The patterns and dynamics of homelessness

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Declaration

I declare that all work contained in this thesis is my own original work prepared and submitted for the Degree of Doctor of Philosophy.

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Abstract

This thesis aims to understand and analyse the multidimensional and dynamic character of housing and homelessness utilising survey and census data. Different types of homelessness are conceived as states that sit on a wider housing spectrum ranging from street homelessness to home ownership. Separately identifying these states is important for at least two reasons. Firstly, they are likely to be qualitatively different experiences and made up of populations of different size and composition. Secondly, different types of homelessness and housing deprivation are often experienced episodically, creating potentially important dynamics between them. Over the long run, these dynamics create housing trajectories or pathways. In this thesis, I seek to contribute to the large body of qualitative evidence on housing pathways with quantitative evidence drawn from a collection of cross-sectional, retrospective and longitudinal survey, census and administrative data. Demographic methods and tools including multistate analyses, spatial regression and microsimulation are utilised to quantify the prevalence, distribution and dynamics of housing and homelessness and reconstruct episodes and pathways. These have wide application and benefits including in terms of deriving improved estimates of homelessness prevalence and distribution and identifying and quantifying the impact of different factors on longer-run housing trajectories.

The thesis has seven chapters. This includes an introduction and conceptual framework in Chapters 1 and 2 respectively, followed by four analytical chapters and a conclusion. In Chapter 3, I describe and present the results of a microsimulation model to estimate the annual number of people who experience homelessness in Australia using a combination of data sources. In Chapter 4, the spatial patterns of different types of homelessness are analysed using data on Sydney, Australia from the Censuses of 2001, 2006 and 2011. In chapter 5, I analyse associations between housing, family and employment events and entries to different states of housing and homelessness. In Chapter 6, I present a multistate microsimulation model to reconstruct housing and homelessness trajectories and predict the longer run effects of different housing policy options. Chapters 4 and 6 have been published as journal articles. In Chapter 7, I conclude the thesis with a discussion of the conceptual and methodological contributions of this thesis, the key themes, important limitations and suggestions for future research.

Contents

1

Introduction

Homelessness is a prominent social issue, shaped in the public's mind by the perceived nature and extent of the problem and the myriad perspectives on its causes and solutions. In Australia, the quinquennial Census of Population and Housing is the preeminent source of information on its extent and distribution. At the 2016 Census, the Australian Bureau of Statistics (ABS 2018) counted 116 thousand people as homeless. In the time since its publication, this figure has been reported in numerous media and community advocacy reports. In so doing, it has become a key piece of information in framing the problem of homelessness within the public domain. There are though several caveats and qualifications around this figure that are routinely overlooked. These have a critical influence on the meaning, nature and extent of homelessness and its relation to poverty, disadvantage and the functioning of housing and labour markets and the social welfare system.

Defining and counting homelessness

The first caveat ought to be the most obvious – what exactly is meant by 'homeless'? The definition developed by the ABS (2012a) is an explicitly social and cultural construct, the product of a decades long interdisciplinary debate that while explicitly international in character is also distinctly Australian. The result is a broad conceptual definition encompassing not only situations where individuals are living without a physical roof over their head but also situations where individuals lack adequate and secure housing that also provides 'space for social relations'. Homelessness as defined, therefore, goes beyond its visible face on the streets and

in shelters, cars, parks and abandoned buildings and into private dwellings, reaching what has been termed the 'housed' homeless. This includes people staying in temporary and sub-market dwellings such as motel rooms, boarding houses and with friends and family, as well as those staying in crowded dwellings. These forms are more common than 'literal homelessness' such that of the total homeless population on Census night 2016, only a small proportion (7 per cent) were 'sleeping rough' with either improvised or no shelter (ABS 2018). The most common form of homelessness was in fact people living in 'severely' crowded dwellings (44 per cent of total homelessness). Thus, the definition creates a very distinct composition of homelessness that may not necessarily align with public perceptions.

A second caveat, though perhaps less obvious, is arguably just as important – how is homelessness counted? There is no question on the Census that asks whether a person is homeless, nor questions as to whether their housing is adequate, secure or provides social space. Rather, a strategy is employed to indirectly infer homelessness within six operational categories based on Census questions on usual residence, dwelling type and even the employment, income and religion of other dwelling residents (ABS 2012b). Post hoc rules and judgements determine who is 'on balance' homeless within each of these categories and who is not – though the subjectivity inherent in the concept of space for social relations implies no such black and white determination is possible. The resulting count and operationalisation of homelessness bears an imperfect resemblance to its conceptual definition. People are counted as homeless in severely crowded dwellings, for instance, if their dwelling requires four or more bedrooms to accommodate all usual residents, an arbitrary cut-off used to determine whether an individual has space for social relations or not and one that has a very large impact on the total homelessness count (ABS 2018). Others that might conceivably lack such space on account of living in physically deficient dwellings or housing that restricts social relations by way of violence, location or any number of other factors are unidentified in the Census and left out of the homelessness count (Chamberlain 2014).

Further, no post-enumeration is performed to validate or adjust the counts. Administrative data are used to identify people staying in publicly funded homeless accommodation (and some boarding houses), though no such cross validation is performed or available for the other categories of homelessness. This is despite the well-documented difficulties in enumerating an often hidden population and the long history of attempts to deal with those difficulties (Darcy and Jones 1975; Hopper 1992; Devine and Wright 1992; Hopper et al. 2008; Coumans et al. 2017). While these establish the challenges in enumerating street homelessness, a potentially larger though less remarked difficulty is in counting those staying temporarily with other households – commonly known as 'couch surfing' or 'doubling up'. Homelessness counts in this category are derived from the Census from those living in private dwellings who state they have no usual residence. Evidence suggests that this may understate the prevalence of this living arrangement to a large degree, perhaps on account of a tendency of many individuals to list their previous or current address as their usual address (Chamberlain 1999; Chamberlain and Mackenzie 2003, 2008). As a consequence, the homelessness count carries a potentially large but unquantified level of uncertainty.

Dynamics of housing and homelessness

A third caveat relates to the Census count as one representing homelessness on a single night. Such point-in-time counts have important uses particularly in estimating the demand for and planning the supply of homelessness services (Chamberlain 1999). However, they also understate the extent and prevalence of the problem. As research has demonstrated, many more people experience homelessness over a year, five years, ten years and a lifetime (Culhane et al. 1994; Link et al. 1994, 1995; Chamberlain and Johnson 2015). This characteristic derives from its episodic nature. While a persistent experience for some individuals and families, homelessness is a one-off or recurring phenomenon for many that may last a matter of days, weeks or months (Kuhn and Culhane 1998; Hudson and Vissing 2010; Chamberlain and Johnson 2013; Donley et al. 2017). Point-in-time counts miss those who exit homelessness prior to the count as well as those who commence subsequent

episodes. Consequently, homelessness is experienced by more people than are counted on any given night.

The caveats described above are important because they shape how society considers homelessness. A count taken at a single point in time and reported as the number of homeless people implicitly reinforces the idea of homelessness as a permanent or static characteristic of a certain class of the population. Proper consideration of the diversity and episodic nature of homeless experiences, by contrast, recasts homelessness as a loosely and heterogeneously defined set of housing conditions and characteristics experienced by people at varying frequencies, durations and intensities. Homelessness, thus, becomes a wider problem affecting a larger cross-section of the population than point-in-time counts suggest. Greater variability though exists in its depth or severity from person to person and its association with personal characteristics and histories. The episodic and sometimes recurrent and chronic character of homelessness further suggests variability within as well as across individuals over time and from episode to episode, giving rise to the concept of housing 'pathways' (Clapham 2003). This recognises that individuals and families may pass through various forms of housing and homelessness before arriving at a destination state – itself part of the pathway to any future state. The causes and contributing factors to movements along these pathways are likely to be a product of a sometimes complex and sometimes straightforward interaction between personal and interpersonal circumstances and histories and broader structural trends in housing and labour markets and social support systems (Fitzpatrick 2005).

Research is increasingly cognisant of these dynamics, though quantitative data and evidence is somewhat lacking and certainly diffuse. The difficulties in identifying and tracking a relatively small and non-domiciled population prevents the analysis of homelessness in general household panel studies. In recent decades, research has instead relied on cross-sectional household surveys that ask about past experiences of homelessness (Bramley and Fitzpatrick 2018; Chamberlain and Johnson 2015; Greenberg and Rosenheck

2010; Link et al. 1994, 1995; Tompsett et al. 2006; Toro et al. 2007; Tsai 2017) and administrative data from homelessness service providers (Chamberlain and Johnson 2013; Culhane et al. 1994, 1996, 2007, 2013; Culhane and Kuhn 1998; Kuhn and Culhane 1998; Metraux and Culhane 1999; Metraux et al. 2001, 2011). The former though are retrospective in nature, do not capture current experiences of homelessness and often suffer from small sample sizes of previously homeless populations. Administrative data, meanwhile, only captures homelessness where individuals come into contact with the service system. Targeted panel studies of disadvantaged and homeless populations are becoming more common and potentially provide better coverage and sample sizes of the homeless population but are not representative of the general population (Cobb-Clark et al. 2016; Curtis et al. 2013; Johnson et al. 2019; Piliavin et al. 1993; Phinney et al. 2007). While each of these shed light on a particular aspect of homelessness, research has yet to investigate how the combination of datasets may provide a more complete picture.

Research aims and objectives

In this study, I aim to provide new information on the multidimensional and dynamic character of housing and homelessness. This character is conceptualised by drawing on existing theoretical frameworks. The concept of a housing and homelessness spectrum (Watson 1984) is borrowed to consider different types of homelessness and housing deprivation. The spectrum is explicitly accommodation-based, recognising that there are different forms – including on the streets, in homeless shelters, hostels, boarding houses and temporarily living ‘doubled up’ or ‘couch surfing’ with family or friends – that vary in their qualitative and lived experience, prevalence, distribution and impacts on individuals and their interpersonal and institutional support systems. There are also potentially important interactions and dynamics between different forms of accommodation. A housing pathways (Clapham 2003) perspective is adopted to capture these dynamics, in which individuals and families make housing decisions, including in relation to accommodation forms, both proactively and in response to involuntary moves and crises. These decisions are shaped by personal histories and

constrained by access to personal, interpersonal, economic and institutional resources. Residential moves, whether voluntary or involuntary, constitute housing transitions which over time determine long-run housing trajectories or pathways.

I seek to draw out and explain the implications and consequences of the above perspective, particularly in terms of the extent, nature, distribution and drivers of homelessness and housing deprivation. To this end, I set out to address the following research questions:

1. What is the prevalence, duration and distribution of different forms of homelessness and housing deprivation?
2. What are the housing, family and economic drivers of homelessness and housing deprivation?
3. What are the pathways into, through and out of homelessness and the role of housing tenure and support?

These questions are deliberately broad, applying to the thesis as a whole. Specific research questions are posed in the analytical chapters. The questions are addressed using quantitative data from multiple sources. This includes Census point-in-time counts, retrospective household survey data, targeted longitudinal survey data and administrative data from homelessness services. As described above, each of these have strengths and limitations, revealing information on a particular aspect of homelessness. Point-in-time counts, for instance, provide the best information on the composition and distribution of homelessness on given nights, while retrospective and longitudinal data provide important information on homelessness dynamics, including incidence, durations and exits. Thus, datasets are selected for analysis in this thesis based on their fitness-for-purpose in responding to the specific objectives and research questions of each of the analytical chapters. Collectively, the analyses provide a more comprehensive picture of the prevalence, distribution and dynamics of homelessness than is available through an analysis of a single dataset.

Through this research, I seek to extend existing knowledge in several ways. Operationalisation of a housing and homelessness spectrum is relatively new in quantitative research. Existing estimates of the prevalence of homelessness largely rely on point-in-time counts such as the Census, while analyses of spatial patterns and longitudinal dynamics often do not distinguish between different forms of homelessness and deprivation. In considering the multidimensional and dynamic nature of homelessness, my estimates and analyses provide improved quantitative understanding of the scale and nature of homelessness as a social problem, including in its extent, nature and distribution in geographic space and across sections of society including households and government. Analyses of transitions and pathways along the housing and homelessness spectrum reveals valuable information on the processes that lead to homeless entries and the intersecting factors that shape them, including housing and family crises and interpersonal and institutional support systems. Novel estimates of accommodation-specific incidence rates and duration times provide useful measures of the burden of homelessness and its distribution across individuals, private households and government. Important implications for policy are revealed through the relative level and effectiveness of government and private housing assistance.

Thesis structure

This thesis is structured as a manuscript comprising an introduction (Chapter 1), conceptual framework (Chapter 2), four analytical chapters (Chapters 3-6) and a conclusion (Chapter 7). The analytical chapters are written as standalone papers, each with their own research questions, data and methods and placed within distinct – though overlapping – bodies of existing literature. Two of these chapters have been published as journal articles (O'Donnell 2018, 2019) and two are being prepared for submission. Chapters 2 and 7, in addition to this chapter, seek to draw together the analytical chapters into a cohesive and complementary body of work, setting out the common objectives, conceptual and operational frameworks, findings and contributions. In the following, I provide a brief description of each chapter.

A conceptual framework for analysing housing and homelessness dynamics is presented in Chapter 2. The chapter begins with a discussion of the most common conceptual and operational definitions of homelessness in Australia and their genesis in a long running interdisciplinary and international debate on the meaning of 'home' and 'homelessness'. A conceptual model is presented whereby housing and homelessness is broken down into a set of accommodation types and states that are conceived to lie along a spectrum from secure home ownership at one end to living on the street at the other. Individuals may move between different states over time either on their own or as members of family or non-family household units. This is followed by a discussion of the data sources available in Australia to measure different aspects of these dynamics. The chapter concludes by presenting and describing the set of analytical tools, including spatial and multistate analyses and microsimulation that will be used in this thesis.

An approach to estimating the annual number of people who experience homelessness is developed in Chapter 3. Regression modelling is applied to retrospective household data to estimate the timing and duration of past homelessness episodes reported by respondents to the 2014 *General Social Surveys* (ABS 2015). Resulting estimates are used to simulate episodes for an entire population including those who were homeless at the time of the survey. Estimates are derived by age and sex and for different forms of homelessness. The model also predicts the number of people who seek assistance from homelessness services. This is compared to the actual number recorded in administrative data to provide some assessment of its validity.

Spatial pattern of homelessness in Sydney, Australia are investigated in Chapter 4[1]. Rates of total homelessness and in its different forms are calculated for sub-city areas using point-in-time counts from the 2001, 2006 and 2011 Censuses. It is hypothesised that the relatively broad definition of homelessness used – the ABS (2012a) statistical definition – has

[1] This chapter was published as O'Donnell (2018).

created large clusters of homelessness in the outer suburbs of Sydney, largely driven by the inclusion of 'severe crowding' in the definition. As the largest category of homelessness, growth in severe crowding is likely to have a large bearing on changes in the spatial concentration of homelessness over time.

A conceptual model for analysing the processes that lead to different forms of homelessness is set out in Chapter 5. Among vulnerable populations, life shocks such as relationship breakdown, job loss, violence and evictions are hypothesised to act as proximal triggers for housing transitions. In the event of housing loss, access to personal, interpersonal and institutional resources and supports are hypothesised to shape the relative risks of transitioning to a new episode along the housing and homelessness spectrum. The model is tested with a multilevel, multistate model using the *Journeys Home* longitudinal study (Scutella et al. 2017; Wooden et al. 2012).

The protective effects of private and public forms of housing tenure and support against homelessness are analysed in Chapter 6[2]. A multilevel, multistate survival model is proposed and applied to a longitudinal sample of highly disadvantaged individuals to estimate the duration of housing episodes spent in public and not-for-profit community housing, subsidised and unsubsidised private rental and staying with family and friends, along with the incidence of exits to different housing and homelessness types. It is hypothesised that the affordability and security of tenure generally provided in public, and to a lesser extent community, housing offers greater protection from housing loss and homelessness than the private rental market or the housing of friends and family. Housing support and tenure is thus anticipated to have important protective effects among disadvantaged and vulnerable populations. This is important in the context of declining investment in public housing around the world and the likely flow-on effects on the incidence and recurrence of homelessness.

[2] This chapter was published as O'Donnell, J. (2019).

The findings of chapters 3-6 are drawn together in a concluding chapter (Chapter 7). This explains the key contributions of the research, the data and methodological innovations and the important themes that have emerged and their implications for research and policy. The chapter and thesis ends with a discussion of some of the limitations of this research and suggestions for future work in this field. One of the important suggestions is a call for more and better integrated data, particularly greater availability and integration of administrative data, to continue to improve our understanding of the extent and dynamics of homelessness.

2

A conceptual framework for analysing housing and homelessness

Abstract

In this chapter, I describe the broad conceptual framework that ties together this thesis. Homelessness is conceived as one or even several states that sit on a wider spectrum ranging from street homelessness to secure housing. Separately identifying these states is important for at least two reasons. Firstly, they are likely to be qualitatively different experiences and made up of populations of different sizes and compositions. Secondly, different types of homelessness and housing deprivation are often experienced episodically, creating potentially important dynamics between them. Over the long run, these dynamics create housing trajectories or pathways. Various data may be used to study these pathways, including qualitative, cross-sectional, retrospective and longitudinal survey, census and administrative data. A methodological toolkit is developed and adopted to quantify the prevalence, distribution and dynamics of housing and homelessness. This includes spatial regression, multistate demography and microsimulation. These have wide application, outputs and benefits including in terms of deriving improved estimates of homelessness prevalence and distribution, identifying and quantifying the impact of different factors on longer-run housing trajectories.

Introduction

Homelessness has long been understood to be one of the most severe consequences of extreme poverty (Rossi 1989; Wallace 1965). However, although invariably coinciding with homelessness, poverty, at least as measured at the household level, is neither a necessary nor sufficient explanation for homelessness. Rather, given the prominence of family breakdown, domestic violence, mental illness, substance use issues, social detachment and deficiencies in the housing and labour markets in explanations of homelessness, the results can be thought to be the product of complex and dynamic interactions between personal, interpersonal and societal factors over time and geographic space (Clapham 2003; Fitzpatrick 2005). Homelessness therefore is not a static condition, but a state or perhaps set of states that changes, evolves and recurs with these interactions. Homelessness ought to be measured and analysed within this dynamic, recognising that individuals and families experience homelessness in different frequencies, durations and intensities as they move in and out of various states of housing and homelessness. Data and research increasingly recognise this dynamic, though quantitative research is yet to consolidate this information into a broader, societal-level understanding of housing and homelessness processes.

