purchaser	P	Purchasers not renting and not in aged care	POH, DEE	Where rent type is '_'
Aged Care	A	Aged care or nursing home	GFH, GFN, NHH, NHN	Overrides rent type
Private Rental	R	Private renters not in aged care	PRI	Where not in (A)
Public Rental	G	Government renters not in aged care	GOV	Where not in (A)
Boarding	B	Boarders and lodgers not in aged care	BOA, LOD	Where not in (A)
Rent-free	F	Rent-free not in aged care	NRP, FBD, FBL, FLD	Where not in (A)
Other	O	Other rent not in aged care	OTH (rent_typ_cd) MOO, SIT, MNT	Where not in (A)
Non-homeowner	N	Cases identifying as 'non-homeowners', but also not identifying rental type	NHO, SRN, PLT	SRN or PLT or NHO in home_own_cd and '_' in rent_typ_cd
		Missing	-	'_' in both

Table A1.2: Operational income support classifications

New IS name	New codes	Description	LDS codes	Notes
Aged	A	Age pension and related IS	AGE, MAA	
Disability	D	Disability pension and related IS	DSP, REH, RHB, DWS, SWS	
Unemployment	U	Newstart, youth allowance and other unemployment related IS	NSA, YAL, YTA	YAL and YTA apply where activity type code is not 'FTS' or 'ED'
Sole parent	P	Sole parent and related IS	SPP, PPS, WID, PGA	
Student	S	Austudy, youth allowance (students) and study related IS	AUS, YAL, YTA	YAL and YTA coded S where activity type code is 'FTS' or 'ED'
Partner allowance	W	IS for partners of others on IS	WFA, WFD, MPA, PGN, PGY, PTA, PA, PGL	
Other	O	Not captured elsewhere	All other IS types	

Appendix 2: Update of tables from positioning paper

Preliminary analysis of the profile of ISRs was included in the Positioning Paper. However, that initial analysis was framed around working age recipients only. Since the release of that paper, the focus of this study has shifted to the broader population of ISRs, including those who may not be typically regarded as being of working age (which is not as straightforward to define as might be supposed). Several of the tables included here provide an update to the initial analysis, but there are some additional materials which have not been covered, and these are provided below.

Table A2.1: Categories of ISRs at last observation and all fortnights

IS type	Last observation		All fortnights	
	Frequency	*Per cent*	*Frequency*	*Per cent*
Age	26,683	29.88	3,913,653	41.13
Disability	8,198	9.18	1,300,656	13.67
Unemployment	28,526	31.95	1,736,479	18.25
Sole parent	6,938	7.77	894,670	9.40
Student	6,935	7.77	448,590	4.71
Partner allowance	7,861	8.80	877,659	9.22
Other	4,150	4.65	342,809	3.60
Total	89,291	100.00	9,514,516	100.00

Table A2.2: Family type of recipients by age group at first observation

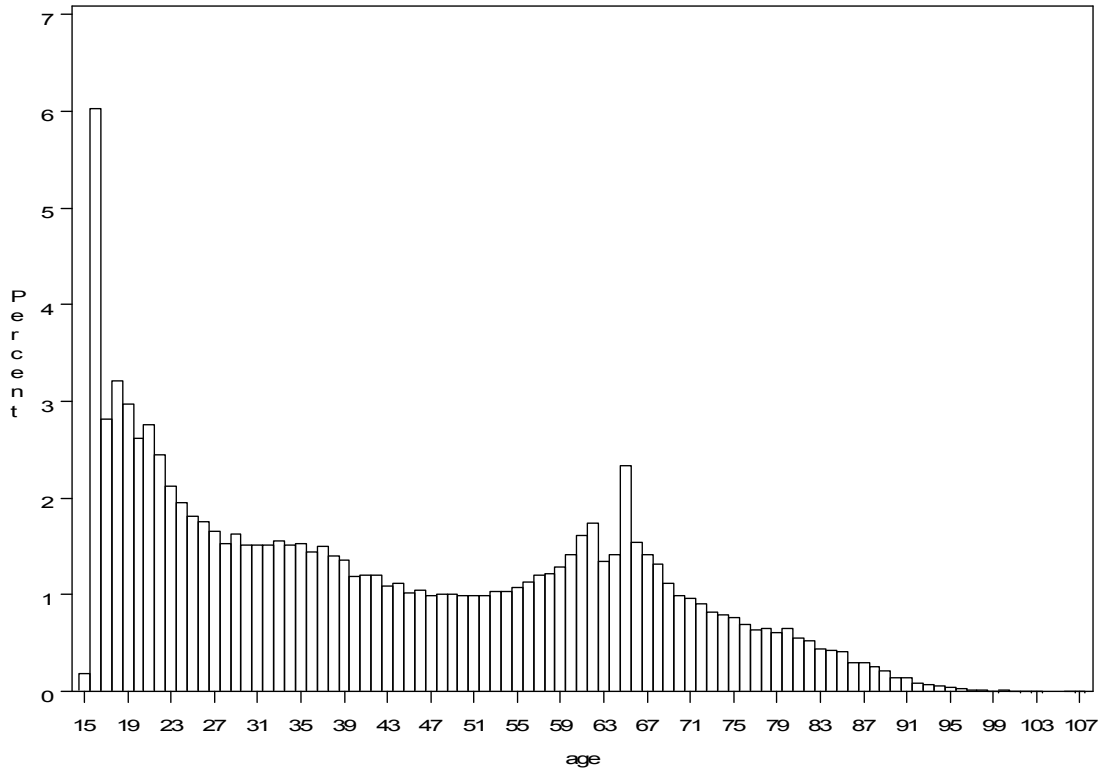| Age	Family type				
	Couple – No children (%)	*Couple – With children (%)*	*Single (%)*	*Sole Parent (%)*	*Total%*
15-24	3.69	3.06	89.84	3.42	100
25-34	9.90	29.89	44.56	15.65	100
35-44	12.81	38.19	29.62	19.39	100
45-54	42.41	16.07	35.79	5.73	100
55-64	68.77	2.25	28.42	0.56	100
65+	50.37	0.29	49.27	0.07	100
Total	27.78	12.46	53.17	6.58	100

Figure A2.1: Age of ISRs

Table A2.3: Earnings of recipients by IS type, 6 September 2002 to 5 September 2003
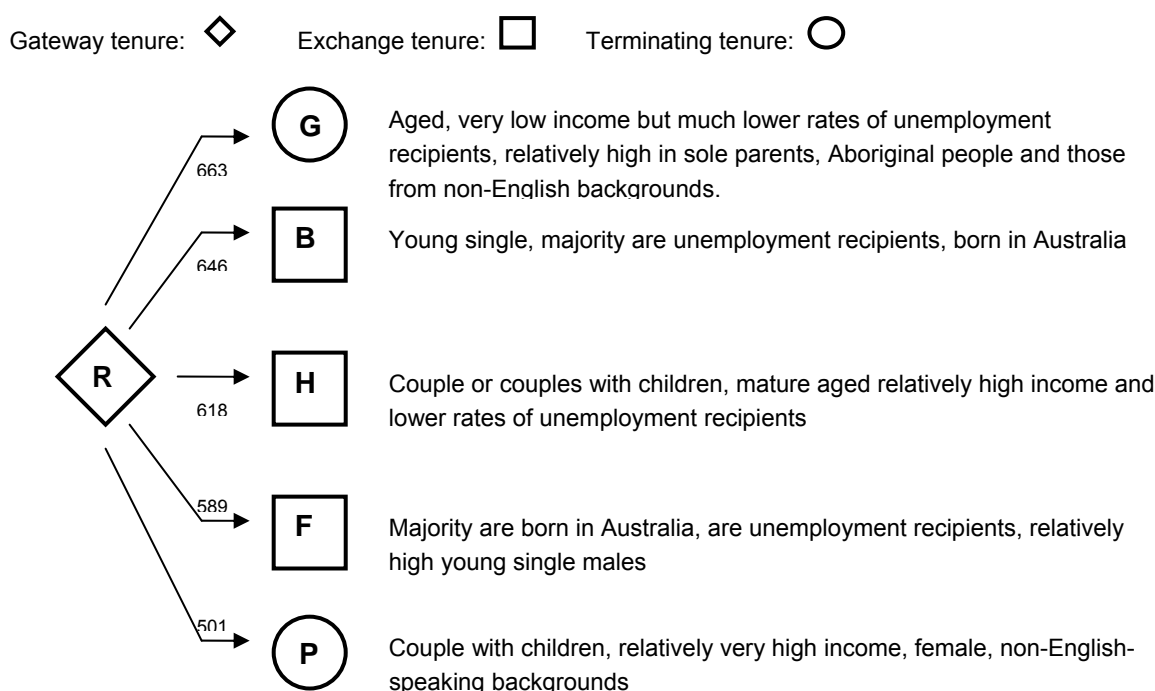
IS type	Overall		Non-zero earned income	
	Percent no income	Mean ($)	Median ($)	Mean ($)
Age	97.64	5.58	128.57	229.57
Disability	92–.37	15.41	106.14	197.15
Unemployment	83.41	61.69	228.49	360.30
Sole parent	74.63	102.04	366.51	391.11
Student	75.49	55.45	183.55	226.23
Partner allowance	89.83	31.97	213.95	304.46
Other	91.88	21.20	181.28	256.53
Total	90.19	31.60	213.42	313.27