This chapter proposes a conceptual framework for analysing and understanding the prevalence, distribution and dynamics of housing and homelessness among vulnerable populations. This work is guided by the framework for producing official population statistics provided by Raymer et al. (2015) and is summarised in Figure 2.1. The framework is developed in this chapter by describing critical aspects and their origins in the existing literature, including the societal context in which homelessness is researched, how it is defined and measured, its position along a spectrum of housing and accommodation types and its dynamic characteristic through time. Existing data sources to operationalise this framework and the methods and techniques utilised are also described. Aspects of this framework will be operationalised in the analytical chapters of this thesis (chapters 3-6).

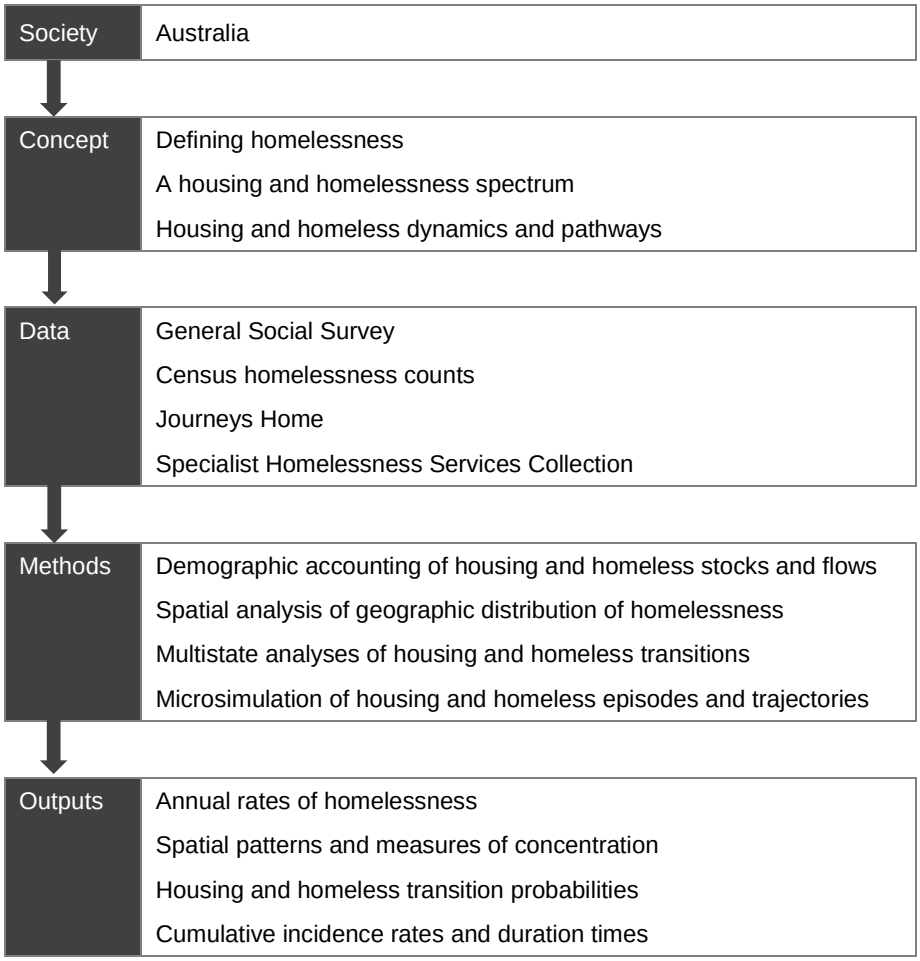


Figure 2.1 A framework for analysing housing and homelessness

It is envisaged that the framework will deliver benefits for research and policy. Importantly, it seeks to quantitatively model homelessness in a way that is closer to lived experiences of homelessness and the actual prevalence of homelessness across both time and space. It is argued that that this will improve understanding of the prevalence and dynamic of homelessness within broader socioeconomic events and phenomena such as poverty, financial stress, family breakdown and macro levels interactions between the housing and labour markets. It also has the potential to provide a better understanding of the relationship between homelessness and demand for homeless services and as a result, improved projections of this demand.

Societal context

The proposed framework is designed primarily using homelessness definitions and data from Australia. This is important to acknowledge at the outset as homelessness tends to be a socially and culturally defined construct shaped by national and sub-national level research, policy, bureaucracy, politics, community, ideology and economics, as well as international norms and influences. This became explicitly evident in Australia with the elaboration and widespread adoption of the 'cultural' definition of homelessness in the early 1990s (Chamberlain and Mackenzie 1992). Under the cultural definition, individuals experience homelessness where their housing situations fall below a *minimum community expectation* for housing. Homelessness under this definition is therefore defined by the society in which homelessness occurs. In 2012, the Australian Bureau of Statistics (ABS 2012a) developed a conceptual definition it calls the 'statistical' definition to replace the cultural definition in ABS homelessness data. This definition is conceptually more in line with European and New Zealand definitions of homelessness though operationally retains the same architecture as the cultural definition with some refinements and additions in the categorisation of homelessness. As a consequence, how homelessness is defined in Australia can be seen to be the product of specific historical and intellectual developments that, while influenced by international developments, are unique to Australia.

Homelessness as a socially and culturally defined construct has important implications for how homelessness, its causes and consequences are defined, measured and addressed conceptually and operationally. Homelessness as defined by community expectations rather than literal 'rooflessness' widens the scope of homelessness in Australia to include housing situations in which dwellings are considered inadequate whether in terms of safety, security or amenity. People living in such situations are often referred to as the 'housed' homeless or the 'hidden' homeless as the physical dwelling in which they reside disguises their homelessness. Including this group in homelessness definitions has at least four important effects. Firstly, it increases the demographic diversity of the population experiencing

homelessness as the 'housed' homeless typically comprises more women, young adults and children than the homeless population living on the streets which is traditionally dominated by middle and older aged men (ABS 2018). Secondly, the apparent nature of homelessness becomes more episodic and dynamic as the housed homeless tend to move between homelessness and stable housing more quickly and frequently. Thirdly, efforts to count the homeless are complicated (even further) because of the greater temporal variation in the homelessness experiences of the 'housed' homeless and difficulties in distinguishing between the housing situations of the 'housed' homeless and the securely housed, requiring specialised and diverse data collection instruments. Fourthly, the causes and consequences of homelessness are likely to be different between the 'housed' homeless and those living on the streets, making homelessness a more elusive phenomenon to understand and prevent. Thus, the socio-cultural meaning applied to homelessness shapes its perceived character and dynamic and how it is measured and addressed.

Defining homelessness

In this thesis, I adopt definitions of homelessness that are commonly used in Australian data. While definitions vary widely within and across time and national borders, existing national-level homelessness data in Australia are generally produced using one of two definitions – the 'cultural' definition (Chamberlain and Mackenzie 1992) and the 'statistical' definition (ABS 2012a). Conceptualisations of these definitions are described in Figure 2.2.

The cultural and statistical definitions have their roots in a long running debate over the meaning of homelessness. Australian conceptions and definitions of homelessness were heavily influenced by research and intellectual movements in the United States, beginning with research in the 1960s and 1970s. This research casts homelessness as a condition affecting extremely poor and disengaged middle and older aged men geographically concentrated in run down areas known as 'skid row' districts in the inner urban areas of major cities in the United States (Bahr 1967, 1968; Bogue 1963; Wallace 1965). These studies provided the basis for concepts of homelessness applied in Australian research in Melbourne

(Jordan 1965), Sydney (de Hoog 1972) and Brisbane (Ward 1977). Jordan (1965) and Ward (1977) reported that concentrated skid row districts existed not as much in a geographic sense in Australia as in the US, but certainly comprised of the same sociodemographic group – poor, disengaged middle and older aged men – living in situations that fitted the authors' concept of homelessness. Following the lead of US researchers, homelessness in these studies did not necessarily imply literal 'rooflessness', as most of their subjects moved between shelters, boarding houses, cheap hotels and the like. Rather, for authors like Jordan (1965), homelessness was defined by the social and personal characteristics of the individual, such as alienation from general society, dependence on public and private welfare for material support (particularly on what were known as 'skid row facilities'), itineracy and inability to create and maintain interpersonal relations.

Cultural definition (Chamberlain and Mackenzie 1992)	Homelessness occurs where people live in housing that falls below a minimum community standard. In Australia, the minimum community standard is for an independent person (or couple) to have "at least a room to sleep in, a room to live in, kitchen and bathroom facilities of their own and an element of security of tenure – because that is the minimum accommodation that most people achieve who rent in the private rental market" p.290

Statistical definition (ABS 2012a)	"When a person does not have suitable accommodation alternative they are considered homeless if their current living arrangement: - is in a dwelling that is inadequate; or - has no tenure, or if their initial tenure is short and not extendable; or - does not allow them to have control of, and access to space for social relations." p.7

Figure 2.2 'Cultural' and 'Statistical' definitions of homelessness in Australia

The skid row conception of homelessness was challenged by the growth in the extent and complexity of homelessness. Beginning in the 1970s and through most of 1980s, homelessness in the US reportedly became more prevalent and demographically diverse,

affecting larger numbers of women, young people and ethnic minorities (Burt 1992; Rossi 1989). At the same time, changes in the inner cities of many US cities through gentrification and deliberate policies to disperse homelessness led to the closure and relocation of business and organisations serving the populations of the various skid rows (Rossi 1989). The large scale closure of boarding houses or single room occupancy hotels pushed large numbers onto the street, increasing their public visibility and making homelessness more synonymous with literal 'rooflessness' than had been the case in previous decades. The response from many of the major studies of the time including the US Department of Housing and Urban Development's 1984 Homeless Study (Elliot and Krivo 1991), Rossi (1989), the US Census Bureau's 1990 S-night count (Barrett et al. 1992) and Burt (1992) was to adopt a narrow definition of homelessness focused on those who were either staying in homeless shelters or living on the street. For authors like Rossi (1989), people without their own dwellings and living in a range of other temporary situations shared many of the same characteristics as the homeless, most notably a high prevalence of extreme poverty, but were nevertheless 'precariously housed' rather than 'homeless'. It was also argued that people on the streets and in shelters were highly visible and easier to count than people 'hidden' in a range of different living situations, making this narrow definition of homelessness a measurable construct. The influence of these perspectives is evident in the continued use of this definition in the US to this day.

A counterpoint to relatively narrow definitions arose from the concept of home as a personal and ideological construct as well as a physical dwelling. In this conception, home exists for the individual as more than just a physical dwelling – it also exists as a source of physical and emotional identity, security and wellbeing (Gurney 1997; Sixsmith 1986; Somerville 1992; Watson 1984). Somerville (1992), for example, offers a multidimensional perspective on the meaning of home as a physical structure providing protection, physical warmth, emotional security, power to control privacy, individual identity, a place to sleep and a personal paradise. Homelessness exists where a dwelling is lacking on one or more of the

first six of these seven dimensions. Thus, having a secure house is not sufficient protection from homelessness, giving rise to the possibility of housed-homelessness. Feminist authors pointed out the gender implications of this, as family and household power imbalances may render individuals homeless even where others in the household are not (Somerville 1992; Watson 1984). Watson (1984) argued that given the traditional domestic division of labour, women and children are most at risk of housed-homelessness. In Australia, these ideas proved influential. Notably, in 1985 the National Youth Coalition for Housing adopted a subjective definition of homelessness that referred to "absence of secure, satisfactory shelter as perceived by the young person" (Chamberlain and Mackenzie 1992). Definitions that incorporated personal perceptions however raised a number of conceptual and operational problems, not the least of which being how to produce valid, robust, comparable and measurable estimates of homelessness (Watson 1984).

Chamberlain and Mackenzie's (1992) critique of subjective definitions on these grounds and their work in homelessness services in Melbourne formed the bases of their 'cultural' definition of homelessness. The cultural definition was explicitly designed as an operationally measurable construct that prevails upon individuals and families living in housing that falls below a certain standard defined by Australian community expectations. It can be characterised therefore as a definition focused on the conventionally defined adequacy of housing as opposed to personal perceptions of 'home' or the characteristics of 'homeless people'. Chamberlain and Mackenzie argued that the minimum housing expectation for people in the private rental market in Australia is for "at least a room to sleep in, a room to live in, kitchen and bathroom facilities of their own and an element of security of tenure" (Chamberlain and Mackenzie 1992, p.290) and this should therefore serve as the benchmark by which homelessness is assessed. Although posited as a rejection of what Chamberlain and Mackenzie referred to as radical (subjective or personal) and conservative (narrow) definitions of homelessness, the establishment of such a benchmark appears to be influenced by proponents of both definitions particularly Watson (1984) and Rossi (1989) respectively. The

reasons for the choice of this particularly benchmark though were somewhat unclear leading the ABS (2012a) to eventually criticise the benchmark for lacking theoretical and empirical justification and being historically contingent.

The cultural definition nevertheless achieved rapid ascendancy in the 1990s. Chamberlain (1999) produced the first national estimate of homelessness from the 1996 Census using the cultural definition. In providing the first national estimate, the Census and the cultural definition became the principal tool and definition respectively for measuring homelessness in Australia. The cultural definition was subsequently used to measure homelessness in the 2001 and 2006 Censuses, replaced the previous definition used in the homelessness services system with the transition from the *Supported Accommodation Assistance Program* (SAAP) to the *Specialist Homelessness Services* system in 2011 and was adopted for the *Journeys Home* longitudinal survey also in 2011. The widespread use of the cultural definition marked a divergence with the United States with its widespread use of the narrower definition, proving to be more closely aligned with European definitions through the development of the European Typology of Homelessness and Housing Exclusion (ETHOS) in 2005 (FEANTSA 2005). Conceptual categories of homelessness in the ETHOS – 'rooflessness', 'houseless', 'insecure' and 'inadequate' broadly align with principles of the cultural definitions but also include people in institutional settings at risk of homelessness, people living under threat of violence and people living in extreme overcrowding.

Increasing political and policy attention on homelessness in the late 2000s prompted the ABS (2012a) to develop its own definition of homelessness. The ABS (2012a) states that it had never adopted a definition of homelessness distancing itself from the estimates of homelessness under the cultural definition in the 1996, 2001 and 2006 Censuses. The resulting 'statistical' definition retained the focus on inadequate and insecure housing from the cultural definition and added a focus on perceptions of 'home' particularly as the focal point for social relations. It also added an element of choice where people are not considered to be homeless if they have the resources and capacity to access accommodation alternatives. The

ABS (2012a) argue that this definition is more theoretically and empirically valid, robust and consistent with international definitions such as ETHOS and the definition used by Statistics New Zealand. There are however substantial measurement difficulties inherent in the statistical definition. The emphasis on “control of, and access to, space for social relations” in particular shifts the concept of homelessness from one of sub-standard accommodation as under the cultural definition to one more centred on the individual and individual experiences of home. The statistical definition therefore can be argued to cherry pick aspects of accommodation based definitions such as the cultural definition and subjective definitions. It doing so though it potentially encounters the same measurement issues faced by earlier subjective definitions.

Homelessness typologies

The conceptualisation and operationalisation of homelessness requires a typology under which different categories of homelessness are articulated. Most definitions of homelessness particularly those that seek to reflect personal perspectives and/or community expectations capture a diverse range of housing and ‘home’ situations. A number of definitions including the ETHOS, cultural and statistical definitions construct categories of homelessness to mirror these situations with homelessness conceptualised as the aggregation of categories. Such a categorisation is justified conceptually on the grounds that the physical, emotional and psychological experiences of homelessness are potentially quite different for people living on the streets, in homeless shelters, boarding houses or private households that are unsafe, insecure or crowded. Indeed, homelessness might be regarded as an otherwise vague concept that is only given meaning in tying together a range of living circumstances that are deemed by individuals, society, researchers or government to be deficient against one or more criteria (Chamberlain and Mackenzie 1992; Veness 1993; Watson 1984). On an operational level, categorisation of homelessness is essential for locating, recruiting and enumerating the population experiencing homelessness for any type of research or population count. This is because locating and identifying people living in different forms of homelessness requires

different strategies. A survey or census of private households, for example, will clearly fail to capture people who are at the time homeless on the streets, in emergency shelters or in boarding houses. Rather, specific strategies are required to locate and identify people in each of these situations.

Typologies of homelessness under the cultural and statistical definitions are reasonably similar despite differences in their conceptual underpinnings (Figure 2.3). Chamberlain and Mackenzie's (1992) cultural definition has three categories of homelessness – primary, secondary and tertiary homelessness. People experiencing primary homelessness are living on the street whether in improvised dwellings, tents or in the open air. People experiencing secondary homelessness are temporarily staying in supported accommodation for the homeless such as emergency shelters, refuges or with private households. People experiencing tertiary homelessness live in housing that falls below a minimum community standard, defined to be housing that lacks a private bedroom or bathroom. People who are housed but live in circumstances close to cultural homelessness are classified as marginally housed.

The statistical definition has similar though more explicitly accommodation-based categories. Primary homelessness is retained and relabelled *Improvised dwellings, tents or sleepers out*. The secondary and tertiary homelessness categories are also retained with secondary homelessness divided between *Supported accommodation for the homeless* and *Staying temporarily with other households* and tertiary homelessness divided between *Boarding houses* and *Other temporary lodgings*. The main difference between the statistical and cultural definitions is the inclusion of *Severely crowded dwellings*. People living in severely crowded dwellings are considered by the ABS (2012a) to lack control of, or access to space for social relations and are therefore defined as homeless. Severely crowded dwellings are defined as those requiring four or more bedrooms to accommodate all usual residents under the Canadian National Occupancy Standard (see Chapter 4). People living in somewhat less

crowded dwellings, improvised dwellings where circumstances are not deemed compatible with homelessness and caravans are not defined as homeless but marginally housed.

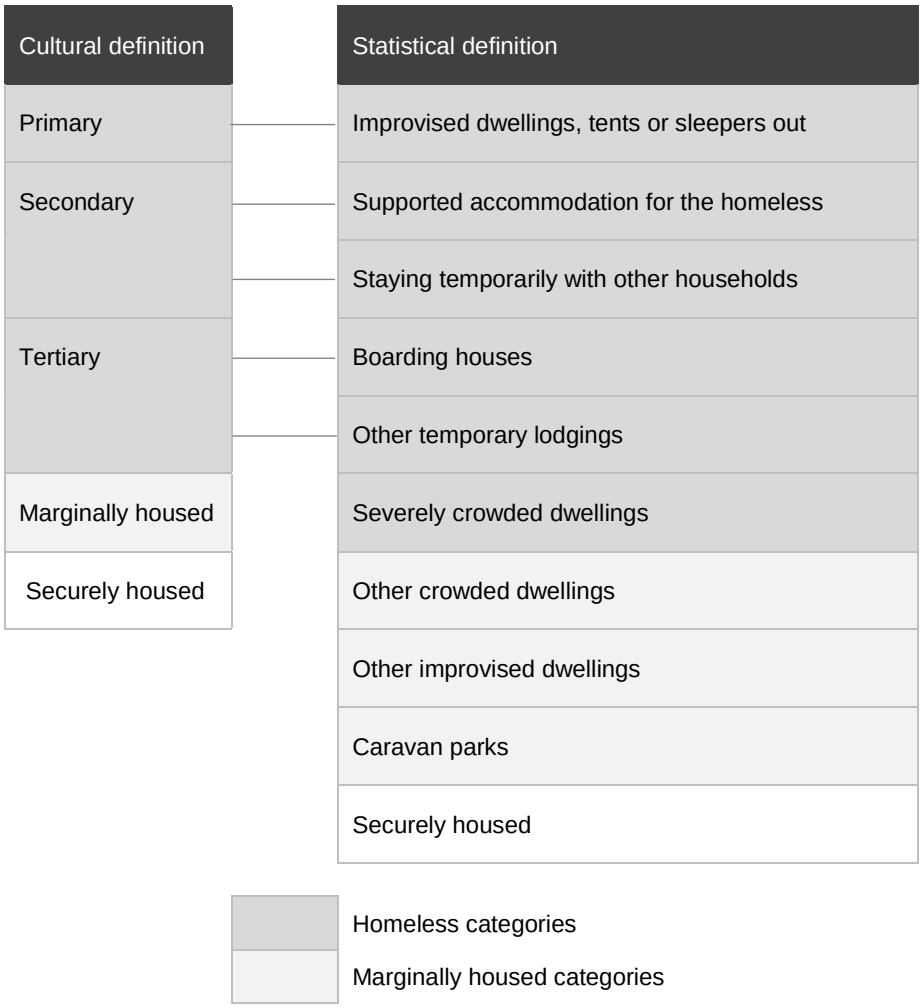


Figure 2.3 Typologies of homelessness, Cultural and Statistical definition

Both definitions were explicitly designed to allow for the enumeration of homelessness in Australia's Census – the primary instrument for deriving a complete or near complete national estimate of homelessness in Australia (ABS 2012a; Chamberlain 1999). However, the Census collects only limited information on the various dimensions of each definition. A consequence of this is that neither typology perfectly aligns with their conceptual definitions. A striking example is that aspects of both that refer to security of tenure, the physical adequacy or characteristics of dwellings and space for social relations are only measured to the extent they align with operational categories. This is despite the possibility that other types of dwellings and accommodation are physically or socially deficient in some way or provide

insecure tenure to residents (Chamberlain 2014). Caravans and mobile homes are particularly problematic. Although included in other survey instruments using the cultural and statistical definitions (ABS 2015; Scutella et al. 2017; Wooden et al. 2012), people residing in caravans were excluded from the Census homelessness counts and, rather, considered marginally housed. Although not explicitly stated, one of the difficulties is that, while there is a population who are temporarily and precariously accommodated in caravans (Goodman et al. 2013), there is a sizable population, particularly of retirees, who are stably and permanently housed. This latter population cannot be reliably excluded from the homeless count based on information collected in the Census. Nevertheless, it appears to be a common form of accommodation for those without a permanent place to live (ABS 2015).

Housing and homelessness spectrum

The accommodation types used in this thesis are drawn from the cultural and statistical definitions (see Figure 2.3). The exact set of categories used in the analytical chapters depend on the data used. Broadly, the accommodation types of interest are 1) street homelessness (including rough sleeping and staying/squatting in tents and improvised dwellings); 2) homeless shelters, refuges and other types of accommodation provided by government and community sector organisations; 3) boarding, lodging or rooming houses, hostels, motels and other temporary sub-market accommodation; 4) caravans/mobile homes; and 5) temporary accommodation with other households (including ‘couch surfing’ and ‘doubling up’ with family and friends). These form one side of a housing and homelessness spectrum. Notably, household crowding is missing from this list. Although recognised and measured by the ABS (2012c, 2018) as a form of homelessness, and indeed the largest form of homelessness, it has not been operationalised in any of the datasets I describe below outside of the Census. Thus, I include household crowding as additional category in work based solely on Census data (chapter 4), but otherwise exclude it. The combination of shelters, refuges and other types of government and community-run accommodation, including transitional housing, in one category is not ideal, though mandated by the availability and quality of data. Indeed, in

the analytical chapters and depending on the data I use, I will often combine the first two categories into a street and sheltered homelessness category and the third and fourth categories into a private sub-market category.

On the other side of the spectrum are different types of housing. Housing can be categorised along multiple dimensions including affordability, amenity, physical adequacy, type, location and safety. In this thesis, I adopt a tenure-based typology. Tenure, in this context, refers to the legal and social rights individuals have to occupy their current residence. This is widely available in most datasets and is hypothesised to have an important role in the stability and security of housing. The categories of housing – in addition to the previous five – are 6) Public housing run by government housing authorities; 7) Community housing managed by not-for-profit organisations; 8) housing rented from private landlords and/or real estate agents; 9) housing owned outright or with a mortgage. Public and community housing are collectively known as social housing and are sometimes combined in this study. Home ownership is relatively rare among disadvantaged and previously homeless populations, so this category is sometimes dropped or combined with privately rented housing (category 7). Another important category on this spectrum is institutional settings, such as prisons and mental health facilities. While I try to account for institutional episodes in this thesis, a proper analysis is prevented by the available data.

This spectrum is used throughout this thesis in place of a specific definition or definitions of homelessness. While the first five categories of the spectrum constitute homelessness under Australian definitions, the majority of research internationally considers only the first two. The third category, or what I refer to as private sub-market accommodation, is under-studied and often neglected in international research despite its historic prominence in the skid row era of the 1950-1970s (Rossi 1989; Wallace 1965) and in having an arguably important function in accommodating the otherwise street homeless on a night-to-night basis and performing an overflow function for formal homelessness accommodation that are operating at or beyond capacity (Goodman et al. 2013). The fourth category of staying with

family or friends is better researched though problematic, particularly in this case due to the difficulty in distinguishing between temporary and non-temporary accommodation. This distinction is important as this housing arrangement is permanent and stable in many instances and does not resemble homelessness, particularly for children living with their parents. However, this distinction is performed differently – or not at all – in each data source that attempts to measure it, often producing very different estimates (ABS 2012d; Chamberlain and Mackenzie 2008). As Watson (1984) argues, these types of issues make it very difficult to define and quantify the homeless population, thus justifying the housing and homelessness spectrum. For this reason, I endeavour to implement this spectrum throughout this thesis in place of a specific definition of homelessness. Nevertheless, I am usually bound by the definitions and measures available in the data I use.

Housing and homeless dynamics

Homelessness is often implicitly or explicitly characterised as a static or permanent characteristic of a certain class of individuals. Point-in-time estimates of homelessness derived from national and local censuses tend to reinforce these characterisations in enumerating a 'homeless population' on census night. Evidence accumulated over recent decades indicates that in reality homelessness is a dynamic and episodic event. Individuals and families move in and out of homelessness at various frequencies with episodes of homelessness differing in intensity and length across time and the population (ABS 2015). Experiences of homelessness are thought to be different for different groups of individuals and families with the risk of long term, recurring or chronic homelessness greatest for those with mental health and substance use issues, disaffiliation from family and social networks and lifelong experiences with homelessness or state care (Chamberlain and Johnson 2013; Culhane and Kuhn 1998; Scutella et al. 2013). Individuals and families can and do move between categories of homelessness (Chigavazira et al. 2013). For example, people may move from the street to temporary supported accommodation to stable housing and vice

versa, or in fluctuating patterns that might reflect the capacity of services or friends and family to accommodate people on a nightly, weekly or monthly bases.

Capturing this dynamic and episodic characteristic of housing and homelessness is a central objective of this thesis. This is conceptualised in Figure 2.4. Time – in this case represented by the 2015-16 financial year – lies along the horizontal axis and individuals along the vertical axis. The blue bars represent hypothetical episodes of different types of homelessness while the white spaces represent periods where individuals do not experience homelessness. An important consequence of the dynamic nature can be seen. On 30 June 2016, 10 people are homeless on that night whereas 24 people experienced homelessness over the course of the financial year. This reflects a generalised and well-documented effect of homeless dynamics that the number of people experiencing homelessness on a given night will be smaller than the number experiencing homelessness over a longer period (Culhane et al. 1994).

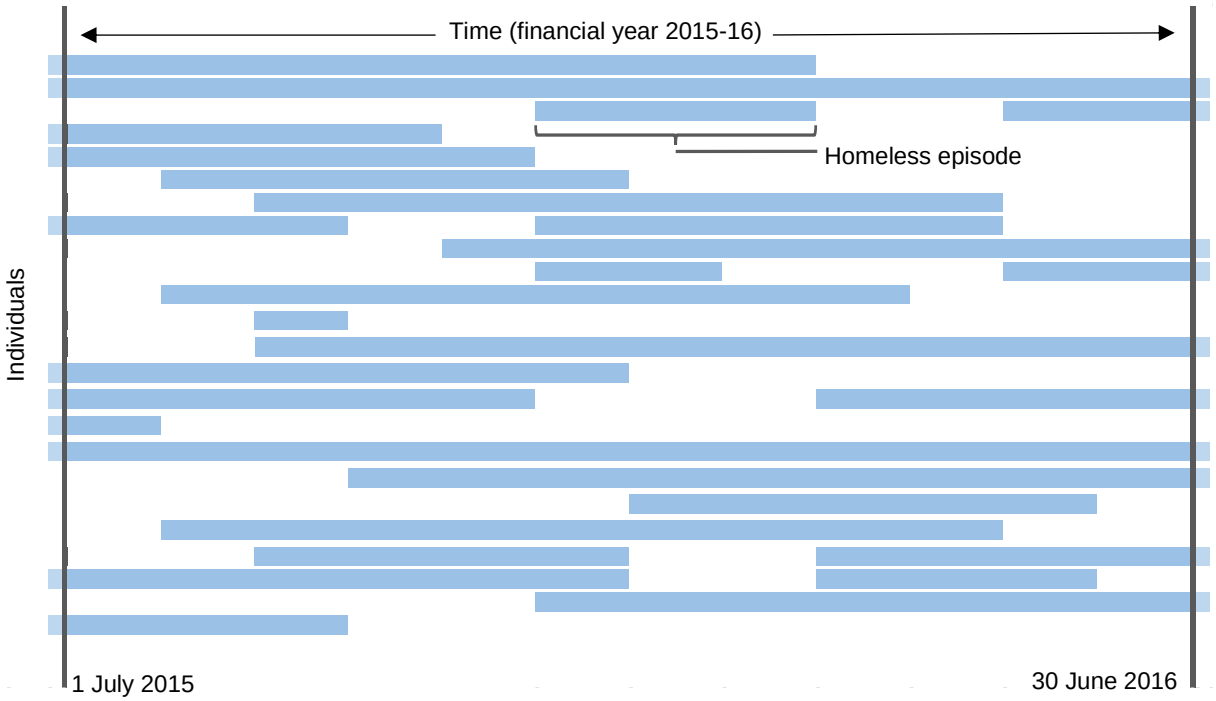


Figure 2.4 Homelessness as a dynamic phenomenon

Housing pathways and trajectories

Housing and living situations before and after episodes of homelessness are an important component in the homelessness dynamic. Homelessness has been linked to the processes by which people experience poverty and accumulate financial stress, often seen as the outcome of severe financial crises and descent into extreme poverty (Rossi 1989; Sharam and Hulse 2014). Likewise, homelessness is commonly associated with housing and financial crises, family breakdown, violence, and exits from institutional settings (AIHW 2018; Chamberlain and Johnson 2013; Diette and Ribar 2018; Moschion and van Ours 2019). Homelessness has also been linked to lifelong disadvantage, childhood experiences of violence, homelessness and State care and histories of incarceration, mental health and substance use issues (Culhane et al. 2007; Johnson et al. 2019; Martijn and Sharpe 2006; McVicar et al. 2019; Metraux and Culhane 1999; Piat et al. 2015; Wong and Piliavin 1997). At a societal level, structural weaknesses in housing and labour markets, sociodemographic trends including in ethnicity and household formation and weaknesses in social security systems are also thought to exert an influence (Byrne et al. 2013; Culhane et al. 1996; Fargo et al. 2013; Johnson et al. 2019; Lee et al. 2003; Shinn et al. 1998; Shinn and Gillespie 1994; Wong and Piliavin 1997). Thus, there is a large ecology of factors that potentially drive housing and homelessness transitions and durations and ultimately shape lifetime trajectories or pathways.

I draw on the concept of 'housing pathways' in this thesis to capture aspects of these dynamics. Rather than a theory in its own right, this is a metaphor through which to theorise, analyse and understand the changing relationships between households and housing through time (Clapham 2002). Building on the concepts of housing careers and trajectories, the housing pathways perspective recognises that individuals move between different forms of accommodation, often in pursuit of housing and life goals and at other times, and for other individuals, in response to adverse circumstances and events. Underpinned by social constructionism and influenced by Giddens' (1984) theory of structuration, proponents

emphasise the centrality of personal experience and subjective meaning in their consumption of housing, and in their interactions with society and societal structures. This, they argue allows for better consideration of how personal, interpersonal and macrostructural factors operate independently and in tandem to shape housing situations and events through time and space (Clapham 2003; Fitzpatrick 2005). Arguably, this framework for considering the social ecologies in which housing and homelessness dynamics operate over time is the most important contribution of the housing pathways literature.

Quantitative research on housing pathways is hampered by intellectual and practical concerns. Most empirical research adopting a housing pathways approach have been based on qualitative studies, most notably biographic life histories (Martijn and Sharpe 2006; Pearson et al. 2009; Piat et al. 2015; van Laere et al. 2009; Sharam and Hulse 2014; Skobba 2016). The reasons for this are at least two-fold. Firstly, life histories have the capability to explore personal experiences, meaning and identity (Clapham 2003). Clapham (2002) argues that quantitative research in the field is largely positivist, implicitly or explicitly assuming there are universal and objective truths to be uncovered, an assumption that suppresses the diversity of experiences and meanings that individuals attach to their housing and living situations. The second reason is more practical. Life histories are argued to provide long enough time horizons over which pathways can be identified and assessed, as well as the capability to explore personal experiences, meaning and identity (Somerville 2013). The rarity and difficulty in identifying and tracking homelessness means that quantitative longitudinal research utilises targeted sample surveys and administrative data with relatively short prospective time horizons with samples biased towards those with previous homelessness experience and/or limited retrospective information on housing and life histories. This has limited the extent to which quantitative research is able to capture the lifelong processes that expose individuals to homelessness in the first place or leaves them vulnerable in later life.

Quantitative research is nevertheless useful and complementary in understanding transitions and pathways through housing and homelessness. Clapham et al. (2014), for

example, use panel data to quantify the number of young people experiencing different pathways identified through in-depth interviews. Further, and as I seek to demonstrate in this thesis, quantitative research is valuable for analysing and quantifying the size and composition of populations experiencing homelessness, the proximal factors associated with housing transitions and durations and the more distal factors of which life history informants may not be cognisant. However, aside from the extent to which experiences of homelessness and housing deprivation are defined by survey respondents, this thesis is largely silent on the meanings individuals give to their experiences. From a social constructionism perspective, one particular concern with this study may be the a priori specification and grouping of different forms of housing and homelessness along the spectrum. The distinctions that are made between private, social, sub-market and sheltered accommodation, for example, are not based on the differences experienced or ascribed by individuals, but rather delineations in types of dwellings and tenure that I perceive. Nevertheless, they are built on a strong foundation of previous research and – in being centred around types of Government, interpersonal and private support – have a sound basis in objective reality. Moreover, the spectrum is argued to provide a useful and pragmatic construct that captures some, though not all, of the diversity of individual experiences that can be overlooked in studies that dichotomise housing and homelessness.

In this thesis, I use the housing pathways concept to consider the longitudinal processes that create and sustain homelessness and housing deprivation. I consider unique episodes of accommodation in different forms of housing and homelessness as important units of study. Individuals experience accommodation episodes as members of family, non-family and lone person households and are thus nested within family and household units. The time elapsed in an episode is referred to as an episode duration. Episodes are connected by transitions or moves, in that individuals may end one episode and transition to commence another. Transitions can be made within and across housing/homelessness states. For example, individuals can move from an episode spent staying with family or friends to a new

episode staying with a different set of family or friends (within-state transition) or to an episode in a different accommodation form, such as a homeless shelter (across-state transition). A transition from one episode to another may involve the transition of all individuals within the household unit, or may result from the dissolution of the household unit where fewer individuals transition and/or individuals transition to separate household units. I conceptualise housing pathways or trajectories as the coalescence of episodes of accommodation for individuals and families over time. Drawing on life course theory, I argue that individuals exert agency in enacting or responding to housing transitions, shaped and constrained by personal, interpersonal, economic and housing histories, the levels of advantage and disadvantage that have accumulated over time and the resources and supports they are able to draw on (Elder et al. 2003). Thus, I hypothesise that there are potentially complex interactions underlying entries to and durations of homelessness. In this thesis, I set out to explore some of these processes and dynamics.

Housing pathways are conceptualised by first adding a time dimension to the housing and homelessness spectrum. A hypothetical illustration is depicted in Figure 2.5. In the first instance, the individual is living in privately rented housing in a family or non-family household. After a certain duration, the individual moves permanently out of the dwelling and commences a new episode temporarily staying with friends or family members (‘doubling up’ or ‘couch surfing’). This could be considered a transfer from housing to homelessness under the cultural and statistical definitions of homelessness. After some period of time, the individual leaves this dwelling but with nowhere else to go ends up living on the street. The individual moves into a homeless shelter before being accepted into public housing. The risks of entering and exiting homelessness at any given time are shaped by the personal, interpersonal, economic and macro-structural factors and the interactions between them. Note that Figure 2.5 is not meant to provide an exhaustive list of relevant types of housing and homelessness. Various institutional settings are a notable omission.