Appendix 3: Single tenure changes and typical demographic profiles

Four diagrams presented here deal with different housing patterns. The first and second diagrams presented in and out of private rental house. Nine housing pathways are associated with this as 'gateway' tenure. The third diagram shows a dynamic housing pattern involving transition between owned, purchased, private rented, rent-free, boarding and aged care house. The last diagram discussed housing pathways in relation to 'Non-homeowner'. Each diagram described socioeconomic and demographic characteristics of ISRs.

Variables used

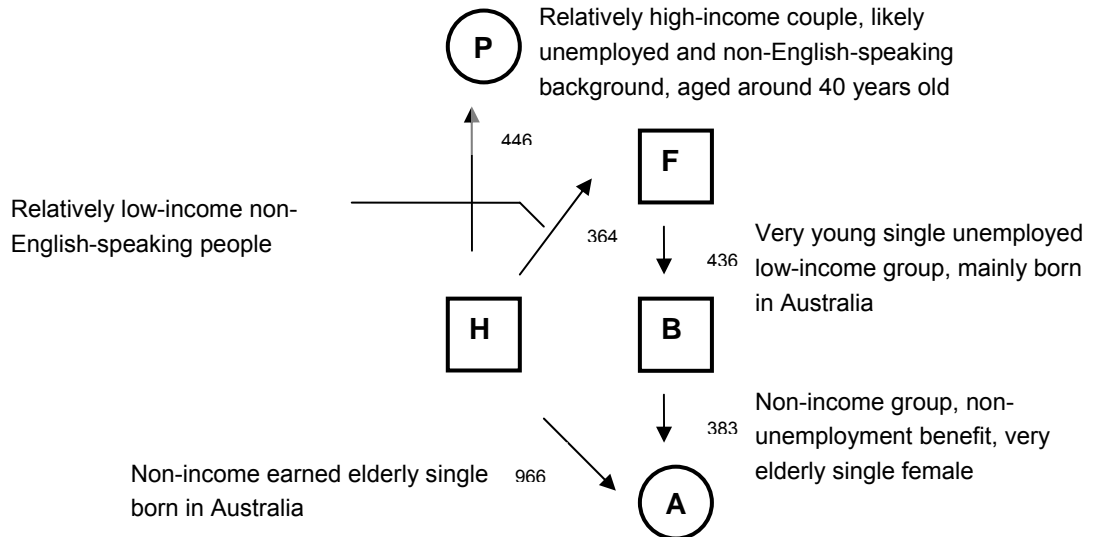|	
Mean income	Mean income
Unem	Per cent unemployment IS[12]
Couple	Per cent couple no children
Single	Per cent single persons
S_Par	Per cent sole parent
CWC	Per cent couple with children
Fem	Per cent female
ATSI	Per cent Aboriginal, Torres Strait of South Sea Islander decent
Aus	Per cent Australian born
NESB	Per cent Non-Australian born, non-English-speaking background
ESB	Per cent Non-Australian born, English-speaking background
Mean age	Mean age

Gateway tenure: ◇   Exchange tenure: ☐   Terminating tenure: ◯

G 663 — Aged, very low income but much lower rates of unemployment recipients, relatively high in sole parents, Aboriginal people and those from non-English backgrounds.

B 646 — Young single, majority are unemployment recipients, born in Australia

H 618 — Couple or couples with children, mature aged relatively high income and lower rates of unemployment recipients

F 589 — Majority are born in Australia, are unemployment recipients, relatively high young single males

P 501 — Couple with children, relatively very high income, female, non-English-speaking backgrounds

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[12] For this analysis, this was the only type of income support that was included.

	Freq	Mean income	Unem (%)	Couple (%)	Single (%)	S_Par (%)	CWC (%)	Fem (%)	ATSI (%)	Aus (%)	NESB (%)	ESB (%)	Mean age
RB	646	71	54.5	5.0	80.8	11.9	2.3	44.6	2.3	68.9	20.7	10.4	39.0
RF	589	70	50.9	13.4	68.9	10.2	7.5	52.1	4.4	74.4	17.3	8.3	38.0
RG	663	44	15.2	23.2	46.2	18.4	12.2	60.8	5.0	59.0	32.7	8.3	52.0
RH	618	99	28.6	36.7	21.68	13.8	27.8	63.1	2.3	61.5	28.6	9.9	47.0
RP	501	164	32.7	26.8	15.8	19.8	37.7	64.7	2.2	56.9	32.7	10.4	39.0

Very young single who is likely to leave their parents' house. Relatively higher unemployment

Relatively young single unemployed male

Relatively high income couple or couple with children

Income relatively very high and less unemployment benefit recipient, higher female
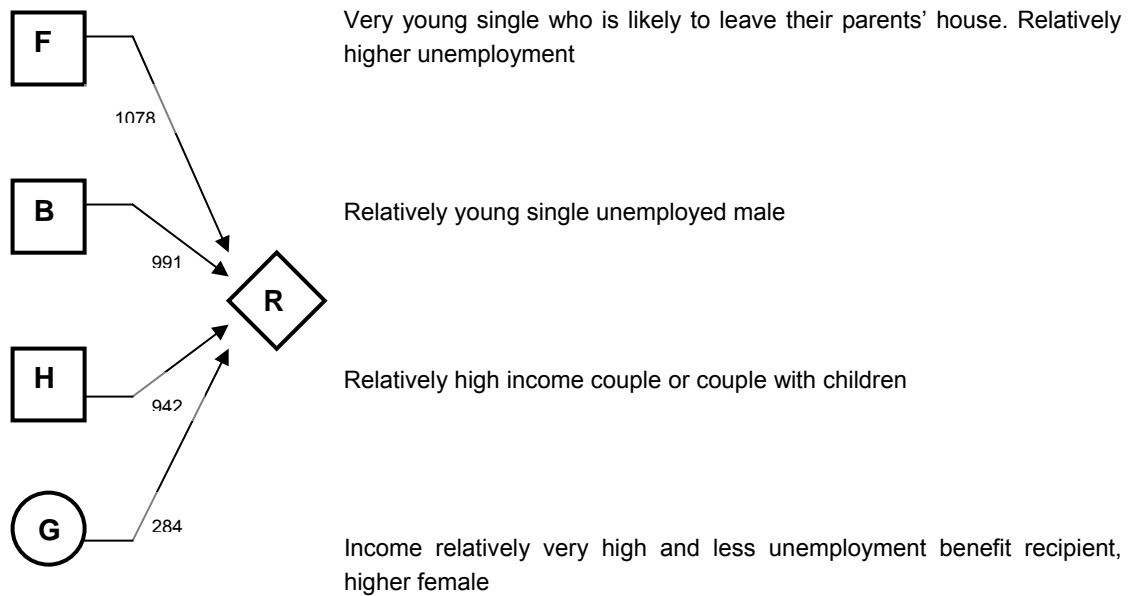
	Freq	Mean income	Unem (%)	Couple (%)	Single (%)	S_Par (%)	CWC (%)	Fem (%)	ATSI (%)	Aus (%)	NESB (%)	ESB (%)	Mean age
FR	1,078	86.88	53.0	14.1	66.4	7.4	12.1	52.3	3.5	70.3	23.0	6.7	31
BR	991	90.56	55.9	12.7	65.6	12.7	9.0	46.1	4.1	75.9	15.6	8.5	33
HR	942	103.86	22.6	28.7	35.9	22.6	12.9	63.5	1.5	72.6	16.2	11.2	52
GR	284	138.06	24.3	23.6	34.5	25.7	16.2	67.6	5.3	70.1	18.7	11.3	47
FR	1,078	86.88	53.0	14.1	66.4	7.4	12.1	52.3	3.5	70.3	23.0	6.7	31