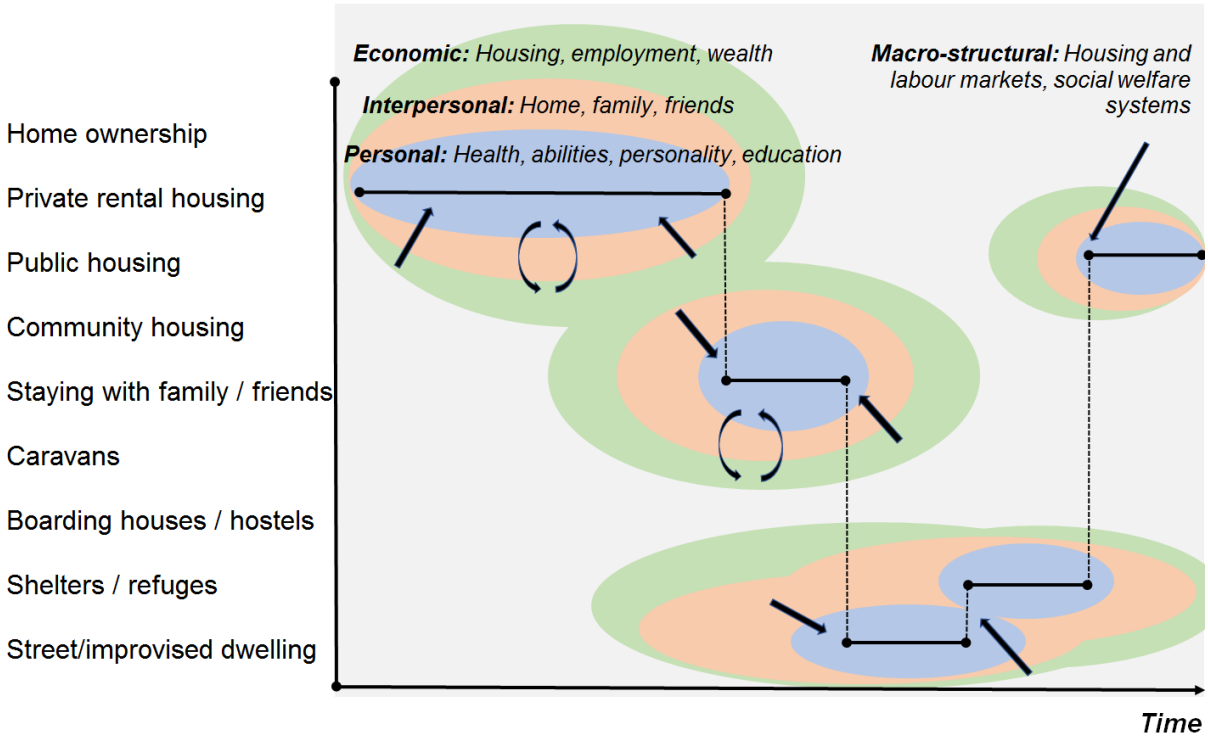


Figure 2.5 A model of housing and homelessness for a hypothetical individual

Instruments for measuring homelessness

Census counts

Point-in-time counts are the most common form of measuring homelessness. These attempt to enumerate the homeless population on a given night or over several consecutive nights. They have a long history, going at least as far back as the skid row era of the 1950-1970s (Bahr 1967; Bogue 1963; Darcy and Jones 1975; Lee 1980). Prominent studies were conducted in the United States in the 1980s and 1990s (Burt 1992; HUD 1989; Rossi 1989), including the 1990 US Census 'S-Night' count (Barrett et al. 1992). More recently, counts have been conducted in cities and across nations around the world, particularly Europe and Australia (Benjaminsen and Dyb 2008; Busch-Geertsema et al. 2014; Coumans et al. 2017; Firdion and Marpsat 2007; Fitzpatrick et al. 2018; Gaetz et al. 2016; Sales 2015; Tainio and Fredriksson 2009). In the US, the Census count has been replaced by biennial counts in 447 Continuums of Care across the country (HUD 2018).

In Australia, the five yearly Census is the principal tool for estimating the total size of the population experiencing homelessness at a given time. A special homelessness

enumeration strategy was first implemented for the 1996 Census (Chamberlain 1999). Estimates of the population experiencing homelessness on Census night have since been produced for 2001 and 2006 against the cultural definition (Chamberlain and Mackenzie 2003, 2008) and for 2001, 2006, 2011 and 2016 against the statistical definition. People enumerated as homelessness on Census night are able to be classified by a select range of geographic, demographic and socio-economic variables, including category of homelessness, geographic location, sex, age group and Indigenous status. On Census night 2016, 116,400 people were estimated to be experiencing homeless under the statistical definition, of whom 58 per cent were male, 58 per cent were younger than 35 years, 65 per cent were living in major city areas of Australia and 44 per cent were living in severely crowded dwellings (ABS 2018).

The Census homelessness count is subject to two types of error. Firstly, the Census inevitably misses a portion of the population as they do not receive or complete and return a Census form. The Post Enumeration Survey is a large household survey run after every Census to estimate the size of the general population not enumerated in the Census. However, as the Survey is only delivered to households in conventional dwellings, it is unable to correct for possible under-enumeration of homelessness – despite the high risk of the Census missing individuals experiencing homelessness on the streets and in improvised, unconventional and crowded dwellings. This means that the Census homelessness count is almost certainly an underestimate of the number of people experiencing homelessness. Studies that have used post-enumeration strategies, such as capture-recapture, invariably estimate large undercounts from single enumerations (Coumans et al. 2017; Darcy and Jones 1975; D'Onise et al. 2007; Hopper et al. 2008; Wright and Devine 1995). Secondly, the homelessness status of people who are enumerated in the Census may be incorrectly classified. A large potential source of error comes from the fact that homelessness is not directly ascertained from the Census, rather is indirectly inferred through the application of decision rules based on various responses to Census questions. As the ABS (2012b)

acknowledge, this has the potential to either over or under enumerate the number of people experiencing homelessness.

A flow-on effect of this is that counts of homelessness under the cultural and statistical definitions do not align despite similarities in their operational typologies. This is shown in Table 2.1, a comparison of homelessness counts from the 2006 Census under the cultural and statistical definitions. The reasonably large difference in the category of *Persons in improvised dwellings, tents or sleeping out* is the result of the ABS (2012b) filtering out people who were employed full-time and potentially living and working on construction and other work sites (5,200 people), people it believes were likely to be owner builders and hobby farmers (2,700 people) and imputed records from unreturned Census forms, believed to be because occupants were enumerated at their principal residence (1,200 people). Thus, the difference is the result of post-hoc operational decisions designed to remove people staying in similar dwelling types but not considered 'homeless'.

A second main reason for the differences in Table 2.1 pertains to the category of people staying with other households. This is measured in the Census from people enumerated in private dwellings who are listed on the Census form as having 'no usual address'. Chamberlain and Mackenzie believed that this is likely to produce an incomplete count because these people, or the people filling out the forms on their behalf, are likely to put down their previous permanent or current temporary address as their usual address (Chamberlain 1999; Chamberlain and Mackenzie 2008). For this reason, a revised estimate was derived utilising a secondary dataset. This form of post-enumeration was not carried over into the statistical definition, resulting in a substantially lower estimate of those staying temporarily with other households. These differences suggest an incomparability between data using the two definitions, including the *Journeys Home* survey and the *General Social Survey* discussed below. Notably though, differences do not necessarily extend to other data sources. Indeed, each has its own approach to operationalising and measuring

homelessness, irrespective of the definitions used. This warrants careful consideration before combining or drawing conclusions from across datasets.

Table 2.1 Estimates of homelessness, cultural and statistical definitions, 2006 Census

	2006 Census homelessness counts	
	Cultural definition (Chamberlain and Mackenzie 2008)	Statistical definition (ABS 2012d)
Persons in improvised dwellings, tents or sleeping out	16,375	7,247
Persons in supported accommodation for the homeless	19,849	17,329
Persons staying temporarily with other households	46,856	17,663
Persons staying boarding houses and other temporary lodgings	21,596	15,960

Sample surveys

Internationally, an innovative range of sample surveys have been used to estimate and analyse homelessness. One of the first large scale national studies was carried out in the early 1980s in the United States by the Housing and Urban Development (HUD) Department. HUD used a range of methods to estimate homelessness including aggregating local area estimates of homelessness from a sample of expert opinions. Later in the decade, Burt (1992) conducted a national sample survey of users of soup kitchens and other services for the homeless. National studies were complemented by a multitude of local and city level studies including the *Chicago Study* where Rossi (1989) and colleagues estimated the number of people experiencing 'literal' homeless in Chicago in Autumn and Winter by searching a probabilistically weighted sample of Census tracts. In recent years, homelessness enumerations have involved telephone surveys that ask random household samples whether homeless people live on their property or in their neighbourhood (Agans et al. 2014) or if respondents themselves have experienced homelessness in the past (ABS 2015; Chamberlain and Johnson 2015; Link et al. 1994, 1995). Different sampling techniques have been increasingly used to estimate street homelessness (Alexander-Eitzman et al. 2013) such as 'capture-recapture' where an initial census or survey is conducted followed by a second

census or survey to measure and adjust for under-enumeration in the initial survey (Coumans et al. 2017).

The use of sample surveys has become more common in Australia. The ABS (2011; 2015) included a module on homelessness in successive versions of the General Social Survey in 2010 and 2014. Survey responses are cross-sectional and retrospective in nature, asking respondents whether they have had past experiences without a 'permanent place to live', the number of experiences, the length of time without a place to live in their most recent experience and whether they sought assistance from welfare services. These responses can be also be cross-classified against a range of demographic and socioeconomic variables. However, these are typically measured at the time of the survey rather than the time of homelessness, preventing analyses of the time-varying drivers of homelessness. The survey is representative of the general adult population who are housed at the time of the survey with people experiencing homelessness at the time of the survey explicitly excluded from the scope of the survey. Survey results can therefore be used to estimate the risk of entering and exiting homelessness and the duration of homelessness but only for people who will exit homelessness by a certain date in the future. Additionally, given the relatively small prevalence of homelessness among the general population, experiences of homelessness are collected for a relatively small proportion of the sample, restricting the statistical power of data on homeless episodes. The 2014 edition of the survey contained 12,932 respondents, of whom a population weighted estimate of 1.9 per cent experienced homelessness in the 12 months before the survey. This equates to a population weighted estimate of approximately 351,000 (95% confidence interval [271,200; 430,800] people, up from the 2010 estimate of 251,000 [183,300; 319,100] people (ABS 2011, 2015).

Targeted surveys of populations experiencing homelessness or risk of homelessness offer the potential for more detailed statistical analysis of homelessness pathways and dynamics. A notable example in Australia has been the *Journeys Home* study, a longitudinal survey of homeless and at risk adults in Australia that was conducted over six waves between

2011 and 2014 (Wooden et al. 2012; Scutella et al. 2017). The sample frame consisted of approximately 110,000 adults who had received an income support payment such as for unemployment, disability or parenting support in May 2011 and who had been flagged in the income support system as homeless or at risk of homelessness or who were predicted by the survey design team to be vulnerable to homelessness based on their socio-demographic and economic characteristics. A multi-stage clustered survey design yielded a final sample of 1,682 adults at a response rate of 62 per cent (see the Appendix for a description of the sample). The retention rate to wave six was 84 per cent. Included in the survey was an accommodation calendar in which respondents listed the types of accommodation that had stayed in each 10 day block since the previous survey (or the start of their current accommodation at wave one). Thus, assuming accurate recall, the accommodation status of each respondent can be approximated for any given block during the survey period. Published research to date using *Journeys Home* data have analysed the factors associated with lifetime homelessness (Scutella et al. 2013), entries to and exits from homelessness (Cobb-Clark et al. 2016; Johnson et al. 2019) and relationships between homelessness and violence (Diette and Ribar 2018), drug use (McVicar et al. 2019) and relationship breakdown (Moschion and van Ours 2019).

As sample surveys, the GSS and *Journeys Home* are subject to sample and non-sample error. The GSS has a relatively large sample – 12,932 respondents in 2014 – giving a relatively small sample error for the general population. However, as the incidence of homeless is low among the general population, sample error is considerably higher when focusing solely on the population with a recent experience of homelessness. Perhaps the largest potential source of non-sample error in the GSS with respect to homelessness is that only usual residents of private dwellings were included in the sample frame, meaning that people who were experiencing homelessness at the time of the survey are unrepresented. The sample frame was also restricted to adults aged 15 years and over, in private dwellings and outside of very remote areas and discrete Indigenous communities (ABS 2015). The

Journeys Home study has a targeted sample with 1,676 respondents at first wave (Wooden et al. 2012), focused only on those in receipt of income support and flagged as homeless or at risk of homelessness or deemed to share similar risk factors for homelessness. The survey therefore does not represent people who experience homelessness but did not receive income support prior to the development of the sample frame.

Administrative data

A substantial body or research has also utilised administrative data from homeless service providers. These types of data have a distinct advantage over Census data in providing a longitudinal perspective on the dynamics and duration of homelessness and over sample survey data in reducing or eliminating sampling error. Relatively high quality administrative data in US cities particularly New York City and Philadelphia in the 1980s and 1990s spurred a series of studies using data on homeless shelters. These included studies that analysed the relationship between point-in-time and prevalence estimates of homelessness (Culhane et al. 1994), determinants of duration in homeless shelters (Culhane and Kuhn 1998), demographic and cohort analyses of shelter use (Culhane et al. 2013), the spatial patterns of homelessness (Culhane et al. 1996; Metraux et al. 2001), the rates and risks of entering, exiting and returning to shelter use within the population (Cusack and Montgomery 2017; Metraux and Culhane 1999; Shinn et al. 1991; Wasson and Hill 1998) and developing and testing typologies of shelter users (Chamberlain and Johnson 2013; Culhane et al. 2007; Kuhn and Culhane 1998;).

In Australia, national-level administrative data have been collected from specialist homelessness services at least as far back as 1985 with the establishment of the Supported Accommodation Assistance Program (SAAP) (Chesterman 1988). However, the data have rarely been used for public research purposes outside of annual reports produced by the agency collecting the data, the Australian Institute of Health and Welfare (AIHW 2018). The data, now captured in the Specialist Homelessness Services Collection (SHSC) is nevertheless a potentially rich source of longitudinal information, capturing information on

288,800 users of homelessness services in 2017-18. The SHSC contains longitudinal data collected by homelessness services across the country and is capable of tracking the experience of individuals and families in the homelessness services system over time. In capturing information on contacts with government funded accommodation services including the network of emergency shelters and refuges, the SHSC is an important source of information on the size and dynamic of the population experiencing secondary homelessness under the cultural definition of homelessness and in the supported accommodation for the homeless category of the statistical definition. The SHSC also captures information collected from a range of non-accommodation support services, including outreach, case management and practical day-to-day, financial, family and logistical support services. In addition to legal and confidentiality issues and concerns around the quality, accuracy and fitness for research purposes, an obvious weakness with administrative data is that it only contains information directly or incidentally relevant to support periods. This means that homelessness periods and episodes will not be captured either adequately or at all where people experience homelessness before and/or after accessing homelessness services or do not access homelessness services at all.

In the analytical chapters of this thesis, I will use each of the main sources of national-level data on homelessness in Australia described above. A summary of these is provided in Table 2.2. These instruments adopt either the cultural (GSS 2010, SHSC 2011-12 to 2017-18) or statistical definition (Census 2001-2016, GSS 2014) of homelessness. Estimates represent different periods and spans of time and cover different populations and aspects of homelessness from the service users in the SHSC to an estimated point-in-time count of total homelessness in the Census.

Table 2.2 National instruments for measuring homelessness in Australia

Data	Type	Data range	Definition	Population coverage
Census of Population and Housing	Census; point-in-time	1996 2001 2006 2011 2016	Cultural Both Both Statistical Statistical	People counted as homeless on Census night under operational rules
Journeys Home	Longitudinal survey	2011-2014 (6 waves)	Cultural	Targeted sample of income support recipients identified as homeless, at risk of or vulnerable to homelessness
General Social Survey	Retrospective household survey	2010; 2014	Statistical (excl. severe crowding)	Sample of people housed at the time of survey
Specialist Homelessness Services Collection (SHSC)	Administrative; Longitudinal	2011-12 onwards	Statistical	People presenting to specialist homelessness services

Methods and outputs

The datasets described in the previous section collectively provide a novel and innovative evidence base from which to quantitatively analyse housing and homelessness. The Census counts represent estimates of the stock of people experiencing homelessness on particular nights, disaggregated at a reasonably fine level by homelessness type, age, sex and geographic location. The *General Social Survey* and *Journeys Home* allow for the estimation of transitions and flows between different forms of housing and homelessness. In representing the national population, the *General Social Survey* has the potential to allow for estimation of entries into homelessness, while *Journeys Home*, in representing a currently or previously homeless population, allows for estimation of transitions through and out of homelessness. Administrative data from the *Specialist Homelessness Services Collection*, meanwhile, provides detailed longitudinal information on the stocks and flows of people entering and exiting homelessness from and to the general population.

These stocks and flows, in principle, provide the critical inputs required for the construction of a demographic account of housing and homelessness. In a hypothetical

account, the population residing in a particular location and state of housing or homelessness is defined as the number of people in that location and state at a previous time point, plus those who enter during the intervening period, minus those who exit. Entries and exits are comprised of births, deaths, international and internal migration and housing transitions, that is, those who move between different housing and homelessness states. Such an account would have enormous research potential, shedding substantial light on the spatial and structural patterns, processes and dynamics that drive the levels of homelessness and demand for housing and homelessness services at different points in time and in different locations. The effects of localised labour and housing market shocks on homelessness, for example, could be tracked through space and time, recognising the potential for direct and indirect pathways, residential mobility and migration.

Data limitations, however, prevent the construction of a full demographic account. As I explain in Chapter 3, the four datasets listed in Table 2.2 represent different homeless populations. Most notably, a) the Census and *General Social Survey* produce very different estimates of the population staying with family or friends; b) the population represented by *Journeys Home* experience more frequent, severe and longer durations of homelessness episodes than the homeless population represented in the *General Social Survey*; and c) the *Specialist Homelessness Services Collection* counts a substantially larger population who receive accommodation services such as shelters and refuges than is captured in the *General Social Survey* or *Journeys Home*. Perhaps explaining these differences is that while definitions are the same or similar across datasets, survey sample frames and the ways in which homelessness is measured vary widely, from being collected reasonably directly and retrospectively from the privately housed population in the *General Social* Survey, to being indirectly inferred from current living arrangements in the Census and directly measured from a targeted sample in *Journeys Home*. Discrepancies with administrative data, meanwhile, may reflect the broad spectrum of supported accommodation options that may not be well captured in the survey data.

The data also restrict a fully life course analysis of housing transitions and pathways. Of the four datasets, only *Journeys Home* contains detailed information on past life events and experiences, such as experiences of violence, institutional care, parental separation and homelessness in childhood. However, as *Journeys Home* contains a highly targeted sample, respondent experiences prior to their selection in the sample are conditional on subsequent levels of disadvantage, including previous homelessness or vulnerability, that make them eligible for selection. This has the effect of distorting, and in most cases underestimating, the associations between life events and experiences and later housing pathways. To explain, assume that violence and homelessness in childhood have adverse effects of housing pathways in adulthood. In this case, individuals with these experiences are likely to be over-represented in the *Journeys Home* sample. Individuals who never experienced violence or homelessness as children will be under-represented as they are more likely to be stably housed and ineligible for sample selection. Comparing those with and without childhood experiences of violence and homelessness among the *Journeys Home* sample will therefore disproportionately exclude more of those without childhood experiences who become stably housed. As a result, the association between childhood violence and homelessness and later housing pathways measured on the *Journeys Home* sample will be smaller than the actual association in the general population. This measurement error will affect all time-invariant and time-varying characteristics of respondents and the events they experience prior to sample selection, making it difficult to analyse historical and life course determinants in any targeted sample survey of this kind.

The above limitations have an important bearing on the types of analyses and outputs that are appropriate for this study. Rather than combine data sources in a demographic account, the four analytical chapters in this thesis treat each dataset as separate and capable of addressing a specific set of research questions on the a) prevalence, b) distribution, c) transitions and d) pathways of and between housing and homelessness. The methodical approaches are designed accordingly to take advantage of the strengths of the data being

used, while being cognisant of their weaknesses. Thus, a microsimulation model is described in Chapter 3 that draws on the ability of the *General Social Survey* to estimate the number of people who have experienced homelessness. In Chapter 4, I use spatial analyses to analyse the geographic distribution of homelessness using the Australian Census – the best available source of information on the location of people experiencing in homelessness on a given night. In Chapter 5, I use multinomial regression to analyse housing and homelessness transitions using the longitudinal and prospective data available in *Journeys Home*. Finally, in Chapter 6, I use a similar regression approach and design a multistate microsimulation approach to recreate housing and homelessness pathways. Chapters 5 and 6 concentrate on analysing the immediate and proximal factors associated with housing and homelessness transitions, recognising the potential for historical and life course events and characteristics to be misrepresented in the data. In the following sections, I describe these methods and outputs in more detail.

Homelessness rates

The size of the population experiencing homelessness is usually measured through point-in-time counts. However, because of the dynamic and episodic nature of homelessness, larger populations experience it over longer periods of time, such as a year, five years or a lifetime (Culhane et al. 1994; Link et al. 1994, 1995). In response, a number of household surveys have asked respondents whether they have experienced homelessness in the past (ABS 2011, 2015; Bramley and Fitzpatrick 2018; Burrows 1997; Chamberlain and Johnson 2015; Fusaro et al. 2018; Greenberg and Rosenheck 2010; Ringwalt et al. 1998; Tompsett et al. 2006; Toro et al. 2007; Tsai 2017). These retrospective surveys have been used to estimate the size of the population with recent or lifetime experience of homelessness and identify contemporary factors associated with past homelessness. These indeed reveal that a substantially larger population experience homelessness over time than are counted on given nights or come into contact with homelessness services, suggesting that the societal burden of homelessness is larger than generally measured. However, one of the problems with these

surveys, is that they generally exclude those who are homeless at the time the sample is selected (Shinn 2010). This is because the sample frames are usually of the privately housed population, thus excluding those on the streets, in shelters and in institutionalised care. The result is that estimates of homelessness are biased downwards. The bias is relatively small in lifetime estimates, but much larger for annual estimates. In my reading of the literature, this problem has never been overcome, leaving a large gap in society's understanding of the magnitude and burden of homelessness.

In Chapter 3, I describe a novel approach for estimating annual homelessness rates from retrospective household surveys. In particular, I seek to use information on whether respondents have ever been homeless, when they were last homeless and how long they were homeless for from the 2014 *General Social Survey*. I combine this information into a microsimulation model to generate synthetic episodes from which I calculate the ratio of the population homeless at the time of the survey to the population homeless in the previous 12 months. I use this ratio to estimate the size of the population missed by the *General Social Survey* and subsequently, the total population who were homeless in 2013-14. I generate annual estimates by age and sex and for different types of homelessness.

Spatial patterns

Point-in-time homelessness rates are often analysed at sub-national levels to identify spatial patterns. These patterns are analysed at a single time point and over multiple points to assess how they have changed, including whether homelessness has become more or less spatially concentrated over time (Lee 1980; Lee and Farrell 2005; Lee and Price-Spratlen 2004; Wood et al. 2014). Several studies also describe the demographic, economic and housing characteristics of the neighbourhoods and cities in which people experiencing homelessness are located or came from (Byrne et al. 2013; Culhane et al. 1996; Elliot and Krivo 1991; Fargo et al. 2013; Gould and Williams 2010; Honig and Filer 1993; Lee et al. 2003; Metraux et al. 2001). In so doing, many of these seek to identify and understand the demographic and structural drivers of homelessness. Studies use different approaches though several use

spatial regression where the homelessness rate or logged homelessness rates for cities or neighbourhoods are the outcome variables. These are regressed on characteristics of those cities or neighbourhoods, including the prevalence of different household compositions (such as lone person and single parent family households), ethnic compositions, unemployment and poverty rates, income levels, availability and use of government assistance and the cost and affordability of housing. Studies sometimes, though not often, include multilevel effects to control for clustering across time and space.

In Chapter 4, I analyse changing patterns for different types of homelessness and their effects on total homelessness at sub-city neighbourhood levels. Spatial analyses are used to depict patterns of different types of homelessness and measure the relative concentration of homelessness in Sydney. A spatial regression models is specified to assess whether homelessness became more or less concentrated over time and the contribution of different types of homelessness to those changing patterns. The regression model controls for spatial autocorrelation by including a spatial weights matrix. Spatial autocorrelation is likely to arise, particularly at sub-city levels due to stochastic variation in where and when individuals are enumerated as homeless and measurement error in concording an individual's physical location to a pre-defined areal unit.

Transition probabilities

Transitions between housing and homelessness are typically analysed using binary regression models. Survival or event history analysis is commonly used to analyse the time-dependent risks of exiting and/or returning to homelessness or homeless shelters (Cobb-Clark et al. 2016; Culhane and Kuhn 1998; Cusack and Montgomery 2017; Metraux and Culhane 1999; Wong and Piliavin 1997), while housing loss and entries to homelessness are often analysed with Markov transition models using logistic and probit regression (Curtis et al. 2013; Desmond and Shollenberger 2015; Johnson et al. 2019; Phinney et al. 2007; Shinn et al. 1998). Studies using multi-process models are emerging in which homelessness transitions and explanatory variables are simultaneously estimated, recognising the potential

for bidirectional causality (Diette and Ribar 2018; McVicar et al. 2019; Moschion and van Ours 2019). Linear regression models have been used to analyse different aspects of housing and homelessness dynamics, including transitions (Wiemer 2014) and number of years spent homeless (Piliavin et al. 1993). Across all these types of studies, housing and homelessness are invariably treated as binary states.

Multistate demography provides a methodological toolkit to quantify the prevalence, distribution and dynamics of multiple forms of housing and homelessness. This was first developed to analyse migration patterns between subnational geographies and has since been applied to analyse a large array of social phenomena (Putter et al. 2007; Rogers 1980; Steele et al. 2004; Willekens 2014). The multistate approach is particularly valuable for operationalising the housing and homelessness spectrum in that it explicitly models transitions between multiple origin and destination states. The multistate space is a useful way to depict and visualise the states and transitions that are of interest. This is shown in Figure 2.6. In this case, individuals commence in an origin housing state shown on the left hand side and the interest is in measuring transitions out of the origin state and into one of the destination states of housing or homelessness on the right hand side. As previously discussed, individual episodes of accommodation are an important focus, such that transitions can occur within- and across-states. The objective of the multistate analysis is to estimate the probabilities of transitioning from each origin to each destination state, treating the other destinations as competing risks.

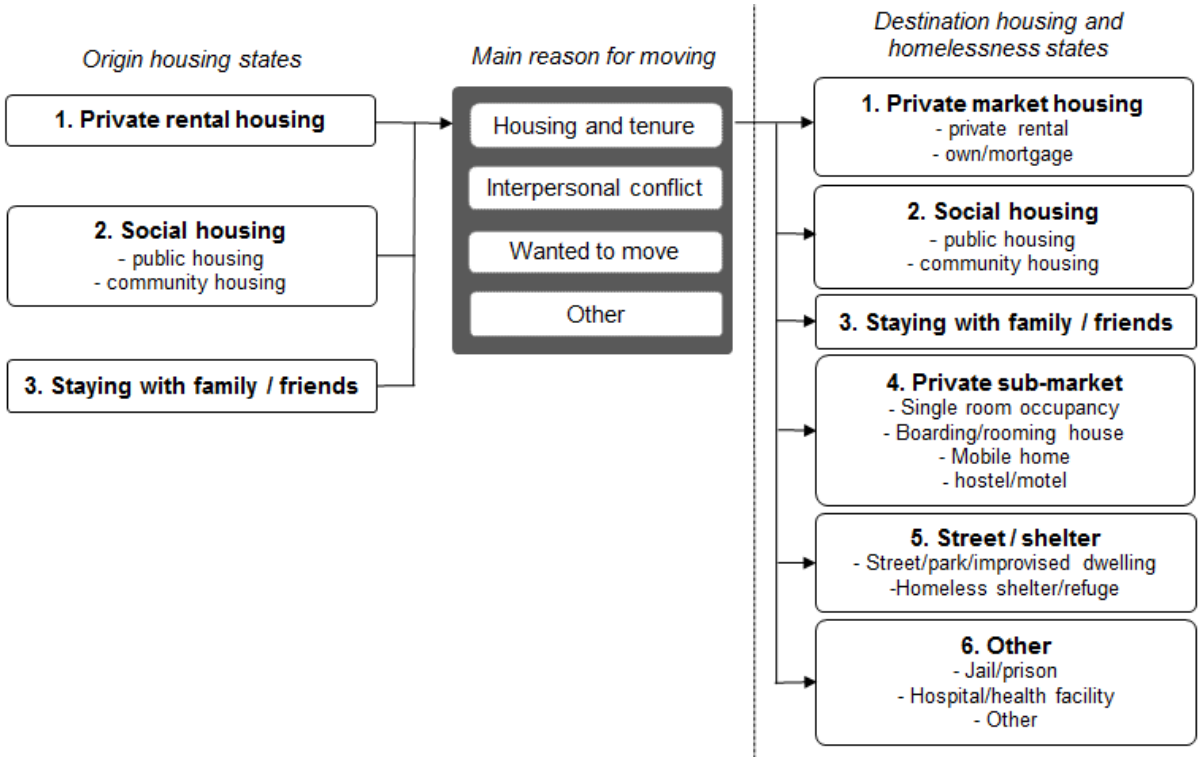


Figure 2.6 Housing and homelessness multistate space

There are several ways in which transitions can be estimated in a multistate framework. This includes regression modelling of competing hazards and probabilities of moving between states in continuous and discrete time (Putter et al. 2007; Steele et al. 2004). In this thesis, I adopt an approach similar to Steele et al. (2004) in fitting multilevel multinomial logistic regression models to estimate discrete-time transition probabilities. The models are known as 'clock reset' models, meaning that the risk of transition is modelled as a function of the length of time in the current housing/homelessness episode. Each time an individual commences a new episode, time resets to zero. The models take the general form:

$$\ln\left(\frac{p_{ij}^{t}}{p_{ii}^{t}}\right) = \beta_0 + \beta_{oi} + \beta_1 X_i \qquad 1.1$$

ln is the natural logarithm; p_{ij}^{t} is the probability of transitioning between state i and j between time t and $t + n$; p_{ij}^{t} is the probability of remaining in state i over the same period; β_0 is an intercept term; β_{oi} is an individual-level random effect designed to help control for the effect of unobserved time-invariant factors and inter-individual clustering among those who have

multiple episodes; X_i is a vector of explanatory variables and covariates that are specific to individuals living in origin i; and β_1 is the measured effect size of X_i. Transition probabilities are calculated by origin i and time interval t.

Housing pathways, incidence and duration times

Multistate analyses can be extended to recreate trajectories and pathways through time. This is particularly useful for estimating the cumulative incidence of and duration of time spent in different forms of housing and homelessness over relatively long periods of time. Measures of cumulative incidence and duration are not usually available in longitudinal surveys because of the effects of censoring. For instance, comparison of the length of time *Journeys Home* respondents spend in street homelessness by their previous housing tenure is distorted by the fact that some respondents may be homeless on the streets at the time of the last survey wave and will remain there for an unknown length of time after the end of the survey. This makes it difficult to say whether one type of housing tenure or another leads to longer episodes of homelessness. Cumulative incidence rates and duration times are nevertheless useful measures as they summarise the effect of explanatory variables in ways that account for longer-term dynamics of housing and homelessness.

There are two main multistate estimation approaches. The first, and most common, is the multistate life table. The second is microsimulation. Both apply empirically measured transition rates to synthetic populations to recreate trajectories through time. Multistate life tables apply rates to the entire population cohort while microsimulation models apply rates separately to each individual. One of the disadvantages of the multistate life table is that it relies on a relatively strict application of the Markov assumption. This assumption says that the probability of transitioning to a future state is conditional only on the current state and not on preceding states or sequences. So, for example, a probability of transitioning to street homelessness could be conditional on the current type of housing and a set of covariates, but not on the previous housing/homelessness state or the length of time in the current housing episode. The reason is that making probabilities path dependent quickly creates a large set of

probabilities and consequently pathways that the population splits into. Indeed, the number of probabilities and pathways can approach or exceed the number of individuals in the population, making it difficult if not impossible to model subsequent transitions for cohorts on each possible pathway.

Microsimulation models allow the Markov assumption to be relaxed. As transition probabilities are applied to each individual in the population, it is relatively straight-forward to incorporate a large set of probabilities while also ensuring the number of pathways does not exceed the number of people. In chapter 6, I use a microsimulation to operationalise a semi-Markov or 'clock reset' model, where transition probabilities are conditional on the current type of housing/homelessness and the length of time spent in that episode (in addition to a set of covariates). Thus, episode duration is hypothesised to be an important influence on transition probabilities. Individuals in the synthetic population are assigned a starting housing/homelessness state and a set of probabilities of completing an episode in that state and transitioning to a destination state. The basic principle for assigning individuals to different states is to draw a random number between zero and one for each individual. If the random number is less than or equal to the probability of transitioning to the first destination, then they are assigned that transition. As an example, if the probability of transitioning to street or sheltered homelessness is 5 per cent, an individual will enter that state if their random numbers are less than 0.05. Performing this assignment process through time creates synthetic housing pathways for each individual. The average incidence rate and duration time can then be calculated across the population for each set of starting conditions.

Conclusion

In this chapter, I have set out the framework on which the rest of this thesis is based. I have described some of the challenges in operationalising and measuring homelessness over several decades. My review of this literature has led me to adopt a housing and homelessness spectrum, recognising the diversity of accommodation forms in which people stay and the difficulty in rigidly defining homelessness given its multi-layered meanings as a personal and

cultural construct. I have described how I conceptualise longitudinal dynamics along the spectrum, borrowing from the literature on housing pathways. I have given an overview of the types of data and methodologies I intend to use to operationalise this conceptual model. As I will discuss through the remainder of this thesis, this operationalisation is a novel contribution to existing literature, better reflecting the lived experiences of individuals and providing for an improved understanding of the prevalence and processes of housing and homelessness.

3

Estimating annual rates of homelessness

Abstract

In this chapter, I set out an approach to estimate annual rates of homelessness from Australia data. This is a novel and difficult task as the most common sources of data only measure a) homelessness on a given night or set of consecutive nights, b) individuals and families who come into contact with homelessness service providers and/or c) episodes that occurred in the past and are not ongoing. I develop a microsimulation model to overcome these issues, using retrospective survey data to recreate homeless episodes and impute those missed by the survey. Administrative data from homelessness service providers are used to validate the estimates. According to the results, 3.6 times as many people experienced homelessness in Australia in the 2013-14 financial year than would have been counted on an average night. The experience of homelessness is diverse with approximately one-third of episodes lasting for less than one month and the large majority involving 'couch surfing' or 'doubling up' with relatives or friends. These findings have important policy and research implications for understanding the impact and nature of homelessness and housing volatility.

Introduction

Homelessness has traditionally been measured through counts of people on a given night. Such point-in-time estimates have taken the form of surveys and censuses of streets, shelters and other 'homeless' accommodation types and services. Notwithstanding these efforts and their importance, point-in-time counts underestimate the extent of homelessness. The primary reason for this is that for many, if not the large majority, homelessness is experienced episodically (Culhane et al. 1994, 2007; Link et al. 1995). Homelessness for some individuals and families is a one-off, short-term experience; for others, a more enduring but nevertheless temporary phenomenon. Some cycle through different forms of homelessness and housing, where for others, it is a persistent and long-term situation (Chamberlain and Johnson 2013; Piliavin et al. 1993). Consequently, a substantially larger number of people experience homelessness over a given period, whether it be one year, 10 years or a lifetime than are counted on a single night.

Research has struggled to quantify homelessness over longer periods. The difficulties in identifying and tracking a relatively small and non-domiciled population prevents the analysis of homelessness in general household panel studies. In recent decades, studies have instead utilised cross-sectional household surveys that ask about past experiences of homelessness (Bramley and Fitzpatrick 2018; Chamberlain and Johnson 2015; Fusaro et al. 2018; Greenberg and Rosenheck 2010; Link et al. 1994, 1995; Tompsett et al. 2006; Toro et al. 2007; Tsai 2017;) and administrative data from homelessness service providers (Chamberlain and Johnson 2013; Culhane et al. 1994, 1996, 2007, 2013; Culhane and Kuhn 1998; Kuhn and Culhane 1998; Metraux and Culhane 1999; Metraux et al. 2001, 2011). The former are retrospective in nature, do not capture current experiences of homelessness and often suffer from small sample sizes of previously homeless populations. Administrative data, meanwhile, only captures homelessness where individuals come into contact with the service system. Longitudinal surveys of disadvantaged and homeless populations are becoming more common and provide better coverage, sample sizes and opportunities for analysing the

dynamics of the homeless population (Cobb-Clark 2016; Curtis et al. 2013; Johnson et al. 2015; Phinney et al. 2007; Piliavin et al. 1993). However, targeted samples make it difficult to extrapolate findings to the general population, limiting their applicability to demographic estimation.

In this chapter, I propose a method for estimating annual rates of homelessness from household surveys that addresses the sample bias and retrospective nature of such surveys. Specifically, the proposed method seeks to estimate those homeless and therefore out-of-scope at the time of the survey and convert past rates of homelessness into concurrent age- and sex- specific rates. Estimates are then validated using administrative data from homelessness service providers. The method is demonstrated using the 2014 General Social Survey of Australia, a survey of almost 13,00 individuals, representative of almost all private dwellings in Australia (ABS 2015). The research questions motivating this study are:

1. How many people experienced homelessness in 2013-14 in Australia?
2. What is the nature of homelessness, in terms of its duration and form?