P — Relatively high-income couple, likely unemployed and non-English-speaking background, aged around 40 years old

Relatively low-income non-English-speaking people

F

446

364

436

Very young single unemployed low-income group, mainly born in Australia

H

B

Non-income group, non-unemployment benefit, very elderly single female

383

Non-income earned elderly single born in Australia

966

A

	Freq	Mean income	Unem (%)	Couple (%)	Single (%)	S_Par (%)	CWC (%)	Fem (%)	ATSI (%)	Aus (%)	NESB (%)	ESB (%)	Mean age
HA	966	1.33	0.0	23.0	77.0	0.0	0.0	64.5	0.3	73.1	16.1	10.9	84
HP	446	117.12	42.6	33.6	21.1	14.1	31.2	57.6	2.7	66.4	21.7	11.9	43
FB	436	58.87	63.8	3.9	91.3	4.1	0.7	39.5	5.1	80.1	14.0	6.0	27
BA	383	0.05	0.0	3.1	96.9	0.0	0.0	76.5	0.5	73.1	13.6	13.3	85
HF	364	29.96	15.1	28.9	61.5	5.2	4.4	62.4	1.1	70.9	20.9	8.2	67

Mature single, in receipt of unemployment IS, born in Australia

517

F — Mostly single young Australian born

1078

N

R — Single or young couple born in Australia

998

368

B — Most are young single Australian born
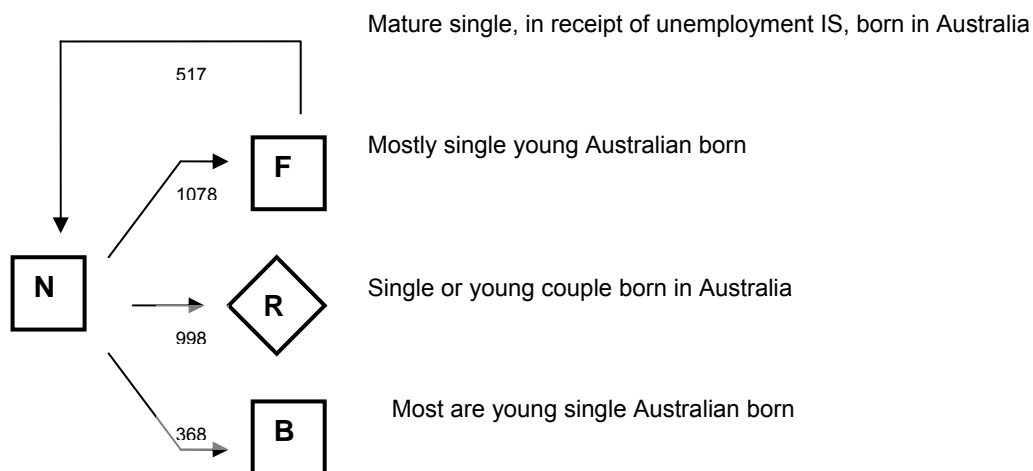
	Freq	Mean income	Unem (%)	Couple (%)	Single (%)	S_Par (%)	CWC (%)	Fem (%)	ATSI (%)	Aus (%)	NESB (%)	ESB (%)	Mean age
NF	1,078	46.47	51.4	4.8	91.3	1.5	2.4	49.5	3.2	78.9	9.2	11.9	23
NR	998	56.74	52.5	10.4	75.8	5.8	8.0	54.1	2.3	78.6	15.4	6.0	27
FN	517	37.07	60.9	10.3	81.8	2.1	5.8	46.0	1.7	75.1	19.7	5.2	49
NB	368	33.28	59.2	1.9	91.6	5.7	0.8	41.9	5.7	81.5	14.7	3.8	24
NF	1078	46.47	51.4	4.8	91.3	1.5	2.4	49.5	3.2	78.9	9.2	11.9	23

Appendix 4: Survivor and hazard functions for remaining in / exiting public housing

Figure A4.1: Base survivor function for remaining in public housing (grouped by 5 fortnightly intervals)
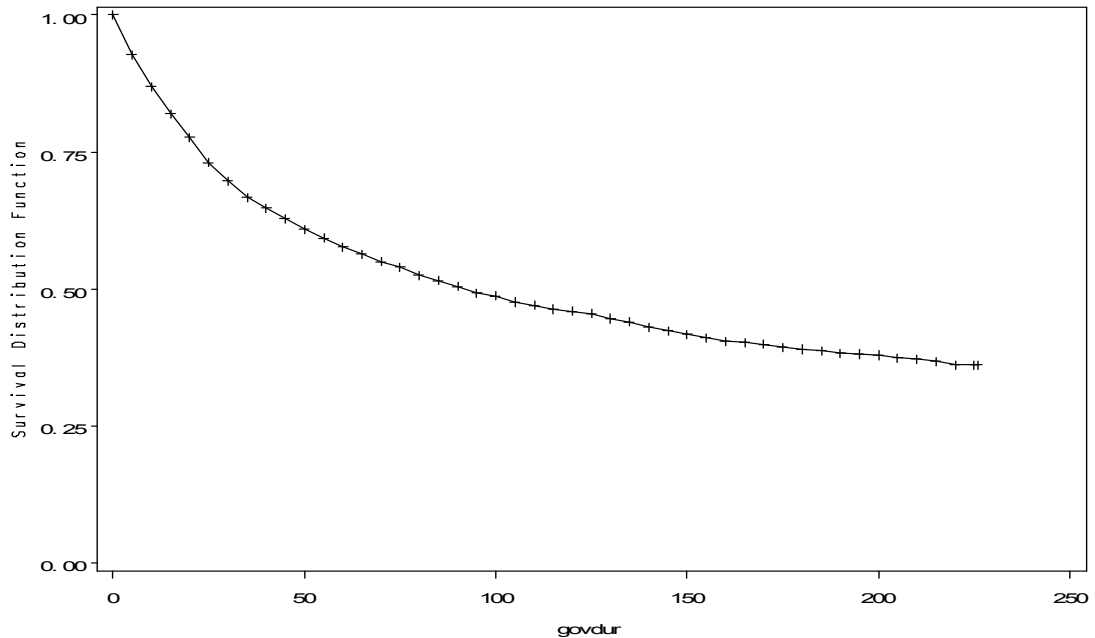
Figure A4.2: Base hazard function for exiting public ('government') housing (grouped by 5 fortnightly intervals)
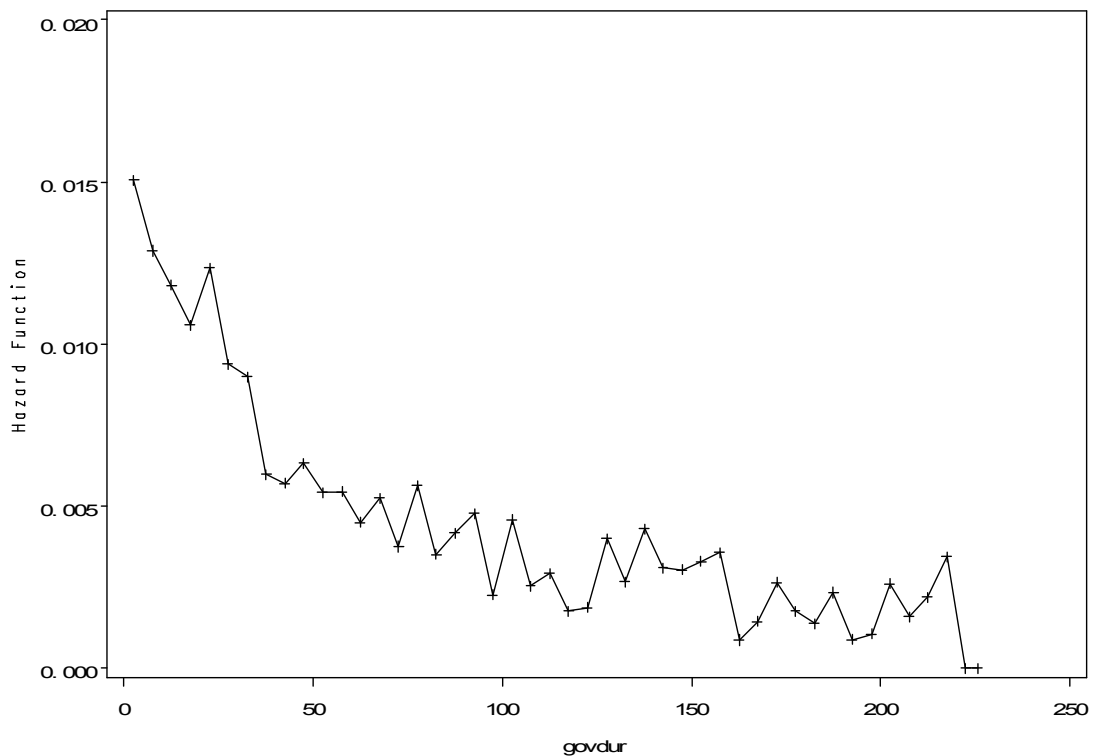
The base survivor and hazard functions presented above show us some basic information about how long ISRs are likely to remain in public housing, and when they are most likely to leave.

Survivor functions represent the proportion of the sample that has not experienced the event (in this case, an exit from public housing) by a given point in time. Consequently, survivor functions are constrained to decline over time, and vary between 1 and 0.

The hazard function is the probability of experiencing the event at any given time point, conditional on not having previously experienced the event. As with the survivor function it can vary between 0 and 1 over time, but can move both up and down over time.

It is important to remember that higher values of hazard imply a sharper decline in the survivor function, so higher hazard also implies shorter durations in public housing. Also, because individuals are progressively removed from consideration as they exit from public housing, standard errors tend to increase over time as the effective sample size declines.

Figure A4.3: Separate survivor functions for remaining in public housing by sex (grouped by 5 fortnightly intervals)
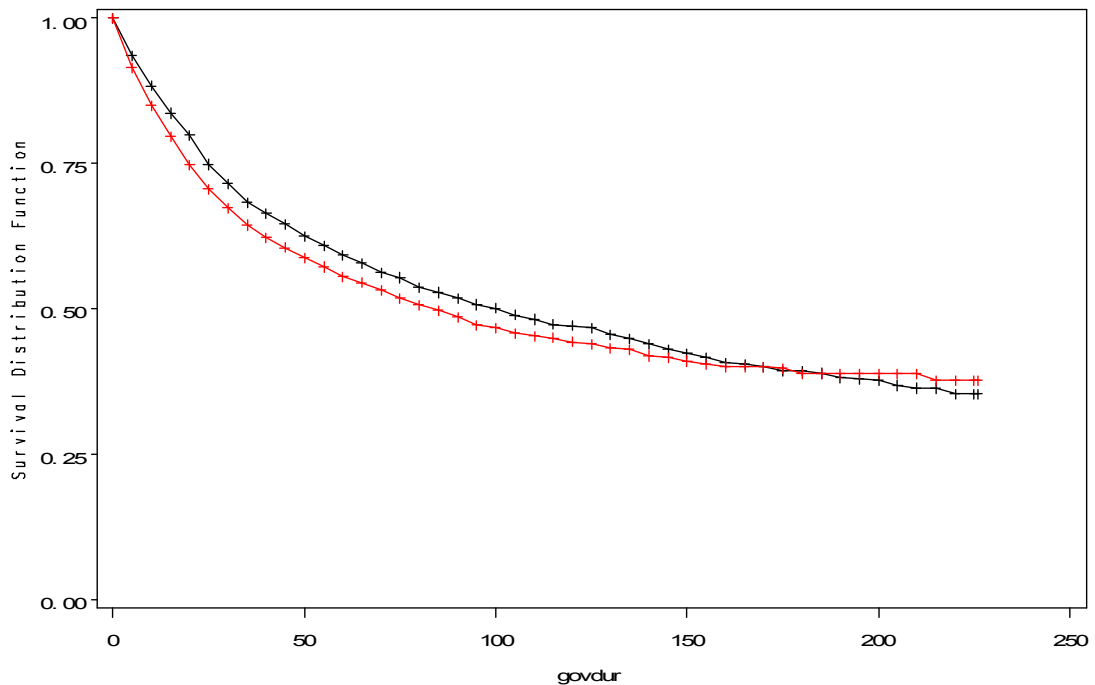
Figure A4.4: Separate hazard functions for exiting public housing by sex (grouped by 5 fortnightly intervals)
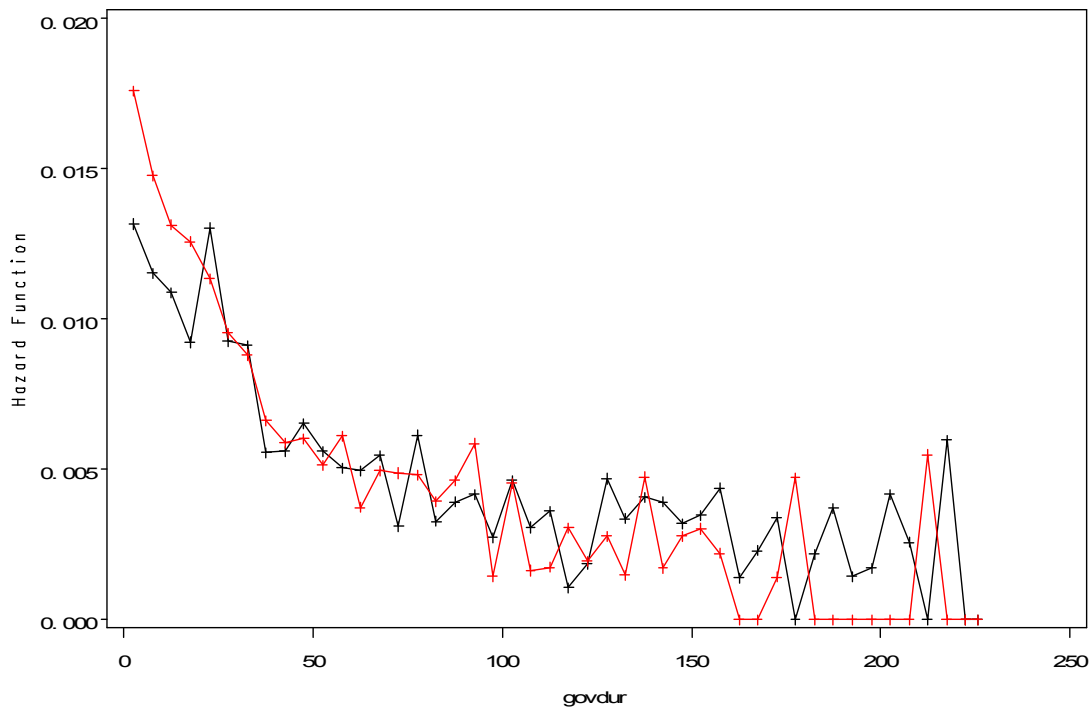
A final caution regarding the hazard function: if there is unmeasured heterogeneity, hazard will appear to decline over time even if there is no change in the hazard for any given individual. This is because persons with relatively higher chances of experiencing the event will be removed from the effective sample at a disproportionate rate, thereby lowering the general hazard. A hypothetical example might be if women have an (unchanging) 40 per cent chance of experiencing a given event and men have a 20% chance of experiencing the same event in any given week. If we start with 100 persons (50 female, 50 male), after the first week 70 will remain, a hazard of 0.3. This leaves 30 women and 40 men. In the second week, 40 per cent of the 30 women and 20 per cent of the 40 men experience the event (12 women and 8 men). 20 events from 70 people gives a 0.286 hazard, although the individuals have not become less likely to experience the event. While this phenomenon does not decrease the value of the hazard function as a descriptive tool, it does imply a degree of caution in interpretation.