Understanding the extent of homelessness is important for understanding its nature and drivers. Several theories of homelessness posit that personal, interpersonal and institutional-structural factors operate independently and in tandem to drive the incidence, prevalence and duration of homelessness (Toro et al. 1991; Wong and Piliavin 1997; Fitzpatrick 2005). Studies have identified some of the potential drivers, in particular by analysing the characteristics of the homeless and the housing, labour market and family structures of the cities and neighbourhoods in which they were enumerated (Lee and Price-Spratlen 2004; Byrne et al. 2013). Evidence though is limited by the nature of the available data sources. Both point-in-time counts and household surveys under-estimate the true population exposed to homelessness to differing degrees, and so potentially understate the level of housing market volatility especially for low income populations. Further, point-in-time estimates over-represent long-term and chronic homelessness (Metraux et al. 2001; Chamberlain and Johnson 2015), while retrospective household surveys tend to

under-represent it. In both cases, this is because the chronic and long-term homeless are more likely to be homeless on any given night, giving them a higher probability of being included in point-in-time counts and excluded from household surveys. As a consequence, the two data sources produce different profiles of homeless durations, and to the extent that durations are positively associated with personal vulnerabilities (e.g. Wong and Piliavin 1997; Culhane and Kuhn 1998; Cobb-Clark et a. 2016), different socio-demographic profiles and drivers of homelessness and the people who experience it.

Background

Point-in-time counts of homelessness have a long history. In the period from the 1950s to the 1970s, researchers utilised the perceived spatial concentration of homelessness to count the total population on one or more nights living or utilising services in the 'skid row' areas of major cities (Bahr 1967; Bogue 1963; Lee 1980). Most studies were conducted in the United States, though they influenced similar work in the United Kingdom and Australia (Darcy and Jones 1975; Priest 1970). The decline of skid row and later growth and dispersal of homelessness in the United States drove the need for systematic national and city-wide counts (Burt 1992; Rossi 1989). Several high profile counts of streets, parks, building and homeless services and shelters took place in the 1980s and early 1990s including the 1984 and 1988 National Survey of Shelters for the Homeless (HUD 1989), the 1985-86 Chicago Homeless Study (Rossi 1989), the 1987 and 1996 National Survey of Homeless Assistance Providers and Clients (Aron and Sharkey 2002; Burt 1992) and the 1990 US Census 'S-Night' count (Devine and Wright 1992). These inspired a proliferation of studies both in the US and around the world, including France (Firdion and Marpsat 2007), Spain (Sales 2015), The Netherlands (Coumans et al. 2017), the United Kingdom (Fitzpatrick et al. 2018) the Scandinavian countries (Benjaminsen and Dyb 2008), Europe as a whole (Busch-Geertsema et al. 2014), Canada (Gaetz et al. 2016) and Australia (Chamberlain 1999). Many of these were one-off or sporadic counts, though annual surveys have taken place in Finland since at least 1987 (Tainio and Fredriksson 2009), while in the United States, local authorities provide point-in-time counts once every two years in 447

Continuums of Care across the country (HUD 2018). In Australia, homelessness counts have been produced from the five-yearly Census since 1996 (e.g. ABS 2012c, 2012d, 2018; Chamberlain 1999). Thus, point-in-time counts provide the most important and prominent measure of homelessness in many countries.

Most studies estimate homelessness on the streets and in shelters. These typically involve physical street searches by teams of volunteers (e.g. Rossi 1989), counts of people utilising homelessness services such as shelters and soup kitchens (e.g. Burt 1992; Firdion and Marpsat 2001) and/or secondary analysis of administrative data from service providers (e.g. Chamberlain 1999; Coumans et al. 2017). Several studies have pointed to the difficulties in locating a non-domiciled and often transient population and the propensity of many to avoid homelessness services altogether. These have utilised a range of post-enumeration strategies to measure and adjust for undercounts, including capture-recapture and plant-capture (Coumans et al. 2017; Darcy and Jones 1975; D'Onise et al. 2007; Hopper et al. 2008). They invariably estimated large undercounts, for example, on the order of 29 per cent (Hopper et al. 2008), 199-338 per cent (D'Onise et al. 2007) and 244 per cent (Coumans et al. 2017). Otherwise, most studies have based their estimates on a single raw count. Relatively few studies have sought to estimate the 'hidden' homeless, particularly those staying 'doubled up' or 'couch surfing' with family or friends. Two separate reports from the 2006 Australian Census placed the number staying temporarily with other households at 46,900 (Chamberlain and Mackenzie 2008) and 17,700 (ABS 2012d) – the difference was largely the result of different post-enumeration strategies. Thus, the size of the 'true' population who experience homelessness is difficult to ascertain.

Evidence of the greater prevalence and burden of homelessness has come through several sources. In the early 1990s, Link et al. (1994; 1995) conducted household surveys that asked respondents about past experiences of homelessness. These revealed substantially higher lifetime and five-year rates of homelessness than comparable point-in-time estimates. These studies have been replicated, with similar results, in the United

States (Fusaro et al. 2018; Greenberg and Rosenheck 2010; Ringwalt et al. 1998; Tompsett et al. 2006; Tsai 2017), the United Kingdom (Bramley and Fitzpatrick 2018; Burrows 1997), Australia (ABS 2011, 2015; Chamberlain and Johnson 2015), Belgium, Germany and Italy (Toro et al. 2007). Differences between point-in-time and retrospective counts may be partly attributed to undercounting in point-in-time estimates and differences in definitions and particularly how definitions and survey instruments are operationalised.

A larger part of the difference relates to the episodic nature of homelessness. This nature has been revealed through analyses of administrative data and targeted longitudinal sample surveys that compare prevalence rates in homeless shelters over different period lengths (Culhane et al. 1994), analyse the characteristics of people by their episode lengths (Chamberlain and Johnson 2013; Kuhn and Culhane 1998) and measure entries, exits and returns to and from homelessness (Cobb-Clark et al. 2016; Culhane and Kuhn 1998; Metraux and Culhane 1999; Wong and Piliavin 1997). Since individuals and families experience homelessness episodically, moving in and out of homelessness through time, more people experience it than are counted on a single night. The Australian Bureau of Statistics (ABS 2015), for example, estimated from the 2014 General Social Survey that 351,000 adults (15 years and over) had been homeless in the previous 12 months, 993,000 in the previous five years and 1.4 million in the previous ten years. These compare with 97,000 adults counted on Census night 2016 under a broader definition of homelessness (ABS 2018). In producing prevalence rates over given periods, retrospective household surveys have thus been able to capture a greater degree of this dynamic, revealing homelessness as a more common experience than point-in-time counts suggest.

Estimation of period-prevalence rates are restricted by the limitations of available data. A potentially large though unmeasured source of bias in homelessness estimates from households surveys arises from the fact that survey sample frames are generally only of individuals living in private households, thus largely excluding those who are homeless at the time of the survey. The bias is relatively small in lifetime rates, but increases as the period of

interest shortens to five years or one year. The bias is such that Shinn (2010; p.20) argues this makes “surveys worthless for estimating current homelessness”, while Ringwalt et al. (1998; p.1,328) justify their estimates of annual prevalence as the “best empirically derived lower-bound estimate to date”. Administrative data are limited primarily by the fact that not all individuals experiencing homelessness interact with service providers. While the ABS (2015), for example, estimated that 351,000 adults experienced a completed episode of homelessness in Australia in the year ending June 2014, only 93,000 adults were recorded in homelessness services data in the same financial year where they were recorded as homeless either at the start, end or during their support period (AIHW 2018). Thus, while the greater prevalence of homelessness over increasing lengths of time is well understood, reliable estimates are difficult to derive.

Data

The Australian Bureau of Statistics (ABS 2015) conducted the fourth edition of the General Social Survey (GSS) from March to June 2014. The sample frame included all private dwellings in Australia, except those in very remote parts of Australia and discrete Indigenous communities. An initial sample of 18,574 dwellings were randomly selected from geographic areas, with low socioeconomic areas over-sampled. Households residing in the sampled dwellings were contacted and an individual was randomly chosen to participate from within each. The final sample consisted of 12,932 people aged 15 years and over, giving a response rate of 80 per cent. Interviews were conducted face-to-face. People who were experiencing homelessness at the time of the survey were excluded from the sample, as were people staying in non-private dwellings.

Data were analysed in the ABS DataLab, a remote access system designed to allow approved researchers access to unit record data. Outputs were checked and approved by ABS officers before release to protect against breaches of confidentiality. The dataset contains

population weights, scaled to match the total estimated in-scope population. A set of 60 Jackknife replicate weights were also provided to generate standard errors.

The ABS defined homelessness in the GSS through two questions. These are shown in Table 3.1. The first question asked respondents whether they had ever stayed in any of the accommodation types listed because they did not have a permanent place to live. The second asked for all the reasons they did not have a permanent place to live. Respondents are counted as having experienced homelessness if they had ever been without a permanent place and cited at least one of the reasons outside of the first six listed. In other words, this question filters out of the homelessness count people who have only ever been without a place to live due to one of the first six reasons. This approach is consistent with the principles of the ABS's (2012a) statistical definition used to count homelessness in the national Census, where people are not counted as homeless where they are considered to have alternatives. Intuitively, it seems reasonable that individuals staying with family or friends because, for example, they have just moved back into town are not considered homeless. However, it is perhaps harder to justify the same for people 'sleeping rough' or staying in an emergency shelter. The ABS (2012b) argues that without this type of filter, people who are living in a tent while building or renovating their home may be otherwise counted as sleeping rough.

Table 3.1 Homelessness questions in the GSS

Question	Response categories
Have you ever experienced any of these things because you did not have a permanent place to live? *More than one response is allowed.*	1. Stayed with relatives 2. Stayed at a friend's house 3. Stayed in a caravan *(mobile home)* 4. Stayed at a boarding house / hostel 5. Stayed in a night shelter 6. Stayed in a shelter for the homeless 7. Stayed at a refuge (e.g. women's shelter) 8. Squatted in an abandoned building 9. Slept rough (include sleeping in cars, tents etc.) 10. Stayed in a detention centre 11. Other (Please specify) 12. No
What led to you being without a permanent place to live? *More than one response is allowed.*	*1. Travelling / on holiday* *2. Work related reason* *3. House-sitting* *4. Saving money* *5. Just moved back / into town or city* *6. Building or renovating home* *Not homeless* 7. Tight housing / rental market 8. Violence / Abuse / Neglect 9. Alcohol or drug use 10. Family / Friend / Relationship problems 11. Financial problems (e.g. not able to pay mortgage or rent) 12. Mental illness 13. Lost job 14. Gambling 15. Eviction 16. Natural Disaster 17. Refugee 18. Damage to house (e.g. house fire) 19. Health issues 20. Other (Please specify)

Source: ABS (2015)

Responses to the GSS homelessness questions are provided in Table 3.2. Based on the survey results, 13.4 per cent of the population are estimated to have ever been without a permanent place to live due to a reason constituting homelessness. The 95 per cent confidence interval around this estimate is [12.4; 14.5]. The most commonly cited reason for homelessness was relationship problems. The most common accommodation type among those who have ever been homeless is staying with family or friends. The surveys also asked about the timing and length of respondents' most recent experience of homelessness. An estimated 1.9 per cent of people [1.5; 2.3] living in private dwellings at the time of the survey experienced homelessness in the 12 months prior to the survey. An estimated 6.6 per cent of people [5.9; 7.3] experienced an episode of homelessness in the last 10 years that lasted for up to one year.

Table 3.2 Timing and length of most recent homelessness episodes, GSS 2014

	Weighted % of population	95% confidence interval	
		Lower	Upper
a) Reasons for ever being without a permanent place to live			
Non-homelessness reason			
Travelling/on holiday	3.4	2.9	3.9
Work related reason	2.8	2.3	3.2
House sitting / saving money	2.8	2.4	3.2
Just moved back / into town or city	8.0	7.2	8.7
Building or renovating home	2.6	2.2	2.9
Homelessness reason			
Tight housing / rental market	2.0	1.6	2.3
Violence / Abuse / Neglect	1.4	1.1	1.7
Mental illness / alcohol or drug use	0.9	0.7	1.1
Family / Friend / Relationship problems	6.7	6.1	7.3
Financial problems / lost job	2.9	2.5	3.3
Other	3.9	3.3	4.5
Total homelessness	13.4	12.4	14.5
b) Accommodation types of those ever homeless			
Stayed with family / friends	11.9	10.9	12.9
Stayed in a homeless shelter or refuge	1.1	0.9	1.3
Slept rough / squatted	2.1	1.7	2.4
Stayed in a caravan / mobile home	2.5	2.1	2.9
Stayed at a boarding house / hostel	1.7	1.4	2.0
Other	0.5	0.3	0.7
c) Timing of most recent homelessness episode			
Less than 12 months ago	1.9	1.5	2.3
Less than 2 years ago	3.1	2.5	3.6
Less than 5 years ago	5.4	4.6	6.1
Less than 10 years ago	7.7	7.0	8.5
Ever	13.4	12.4	14.5
d) Length of most recent homelessness episode (last 10 years)			
One day to less than 1 week	1.1	0.8	1.4
One to less than 2 weeks	0.7	0.5	1.0
Two weeks to less than 1 month	1.0	0.7	1.3
One month to less than 1 months	1.0	0.7	1.3
Two to less than 3 months	0.9	0.7	1.2
Three to less than 6 months	1.3	1.1	1.6
Six to less than 12 months	1.2	1.0	1.5
12 months or more	1.1	0.8	1.4
e) Number of times ever without a permanent place to live			
One time	7.7	6.9	8.5
Two times	2.0	1.6	2.4
Three times	1.1	0.8	1.3
Four times	0.4	0.3	0.6
Five or more times	1.2	1.0	1.4

Source: ABS (2015)

The *Journeys Home* study (Wooden et al. 2012; Scutella et al. 2017) is used as a supplementary data source to estimate the timing and duration of homeless episodes –

particularly those lasting longer than 12 months. As discussed in Chapter 2, while the definitions of homelessness used in the GSS (statistical definition) and *Journeys Home* (cultural definition) are conceptually different, in practice they are constructed using the same operational categories. The main differences lie in the questions used to collect information on homeless categories between the surveys and the fact that the GSS contains the filter question described above. Interestingly though, analyses of *Journeys Home* suggests it is not particularly representative of total homelessness in Australia. It contains a smaller homeless population than the GSS and excludes those who were not receiving income support prior to the survey and potentially those whose homelessness was never recorded in the income support system. Compared with the GSS, completed episodes of homelessness are longer with approximately 28 per cent lasting 6-12 months and 20 per cent lasting 12 months or longer. Further, without a refreshment sample of newly homeless, the decline in homelessness rates over the course of the survey period is not representative of a broader trend in homelessness nationally. For these reasons, *Journeys Home* is used in this study to analyse the homeless episodes within the duration ranges used in the GSS survey (Table 3.2d) and is otherwise not assumed to represent homelessness nationally.

Estimating the currently homeless

I propose an approach for estimating the number of people experiencing homelessness at the time of a retrospective household survey – in this case, the GSS. This relies on information provided by respondents on the timing and length of recent homeless episodes to estimate a ratio of homeless episodes missed by the survey to those captured. To explain, consider the proposition that the population who experiences homelessness in the 12 months leading up to the selection of the GSS sample has a probability of being homeless at the time of selection and therefore ineligible and unrepresented in the GSS. This probability is related to the duration of homelessness over the year. The shorter the duration, the larger the exposure time and the smaller the probability of selection in the GSS sample and vice versa. A person who is homeless for one week, for example, has only a one-in-52 chance of being homeless on a

given night during the year, compared with a 40-in-52 chance for someone homeless for 40 weeks. If homeless episodes are uniformly distributed throughout the year, these probabilities can also be taken as the probabilities of being homeless and ineligible at the time of sample selection. The odds of these probabilities represent the ratios of people homeless on a given night, t to those homeless over the 12 months but not at t. I refer to these odds as k ratios. Multiplying them by the observed population who were homeless in the last 12 months gives an estimate of the population who were homeless during the survey.

Several aspects need to be taken into account before calculating these ratios. Firstly, the survey asks about the duration of the most recent episode, rather than time spent homeless over the whole year. Secondly, episode durations are reported in ranges rather than exact values. As shown in Table 3.2d, there are eight reported duration ranges from less than one week to 12 months and over. Thirdly, episodes may have commenced in previous years as will certainly be the case for episodes longer than one year. Fourthly, completed episodes may not be captured in the GSS where individuals die or emigrate before the survey period or are living in non-private dwellings (for example, prisons and hospitals) or in remote parts of Australia during the period. Finally, trend or seasonal variation may affect the timing of episode commencement and duration. Fluctuations in housing markets, social and interpersonal support and/or the weather, for example, could affect the number of entries to, exits from and prevalence of homelessness at given points across the year. Thus, the relationship between the annual number of people homeless and the number homeless during the survey period will vary across the year.

A microsimulation model is used to deal with the aspects described above. The first step is to estimate the size of the previously homeless population from the GSS by the duration of their most recent episode. The probabilities of homelessness in the previous one, five and ten years and the length of the episode are simultaneously predicted with multinomial logistic regression on the individual-level data using Generalised Structural Equation Models in Stata 15 (Statacorp 2017). Age is modelled using a cubic spline with knots at 25, 35, 45 and 55

years. Knots were selected by testing different combinations and comparing their fit and p-values. The regression equations take the form:

$$\log\left(\frac{p(when_i)}{p(when_0)}\right) = \beta_{0f} + \beta_1.age + \beta_2.age^2 + \beta_3.age^3 + \beta_4.\max(0, age - a_k)^3 + \beta_5 female \quad 3.1$$

$$\log\left(\frac{p(length_d)}{p(length_8)}\right) = \beta_{0f} + \beta_1.age + \beta_2.age^2 + \beta_3.age^3 + \beta_4.\max(0, age - a_k)^3 + \beta_5 female + \beta_6 when_i \quad 3.2$$

age is the single year age of the respondent at the time of the survey, a_k are the four age knots (20, 30, 40 and 50 years); $female$ is a dummy variable indicating the sex of the respondent. The first equation is run on the full GSS sample and the second on the subsample who had been homeless in the previous ten years. Respondent ages are adjusted in the second equation to reflect their approximate average age at the time of their most recent homelessness episode – that is, their age at the time of the survey minus six months for episodes in the last 12 months, three years for episodes 1-5 years ago and 7.5 years ago for episodes 5-10 years ago. Interactions are included between each of the age variables and $female$ to produce separate splines for males and females. Interactions between $when$ and the age and sex variables are also tested in the second equation, though dropped if their p-values were greater than 0.15.

Predicted probabilities are multiplied by the GSS in-scope population by age and sex to produce homelessness population estimates. Estimates are constrained to population totals by Iterative Proportional Fitting (IPF). To do this, homelessness estimates by age, x, and sex, f, in the previous 12 months, h_{af}^{12} are firstly constrained to the total homeless population in the last 12 months ($h^{12} = 351{,}000$):

$$h_{x,f}^{12} = \frac{h_{x,f}^{12}}{\sum_x \sum_f h_{x,f}^{12}} \times h^{12} \quad 3.3$$

Estimates by age, sex and length, d, of homelessness in the last 12 months, h_{xf}^{12d}, are then iteratively constrained to h_{xf}^{12} and the total homeless population in the last 12 months by length of episode, h^{12d}:

$$h_{x,f}^{12,d} = \frac{h_{x,f}^{12d}}{\sum_d h_{x,f}^{12d}} \times h_{x,f}^{12} \qquad 3.4$$

$$h_{x,f}^{12,d} = \frac{h_{xf}^{12d}}{\sum_x \sum_f h_{x,f}^{12d}} \times h^{12,d} \qquad 3.5$$

These calculations are repeated until h_{xf}^{12d} converge on a stable set of values. For more information on IPF, see Lomax and Norman (2016). Estimates of h_{xf}^{12d} are used to weight simulated episodes so that their sum is representative of homelessness nationally. A small number of those aged 15 years who were predicted to have experienced homelessness as 14 year olds are dropped from the model to focus on the adult homeless population (defined in the GSS and in this chapter as 15 years and over).

Homeless episodes are generated for a synthetic population of 20,000 people for each of the eight duration ranges. That is, 20,000 people experience homelessness for up to one week, 20,000 for one-two weeks, 20,000 for two weeks to one month and so on. The simulation period is 12 months, designed to mirror the 2013-14 financial year, though episodes may commence prior to and/or conclude after this time. Individuals are assigned an age, sex and a flag indicating whether they die or not between one birthday and the next. Deaths occur where a uniformly distributed random number between 0 and 1 is less than or equal to the age and sex specific probability of death taken from national life tables for 2013-2015 (ABS 2016). For those who die, a date of death is simulated along a uniform distribution. This conservatively assumes that those who experience homelessness have the same age-specific mortality rates as the continuously housed. Although mortality rates have been shown to be high for those experiencing street and sheltered homelessness (Barrow et al. 1999; Metraux et al. 2011; Nilsson et al. 2018), no information is available on the mortality of this broader homeless population, particularly the large population who stay with family and friends.

Likewise, the population who are otherwise out-of-scope at the survey (for example, those in prison) are also assumed to share the same homelessness rates as the privately housed population. The effect of these assumptions on the final results are tested in the validation steps described below.

The exact number of days in an episode are simulated by constructing a homeless life table from the *Journeys Home* accommodation calendar. This is similar to a standard life table, except that in place of age, each row represents a single day of homelessness and, in place of mortality, life table decrements consist of exits from homelessness. The life table commences at day one, as all episodes are assumed to last at least one day and ends with episodes lasting five years or longer. Non-parametric probabilities of episodes concluding between day x and $x+1$, q_x, are estimated by dividing the number of episodes that end on day x, d_x, by the number of episodes that last to at least x days, H_{x+}:

$$q_x = \frac{d_x}{H_{x+}} \qquad 3.6$$

Homelessness 'survivorship', l_x, is estimated as:

$$l_1 = 1$$

$$l_{x+n} = l_x \times (1 - q_d) \qquad 3.7$$

The number of days is simulated by generating a random number for each individual between the survivorship value at the start, l_d, and end, l_{d+n}, of the duration range. If the random number is less than or equal to l_x and greater than l_{x+1} then the homeless episode lasts for x days. Durations for the two shortest duration ranges (less than one week and one to two weeks) were not simulated in this way due to small sample sizes and the fact that *Journeys Home* respondents reported accommodation episodes in ten day blocks. For these ranges, durations were simulated from uniform distributions. Average durations are shown in Table 3.3. These are similar to linear averages (halfway between the minimum and maximum number of days in each range) except in the 6-12 month range where the simulated average is shorter than the linear average (approximately 274 days). This may accurately reflect a

positively skewed distribution, although it may also be a consequence of duration heaping where *Journeys Home* respondents are inclined to report living in their current or past accommodation for six or 12 months.

Table 3.3 Estimating adult annual homelessness

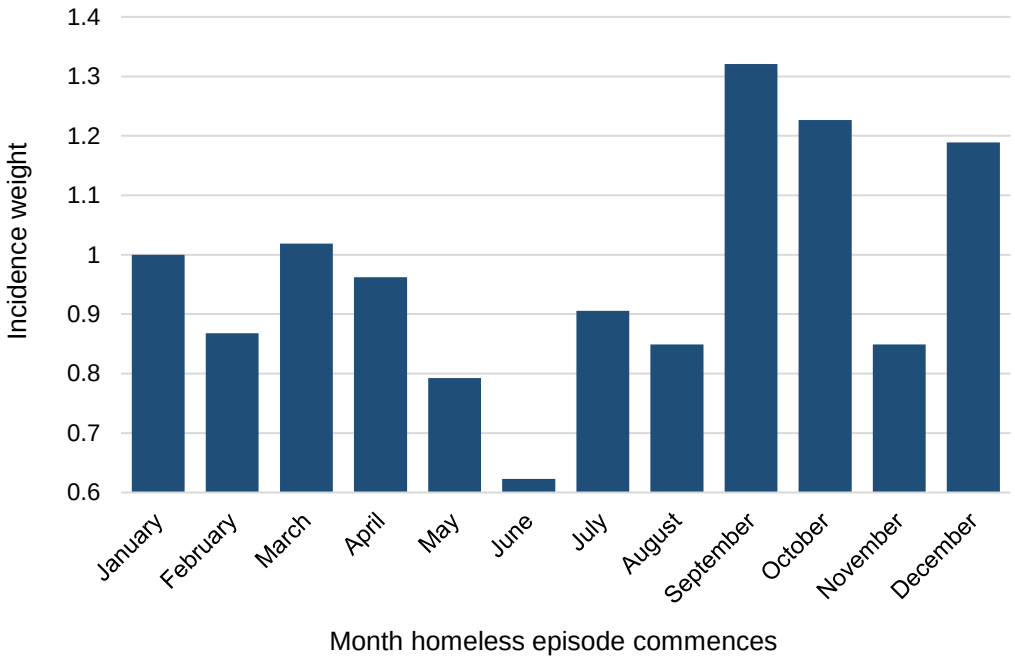
Duration of most recent episode, d	Ave. days	Homeless last 12 months ('000s)	Missing homeless ('000s)	k ratio	Total homeless, 2013-14 ('000s)	Std. error ('000s)
<1 week	4.0	53.5	1.5	0.029	55.0	16.0
1 to <2 weeks	10.5	46.2	2.5	0.055	48.7	17.9
2 weeks to <1 month	22.1	53.5	5.2	0.096	58.7	15.8
1 to <2 months	47.7	40.9	5.3	0.130	46.2	18.4
2 to <3 months	79.8	30.3	6.3	0.206	36.6	10.4
3 to <6 months	135.2	47.7	16.4	0.344	64.1	13.9
6 to <12 months	257.5	41.1	28.2	0.685	69.3	21.0
12+ months	802.6	37.8	70.4	1.862	108.3	39.3
Total		**351.0**	**135.8**	**0.387**	**486.8**	**61.6**

Source: author's estimates from ABS (2015), Wooden et al. (2012) and Scutella et al. (2017)

Episode start dates are simulated for all duration ranges along a uniform distribution between the date of sample selection and 365 days plus the duration. For example, if the duration is 21 days, the start date occurs sometime between zero and 386 days prior to sample selection. This allows for the fact that episodes in the past 12 months may have commenced in a prior year. End dates are then calculated by adding the start date to the duration. To account for the possibility of seasonal variation, a weight, w_m, is applied to each episode based on the month in which it commences. Weights are calculated from *Journeys Home* by calculating the number of homeless episodes that commence or conclude in the 12 months prior to the wave six survey. The survey period for this wave (March to May 2014) overlapped that of the GSS. The number of episodes commencing in each month, E_m, are divided by the number commencing in January, $E_{january}$, such that the weights are indexed to January ($w_{january} = 1$):

$$w_m = \frac{E_m}{E_{january}} \qquad 3.8$$

A single combined weight is calculated for episodes less than one month. Weights are shown in Figure 3.1. Note that these weights attempt to adjust for monthly variation in homelessness occurrence but assume the underlying trend in homelessness rates over the reference period is zero. The weights suggest that entries to homelessness may be more common towards the end of the year (the Australian Spring), though the differences may be driven by stochastic variation or other factors unique to the *Journeys Home* survey. Nevertheless, weights are used in their raw form as they provide the best evidence of seasonality.



Source: author's estimates from Wooden et al. (2012) and Scutella et al. (2017)

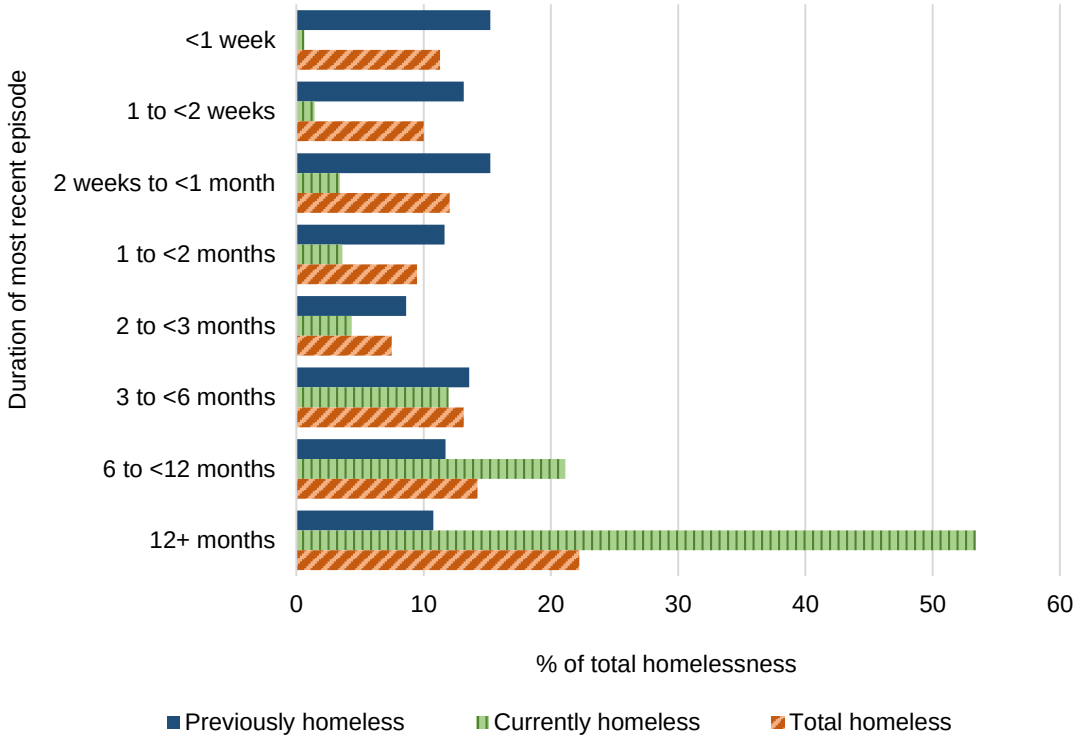
Figure 3.1 Monthly homelessness incidence weights

On completion of an episode, individuals join a private in-scope household or remain out-of-scope. Each household is randomly assigned a date, t_i, along a uniform distribution between 1 March and 30 June 2014, in which an individual member is selected to participate in the GSS. If individuals complete their homeless episode and enter the household prior to this date, they are eligible for inclusion in the sample and are considered represented in the survey results. If their episode overlaps the selection date, they are ineligible and unrepresented in the results. Individuals who died or are otherwise out-of-scope at the time of the survey are also ineligible and unrepresented. The ratio of those ineligible to those eligible

for episodes in each duration range d, k_d, is multiplied by the GSS estimate of the population homeless in the previous 12 months, h_{xf}^{12d}, to estimate total homelessness. The model is re-run using each of the 60 Jackknife replicate weights to produce estimated standard errors.

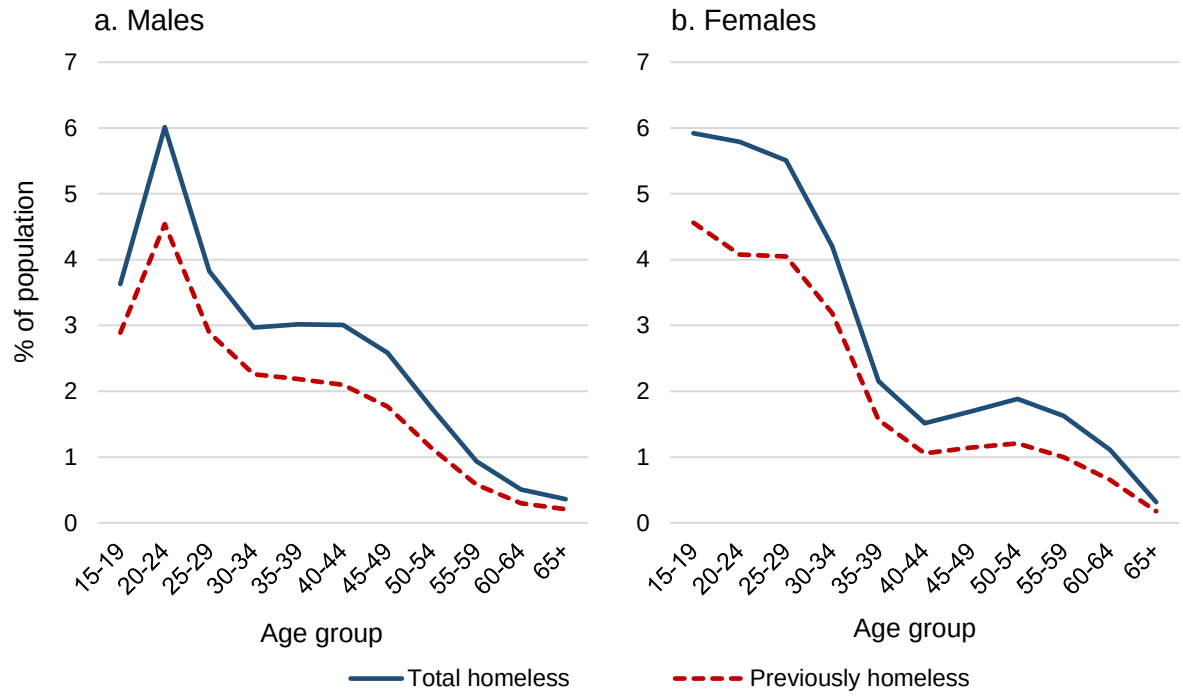
Several of the key results are presented in Table 3.3. The number previously homeless in 2013-14 (column 3) is derived directly from the GSS results. The missing homeless (column 4) is the estimated number of adults who were homeless in 2013-14 and not captured in the GSS, because they were homeless or out-of-scope at the time of the survey. This population is estimated at 135,800 people (s.e. 29,300). Of these, 130,800 (s.e. 30,000) are estimated to have been homeless at the time of the GSS, with the remainder otherwise out-of-scope. Thus, for every one person captured in the GSS, an estimated 0.387 adults are missed (column 5). In total, 486,800 adults (s.e. 61,600) are estimated to have been homeless in 2013-14. This equates to 2.6 per cent of the estimated resident population of Australia aged 15 years and over. The 130,800 adults who were homeless at the time of the GSS approximates a point-in-time or nightly estimate, equating to 0.7 per cent of the adult population.

The effect of different measures on estimates of episode duration are shown in Figure 3.2. By these estimates, 22 per cent of the population who were homeless in 2013-14 were homeless for 12 months or longer, compared with 52 per cent of the nightly population and 11 per cent of the previously homeless population. Age and sex rates of homelessness are shown in Figure 3.3. Rates are predicted to be highest for males and females in the late teens and/or early twenties. Predicted rates are higher for males than females in the 35-49 year age group, though this difference is not found to be statistically significant. Patterns are not substantially affected by how homelessness is measured. Middle and older aged adults are more likely to experience longer episodes, meaning they are proportionately more likely to be homeless at the time of the GSS. Nevertheless, nightly rates of homelessness are also higher for young adults.



Source: author's estimates from Wooden et al. (2012) and Scutella et al. (2017)

Figure 3.2 Predicted homeless episode durations, 2013-14



Source: author's estimates from Wooden et al. (2012) and Scutella et al. (2017)

Figure 3.3 Age and sex specific rates of homelessness, 2013-14

Estimating different forms of homelessness

Rates for different forms of homelessness are important for several reasons. They provide information on the nature and experience of homelessness and a basis for comparing estimates against a range of homelessness definitions. However, estimation from the GSS is difficult because the confidentialised unit record file does not contain the accommodation type experienced during respondents' most recent homelessness episode. It only includes the accommodation type ever experienced during any episode without a permanent place to live. Interestingly, the majority of respondents who have been homeless in the last 10 years reported being without a permanent place only once in their lives (see Table 3.4). Accommodation types can be computed directly from the available information for this group as any accommodation ever experienced must relate to their most recent (and only) experience. For respondents with multiple past experiences, accommodation in their most recent episode is simulated by assigning them accommodation types for each episode they have ever experienced. These are then revised so that the total number of people to have ever experienced each accommodation type is identical between the simulation and survey data. Table 3.4 presents survey estimates of the population experiencing homelessness in the last 10 years (excluding the missing homeless) by the accommodation type ever stayed in and the number of lifetime episodes without a permanent place to live.

Table 3.4 Accommodation types ever experienced by number of lifetime homeless episodes

Ever stayed in accommodation type	Number of episodes without a permanent place to live				
	1	2	3	4	5+
	Estimated population ('000s) homeless in last 10 years (std. error)				
Stayed with family/friends	2,731 (93)	775 (51)	340 (35)	134 (22)	333 (31)
Stayed in a caravan/mobile home	266 (36)	164 (23)	74 (14)	42 (11)	125 (16)
Stayed at a boarding house/hostel	156 (22)	89 (17)	72 (13)	27 (7)	125 (18)
Stayed in a shelter/refuge	47 (11)	37 (9)	32 (9)	14 (6)	92 (13)
Slept rough/squatted	137 (21)	61 (11)	70 (13)	25 (7)	181 (18)
Total homeless in last 10 years	3,027 (98)	819 (54)	367 (35)	146 (22)	358 (31)

Note: this table is based on calculations on the raw survey data, so excludes estimates for the missing homeless.