As we can see, the overall survivor function declines sharply at first before levelling off. The median duration in public housing falls between 95 and 100 fortnights. Over the full span of the data, survival is 0.3613, which implies that after 8.7 years, 36 per cent of public housing tenants have not moved away from that tenure.

We see above survivor and hazard functions estimated separately by sex. The basic conclusion here is that there is very little difference. Men appear to exit at a disproportionate rate initially, but over 8.7 years are actually slightly less likely to exit from public housing. However, these differences appear too small to be of great significance.

The separate survivor functions for family type display considerably more variation, with childless couples least likely to exit from public housing over time. After 8.7 years, the survivor function is estimated at 0.56; this implies that 56 per cent of childless couples are still in public housing after this period of residence. Single persons are the

next longest stayers, with a median 'life time' (period of residence) in public housing between 125 and 130 fortnights. Sole parents and couples with children have median life times of 70 to 75 and 50 to 55 fortnights respectively.

While it seems counterintuitive that childless persons are less likely to leave public housing than those with children (we might normally suspect that being childless is an advantage in many ways), this is probably due to other confounding factors, particularly age and potentially also disability status. Older people particularly are less likely to have children. As such, some caution is recommended in interpreting these findings.

Turning now to age as a differentiating factor, we see that older persons (based on age at last observation) tend to stay longer in public housing. The graph of the hazard functions excludes the youngest (15-24) age group because at later stages small numbers make the hazard function very unstable, which stretches the Y axis of the graph.

Figure A4.5: Separate survivor functions for remaining in public housing by family type
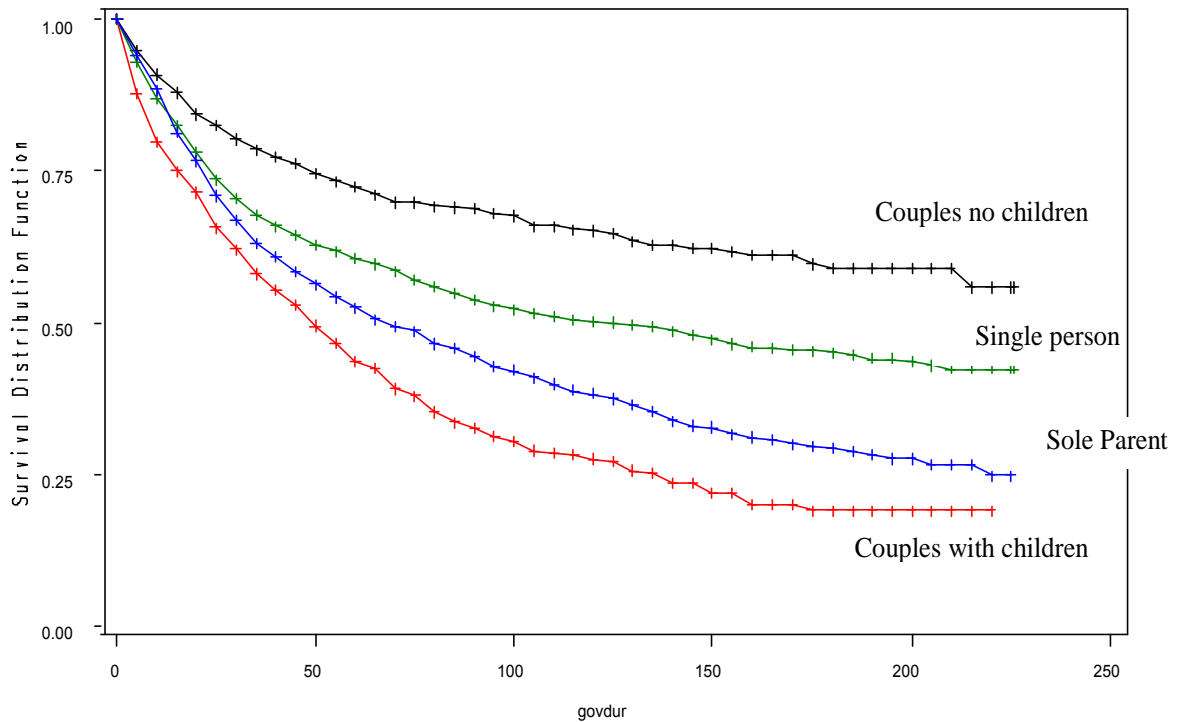
Figure A4.6: Separate hazard functions for exiting public housing by family type

STRATA: family_structure=ONC family_structure=OWC
family_structure=SIG family_structure=SPF
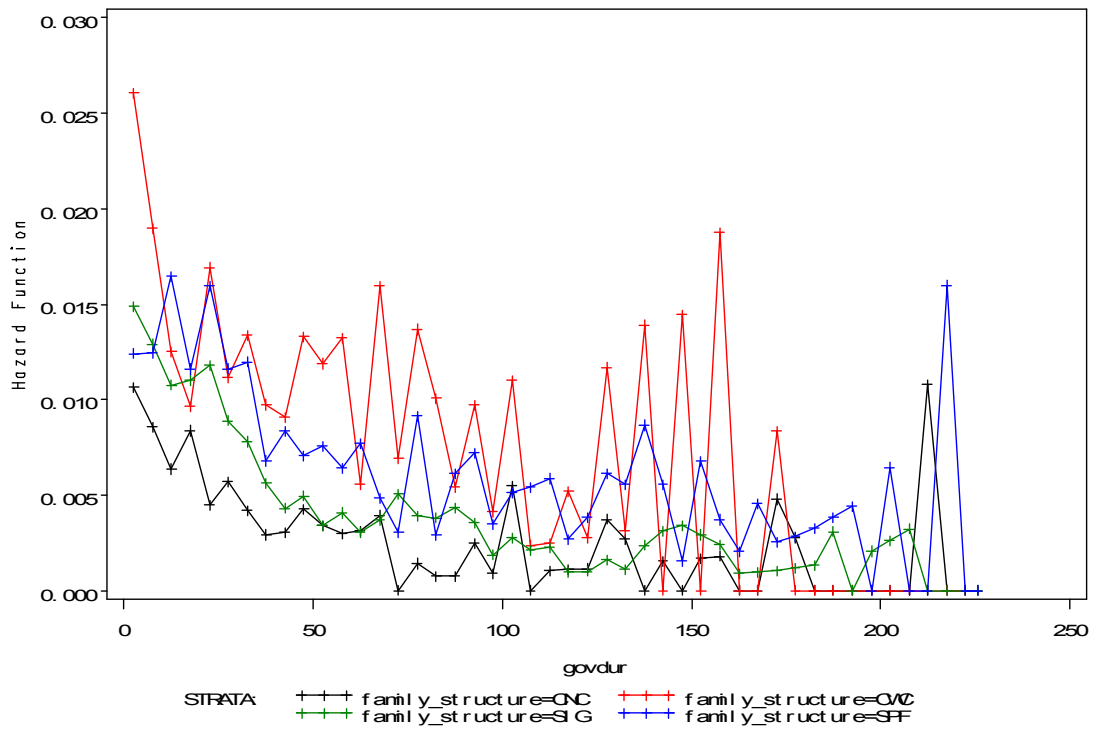
Figure A4.7: Separate survivor functions for remaining in public housing by age group
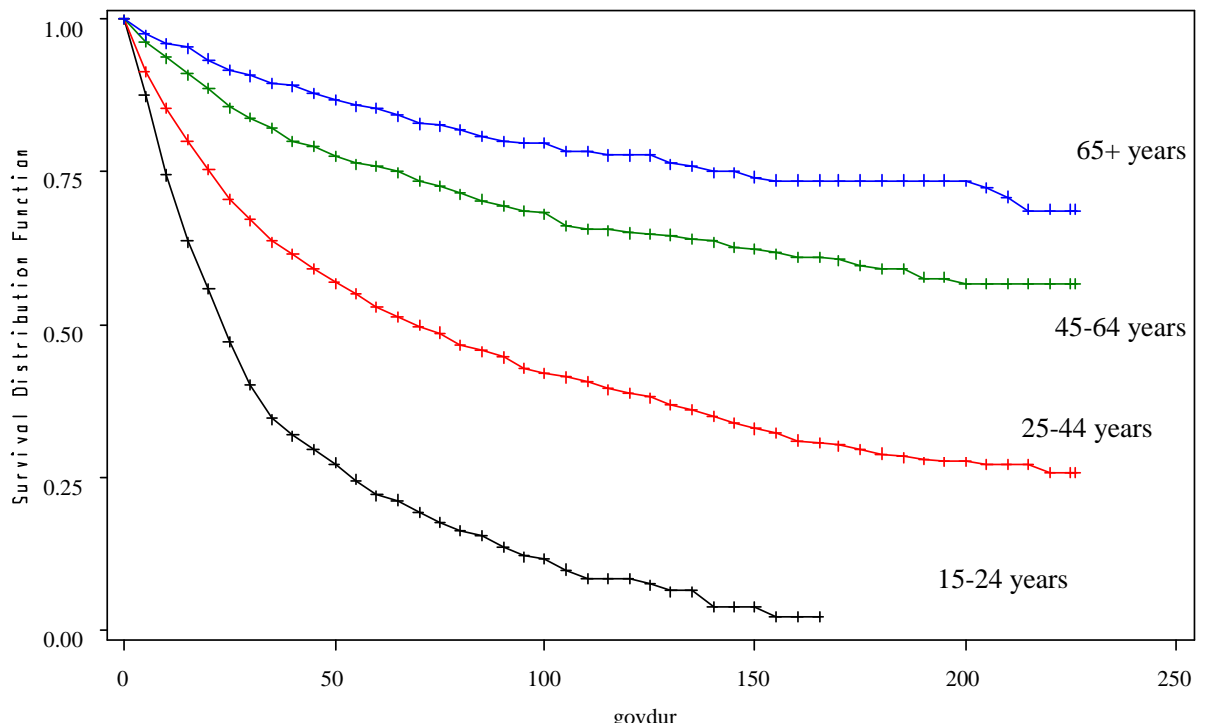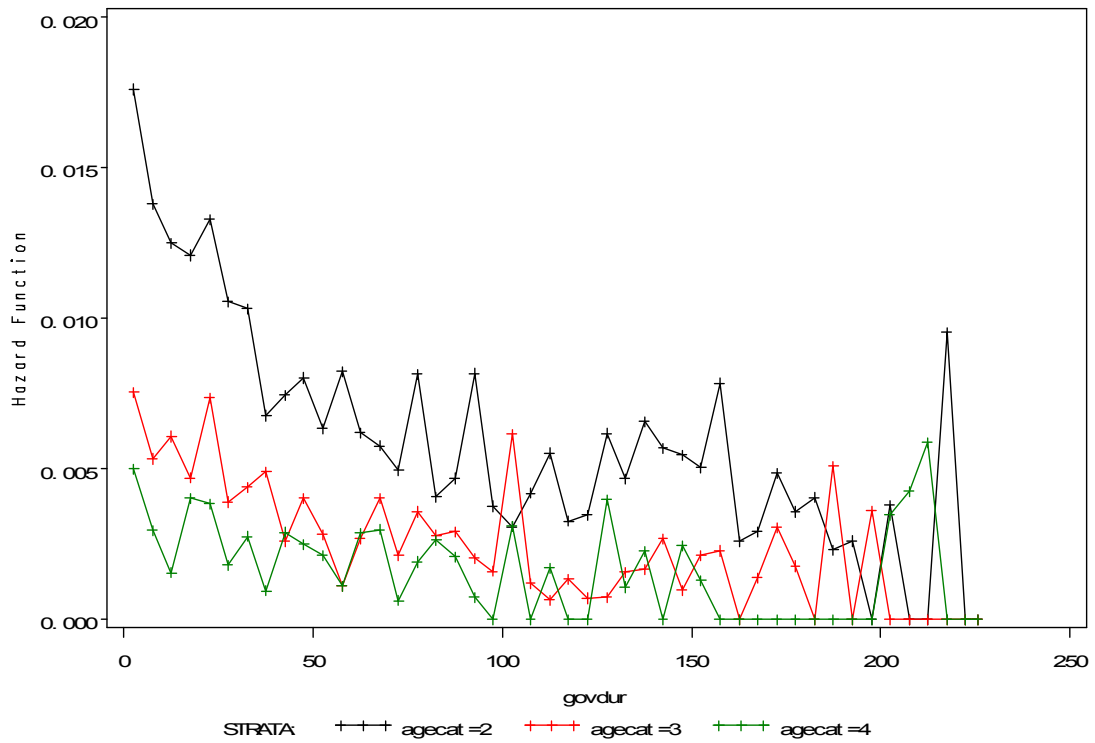

65+ years

45-64 years

25-44 years

15-24 years

Figure A4.8: Separate hazard functions for exiting public housing by age group (excluding youngest group)

We exclude the youngest groups' hazard function because late in the period it becomes very unstable due to small numbers, truncating the graph's Y axis.

Figure A4.9: Separate survivor functions for remaining in public housing by income support type (4 largest only)
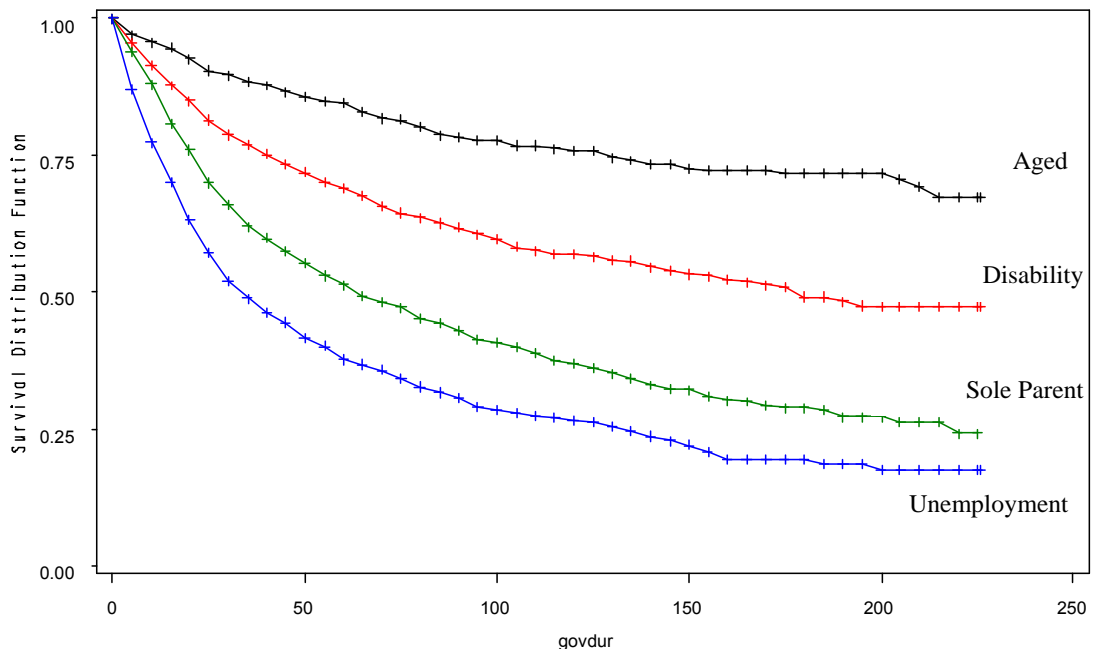
Figure A4.10: Separate hazard functions for exiting public housing by income support type (4 largest only)
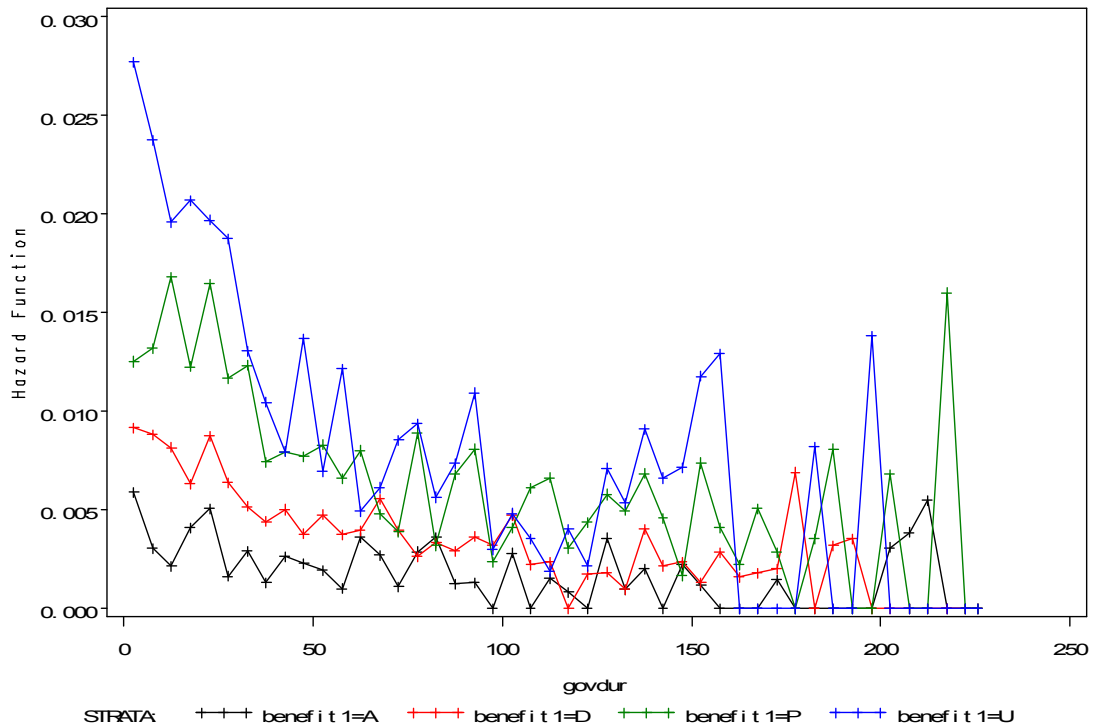
IS type also displays similarly large differences in the time spent in public housing. The graphs presented above only include the four largest IS categories in public housing for clarity. The full set are presented below.

Unsurprisingly, unemployment and parenting ISRs tend to have relatively shorter stays in public housing relative to disability and age pension recipients. Over the duration of the LDS, we only expect 33 per cent of age pension recipients to exit from public housing. Disability pension recipients have a median life time of 180 to 185 fortnights, sole parent income supports 65 to 70, and unemployment income supports 35 to 40 fortnights. As is apparent, this represents major differences in the length of stay between different IS types.

'Other' ISRs have a median life time of 175 to 180 fortnights, students 55 to 60, and partner allowance recipients 75 to 80.

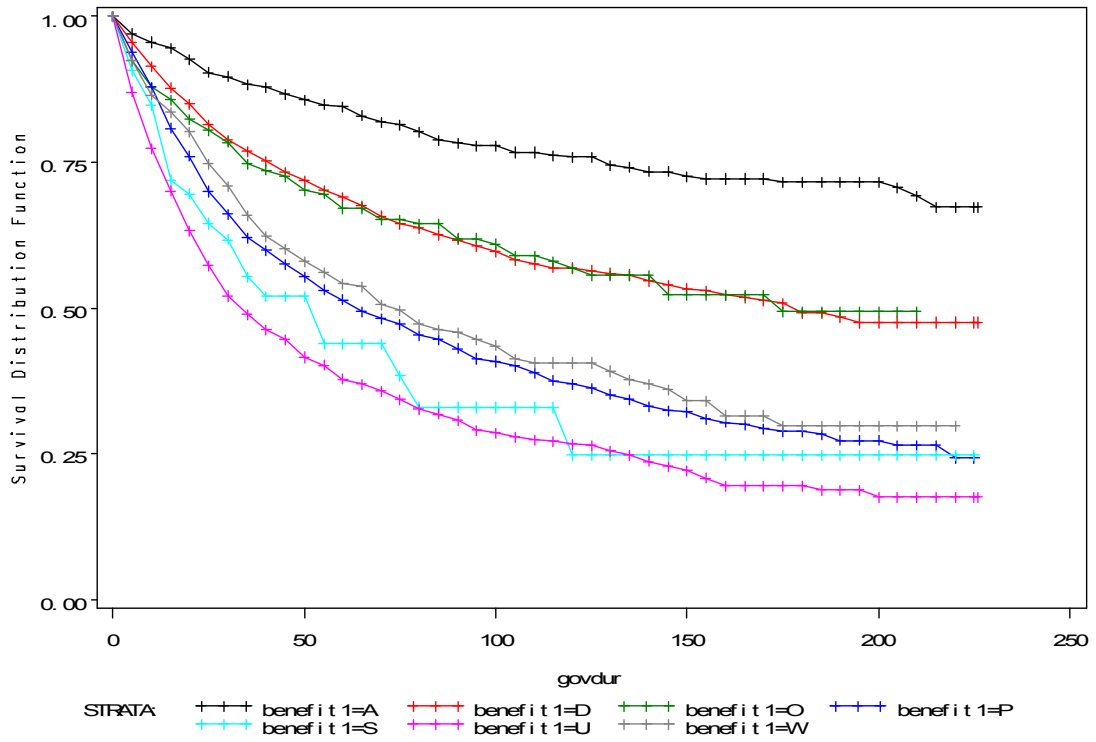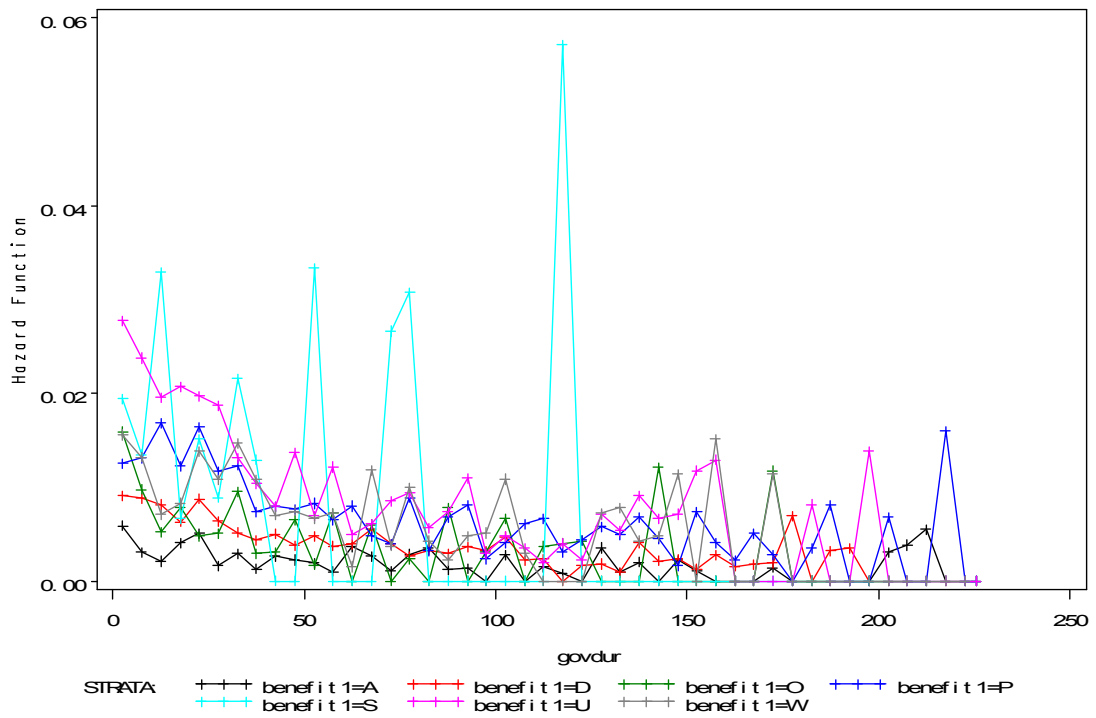**Figure A4.11: Separate survivor functions for remaining in public housing by income support type**

Figure A4.12: Separate hazard functions for exiting public housing by income support type

A note on censoring for the proportional hazard modelling

The analyses presented above are not based on all persons who were (depending on the particular analysis) on income supports/in public housing/not in public housing, which might be the commonsense assumption. This is because in many cases we do not observe the beginning of the relevant state; in statistical terms, these people are left censored. The most important implication of this is that we do not know the duration of that state, although there is also the issue that we are unable to know the values of time varying predictors prior to the start of observation. A further problem arises in that the models that we are using do not allow us to deal with situations where the event of interest (for example, an exit from income supports) occurs multiple times for the same individual.

Because of these problems, we are forced to adopt more strictly limited criteria for inclusion in the analysis. These are as follows. For the exit from income supports analyses, a person must start receiving income supports after the first date of observation for the LDS. This does not imply that they could not have received income supports prior to the LDS, simply that they were not receiving income supports on the first date of observation. For exit from public housing we must observe entry to public housing. The re-entering public housing analysis requires that an individual exit from public housing during the period of observation. In all cases we use only data from the first time an individual is eligible to experience the event up until the first time the event is observed, or the end of observation.

It is worth noting also at this point a minor limitation with the exiting/re-entering public housing analyses: because persons may be away from income supports and hence not observable, it is possible that they might experience the event during that period but return to the 'risk' state before we observe them again. The impact of this on our analysis is difficult to determine, although it might slightly inflate the rate of right censoring and median life times. However, given that public tenancies are generally quite stable and that most persons spend relatively little time away from income supports, this is likely to be at most a minor bias.

Appendix 5: Changes in relative distribution of is types 1995-2003

The figures show changes in the proportion of tenure and IS types in the LDS from 1995 to 2003. There is no significant change in tenure proportion. However, it is worthwhile noting that the proportions of aged care and purchaser slightly increased, while private renter and homeowner dropped. In 1998 there is a sharp increase of non-homeowner, but it seems that a large part of rent-free tenants shifted to this category (see Figures A51 and A5.2).

Considering changes in IS type, the proportion of unemployment IS decreased from 29.1 per cent in 1995 to 18.8 per cent in 2003, while that of disability increased from 10.3 per cent to 13.8 per cent for the same period. The 'student' category of income support appears in 1998, when the previous AUSTUDY (non-IS) was replaced by Youth Allowance (IS-based, and thus captured by the LDS) for students under 25 years, and 'Austudy payment' for students over 25 years.

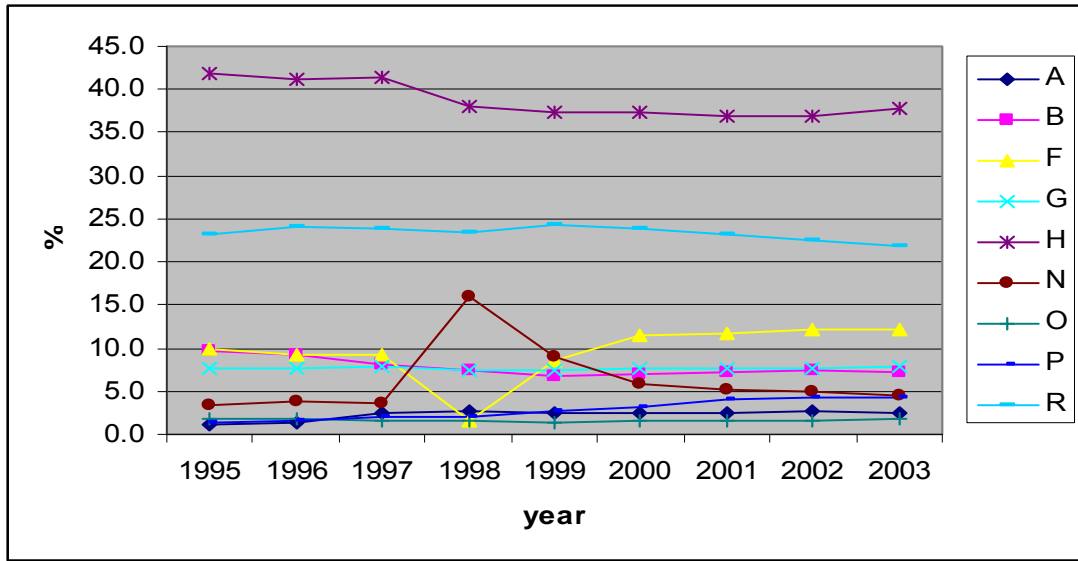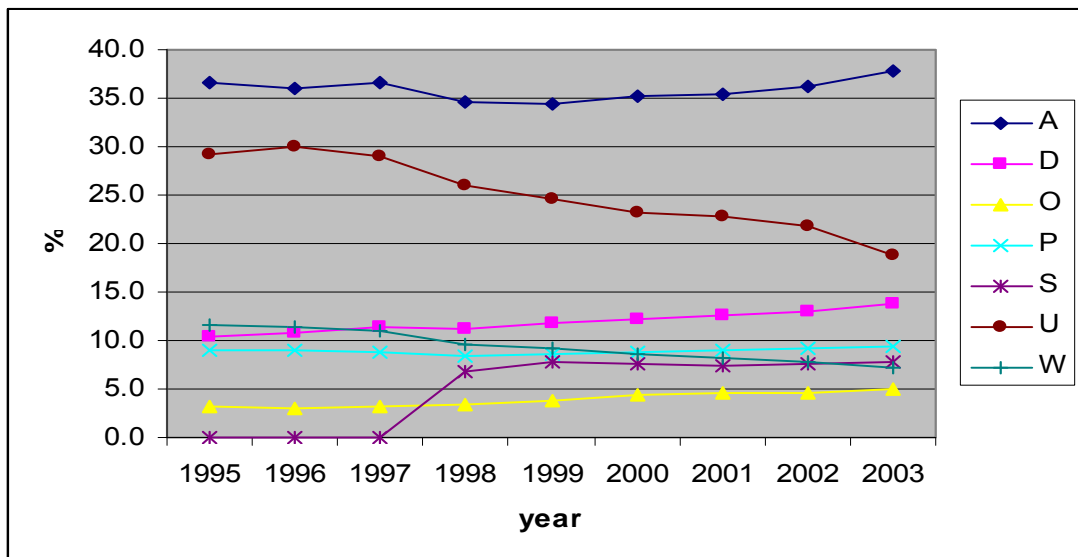**Figure A5.1: Proportion of tenure by individuals, 1995-2003**

Figure A5.2: Proportion of income support type by individuals, 1995-2003

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