Source: ABS (2015)

The approach to estimating different forms of homelessness starts by predicting the number of episodes without a permanent place to live that respondents have ever experienced and all the accommodation types they stayed in during these episodes. This is achieved by adding two regression equations to the structural equation model described in equations 3.1-3.2. Note that respondents can and do report multiple accommodation types for a given episode, so episodes are interpreted as continuous periods of homelessness involving one or more accommodation types, each of which are therefore predicted through separate equations. The additional equations take the form:

$$\log\left(\frac{p(episodes^{e})}{p(episodes^{1})}\right) = \beta_0 + \beta_1 age + \beta_2 age^2 + \beta_3 age^3 + \beta_4 . \max(0, age - a_k)^3 + \beta_5 female + \beta_6 when_i + \beta_7 length_d \quad 3.9$$

$$\log\left(\frac{p(accom^{s})}{1-p(accom^{s})}\right) = \beta_0 + \beta_1 age + \beta_2 age^2 + \beta_3 age^3 + \beta_4 . \max(0, age - a_k)^3 + \beta_1 when_i + \beta_2 length_d + \beta_3 episodes_e \quad 3.10$$

The first equation is estimated with multinomial logistic regression and the second equation with a set of binary logistic regressions. Both sets are estimated on the subsample who reported being homeless in the previous 10 years. $episodes_e$ is the number of episodes respondents have ever been without a permanent place to live; $accom^s$ indicates whether the respondent has ever stayed with family or friends ($family$), in a caravan/mobile home ($caravan$), in a boarding/lodging house or hostel ($boarding$), a homeless shelter or refuge ($shelter$) and/or slept rough on the streets or in an improvised dwelling ($street$); p is the probability; and $\log$ is the natural logarithm. Cubic splines were tested using the same knots as previously along with interactions between each combination of independent variables. Knots were dropped if their p-values were greater than 0.15. From equations 3.9 and 3.10, the probabilities of having ever experienced e past episodes without a permanent place to live and of having stayed in each accommodation type s are estimated. Probabilities are multiplied by the predicted population homeless in the previous 12 months to estimate this population by age, sex, the length of their most recent episode, the number of episodes they have ever experienced and the accommodation types ever experienced,

$$h_{x.f}^{12,d,e,s} = p\left(accom_{x,f}^{d,e,s}\right) \times p\left(episodes_{x,f}^{d,e}\right) \times h_{x,f}^{12,d} \qquad 3.11$$

The next step is to approximate probabilities of having stayed in each accommodation type in the most recent episode. This is straightforward for the population who have only experienced one homeless episode in their lifetimes – the probability of having stayed in $accom^s$ in their most recent episodes is equal to the probability of having stayed in $accom^s$ in their lifetimes. To estimate probabilities for the population with two or more lifetime episodes, stays in $accom^s$ are simulated for each episode. The simulation is performed by using the probability of ever staying in $accom^s$ among those with one lifetime episode ($p\left(accom_{x,f}^{d,e=1,s}\right)$) – given the individual's age, sex and duration of most recent episode – as an initial proxy for the probability of staying in $accom^s$ in each episode. A random number, R, is drawn for each individual with two or more lifetime episodes. If R is less than or equal to $p\left(accom_{x,f}^{d,e=1,s}\right)$, then

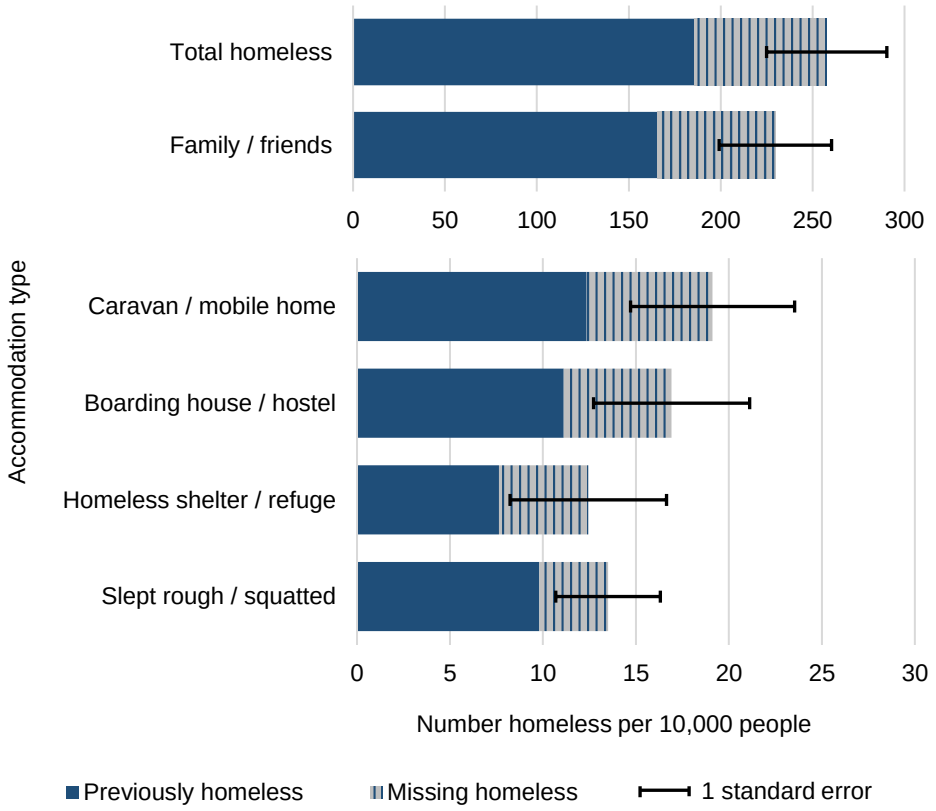
the individual is assigned to $accom^s$ in their first episode – noting that individuals can be assigned to multiple accommodation types for each episode. Whether individual, i, stays in $accom^s$ in their second episode is simulated in the same way,

$$accom_i^{e=2,d,s} = \begin{cases} 1, & R \leq p\left(accom_{x,f}^{family} \mid episodes = 1, length = d\right) \\ 0, & otherwise \end{cases} \quad 3.12$$

From these simulated episodes, the number of individuals with two past episodes who stayed in $accom^s$ in their second and most recent episode can be calculated. This population is then weighted so that the number of individuals who stay in $accom^s$ in either or both of their two episodes is equal to the predicted population, $h_{x.f}^{12,d,e=2,s}$, calculated in equation 3.11. The procedure is performed for the population with three past episodes by simulating a third episode and so on, up to a maximum of five episodes. The total population to have been homeless in each accommodation type by the length of their episode is estimated by summing the populations across those with one, two, three, four and five or more past episodes. Importantly, this approach is an indirect approximation

Estimated annual rates of homelessness in each accommodation category are shown in Figure 3.4. Strikingly, 434,000 (s.e. 57,800) people, or 230 in 10,000 adults in the general population are predicted to have stayed with family or friends while homeless in 2013-14. This equates to 89 per cent of the total homeless estimate. Estimates for the other accommodation types are substantially smaller and have relatively large standard errors. Differences between them are not statistically significant. Interestingly though, the most common of these is staying in caravans and mobile homes (19 per 10,000 adults; s.e. 4.4) and boarding houses and hostels (17 per 10,000; s.e. 4.2). The rates for homelessness in shelters and refuges are 12.4 (s.e. 4.2) and 13.5 (s.e. 2.8) per 10,000 people respectively. The ratio of nightly to total homelessness is relatively high for caravans/mobile homes (0.34), boarding houses/hostels (0.33) and shelters/refuges (0.36) compared with total homelessness (0.27) suggesting that

homelessness in these categories is likely to be overrepresented in point-in-time counts and underrepresented in retrospective measures.



Source: author's estimates from Wooden et al. (2012) and Scutella et al. (2017)

Figure 3.4 Annual homelessness rates by accommodation type, 2013-14

Validating and comparing the estimates

This microsimulation is intended to produce a more accurate estimate of the true prevalence of homelessness. However, the indirect approach to estimating the missing homeless potentially introduces new sources of error while amplifying existing ones. As previously discussed, particular assumptions are made about the timing and length of homeless episodes and the prevalence of homelessness among the out-of-scope population, including those who died or were incarcerated or hospitalised in the 12 months prior to the survey.

There are also several implicit assumptions concerning the GSS sampling strategy that may have been violated. For example, the model assumes no currently homeless

individuals have been inadvertently captured in the survey. Filtering the currently homeless out of the survey is probably straight forward for the street homeless though perhaps more difficult for those staying with family or friends or in longer term supported accommodation that is difficult to distinguish from private housing. Failure to exclude these groups will lead to double counting of homelessness in this model. Further, and as with any estimates based on retrospective data, these estimates rely on accurate respondent recall, understanding and interpretation of the survey questions. In this case, inaccuracies may be amplified where, for example, respondents overestimate the length of their most recent homelessness episode. This is because the k values are larger for longer past episodes, meaning that over-reporting of episode length will lead to an overestimate of the missing homeless.

One way to validate the estimates is to compare them against administrative data from Australia's homelessness services system. The GSS asks whether respondents sought assistance from housing and homelessness services during their most recent episode:

"Did you seek assistance from services such as these?

- *Housing service providers*
- *Crisis accommodation/supported accommodation for the homeless (e.g. Shelter, women's refuge etc.)"* ABS (2015, p.100)

Other types of services provided in response categories include mental health services, church or community organisations, health services, members of parliament, hospitals and the police. Respondents were allowed to provide multiple responses.

These responses are used to predict the probability of seeking help from housing and homelessness services, p_{help}, by age, sex, episode duration and timing of most recent episode among those homeless in the last 10 years:

$$\log\left(\frac{p_{help}}{1-p_{help}}\right) = \beta_0 + \beta_1.age + \beta_2.age^2 + \beta_3.age^3 + \beta_4.\max(0, age - a_i)^3$$

$$+\beta_5.female + \beta_6.age.female + \beta_7.when_i + \beta_8.length_d \qquad 3.13$$

Age is again modelled with a cubic spline with knots at 20, 30, 40 and 50 years. Interactions were tested between each set of variables, with only an interaction between age and sex retained in the final model. The resulting probabilities are multiplied by the estimated number of adults homeless in the last 12 months to derive an estimate of the number of homeless people to seek assistance from housing and homelessness providers during the 2013-14 financial year.

Of the annual homeless population, 20 per cent are predicted to have sought assistance from housing and homelessness services in 2013-14. This amounts to 98,200 adults (s.e. 15,200). This prediction is compared to the equivalent figure available in the *Specialist Homelessness Service Collection (SHSC)*, the national data collection for government-funded homelessness service providers in Australia (AIHW 2018). In 2013-14, 197,400 adults sought or received services. Of these, 93,400 were recorded as either homeless at first or final presentation or at some stage during a support period. There were another 33,900 adults whose homelessness status was not recorded. This may have been because an initial contact was not maintained or followed up. The remainder were considered at risk of homelessness, perhaps because they faced a threat of housing or accommodation loss (for example, an eviction notice or release from institutional care) which was resolved before homelessness occurred. One means of imputing the homelessness of the 33,900 adults with an unrecorded status is to assume that this population has the same rate of homelessness as those who did not receive support services but provided enough information to have a status inferred. This rate is approximately 12 per cent, which gives an estimate of an extra 4,000 homeless adults and 97,300 in total. This is reasonably close to the model prediction (98,200). On face value, this suggests a good degree of accuracy in the model estimates.

Caution is warranted for at least three reasons. Firstly, this comparison understates the true size of the error in the total homeless population. That only one-in-five people are predicted to seek help suggests the prediction error for the total homeless population could

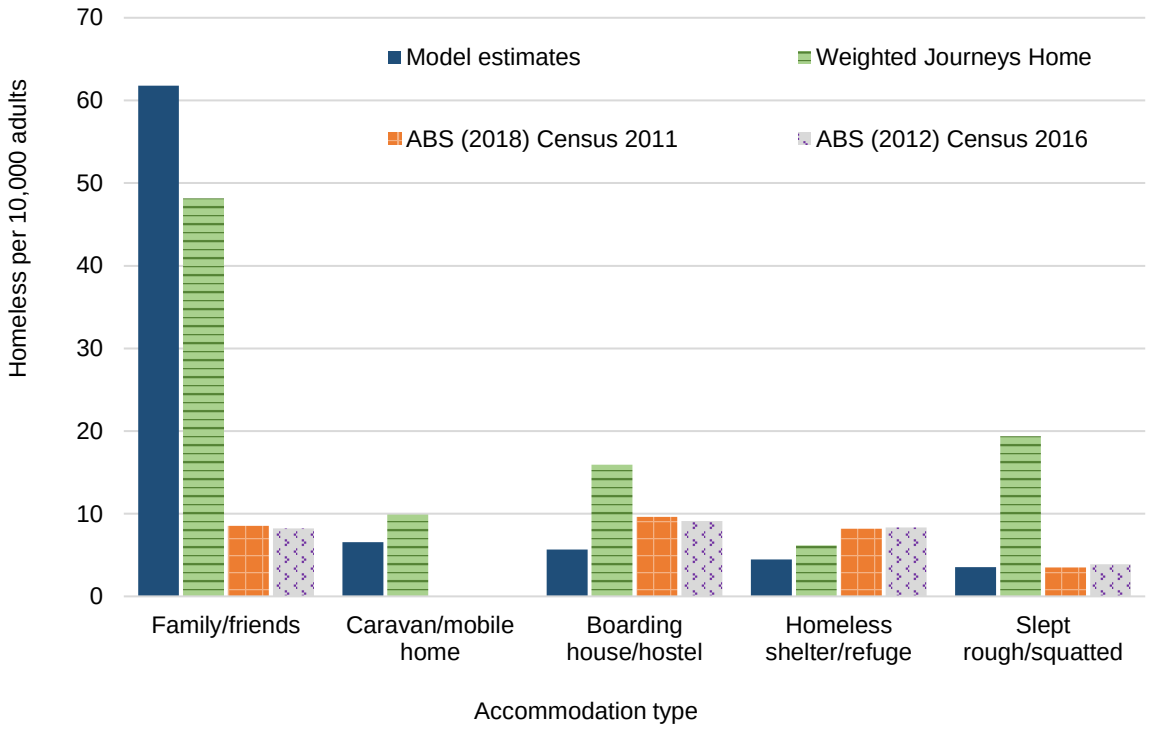
be five times larger than the error among those who seek help. Although, in this case, the error for the total population remains modest (4,100 people), this is sensitive to changes in the parameters and assumptions of the model and the imputation of administrative data. Secondly, the validity of the comparison to administrative data rests on a common definition and measurement of homelessness. The two sources use the same conceptual definition and categories of homelessness. However, differences in measurement no doubt arise given the GSS asks respondents to self-report past experiences with specifically worded questions while the SHSC measurement is based on administrative processing of data collected and reported by service providers and intake systems. Thirdly, the GSS questionnaire asks whether respondents sought help from housing or homelessness services. It is not known how these responses concord with actual presentations to services which are likely to be the product of referrals from other services, outreach in which services providers seek out clients and family and group presentations, in addition to self-referrals. In view of these points, the comparison to administrative data gives the model estimates plausibility as opposed to a high degree of certainty.

Validating the estimates for the different accommodation types is more difficult. One possibility is to compare estimates of shelter and refuge use to administrative data. In 2013-14, 59,400 adults were recorded in the SHSC as having received accommodation support (AIHW 2018), 2.5 times larger than the number predicted by the model to have stayed in homeless shelters and refuges (23,500, s.e. 7,900). A large portion of this difference is likely explained by the broader range of accommodation provided in Australia's homelessness services system. While the GSS focuses on accommodation in shelters and refuges, the homelessness services system includes longer-term and semi-permanent accommodation including transitional housing. The model estimates also better conform to Wright and Devine's (1995) argument that point-in-time ratios of street to sheltered homelessness are typically greater than one than if the shelter/refuge count was indeed substantially higher. On the other hand, the ratio of the average point-in-time rate of shelter/refuge use to the annual rate

predicted by the model (0.36) is lower than previously published estimates (Culhane et al. 1994). This suggests that the model predicts relatively long homelessness episodes among shelter users.

Model results can also be compared against Census counts and the *Journeys Home* survey. This is shown in Figure 3.5. To provide a reasonable basis for comparison against the point-in-time Census counts, the model estimates are of those at the time of the GSS. The *Journeys Home* estimates are calculated by weighting the number of respondents who were homeless at wave four so that the population estimates are equal to the model prediction of the total number of homeless adults at the time of the GSS by sex, age group and duration of episode. Wave four is chosen because the survey period covered a similar time of year to the GSS (March-May 2013) but early enough that episode durations are not affected by censoring.

Perhaps the most striking finding is that the model predicts a substantially larger prevalence of staying with family and friends than the two most recent Census estimates. Although this may result from model overestimates, it is also likely to reflect a longstanding issue in estimating this form of homelessness in the Australian Census (Chamberlain and Mackenzie 1999). The weighted *Journeys Home* estimates also suggest it is much more prevalent than the Census suggests, though not as much as in the GSS model. For the other accommodation forms, the model appears to underestimate the other forms. In saying that, note that a) *Journeys Home* represents a highly disadvantaged population, so will perhaps overestimate these three categories, particularly rough sleeping; b) as with the SHSC, the Census shelter count includes all forms of accommodation support, not just shelters and refuges; and c) unlike in the Census and *Journeys Home*, GSS respondents are asked to self-report staying in different accommodation types specifically because they did not have a permanent place to live. In other words, people may stay in different accommodation forms without necessarily considering it temporary. Nevertheless, these comparisons suggest a high degree of uncertainty worthy of further research.



Source: author's calculations from ABS (2012c, 2015, 2018); Wooden et al. (2012); Scutella et al. (2017)

Figure 3.5 Comparison of GSS model predictions to Census and *Journeys Home* estimates

Conclusion

Homelessness is difficult to measure. Just as with point-in-time estimates, annual predictions are subject to substantial uncertainty. Estimates of homelessness in different accommodation types has proved particularly challenging. The Jackknife standard errors give a sense of the sampling error, however the potential for non-sampling error appears large. As discussed throughout the chapter, there are a number of possible sources of error, including those related to sampling, sample sizes and recall. Sampling is a particular issue for measuring such a phenomenon that is reasonably rare in the general population, highly episodic and highly elusive, requiring data that is both targeted and able to be generalised. Combining different datasets provides the ability to overcome some of the limitations inherent in each, though this requires uniformity not only in how homelessness is defined but also operationalised and measured. To the extent these were managed in this study, notable shortcomings include the omission of homelessness among children, emigrants who left the country and those who

died, were institutionalised or moved out-of-scope before the end of year, as well as in other increasingly recognised categories of homelessness such as household crowding (ABS 2012a). Future data collection in this area ought to consider how to better integrate the design, timing and measurement aspects of point-in-time, household survey and administrative data instruments.

In the meantime, the annual rates estimated in this study are valuable. The comparison to administrative data suggests the magnitudes of these estimates are plausible. Even if not highly precise, they point to certain truths about homelessness that are sometimes suppressed in traditional measures. Firstly, homelessness is more prevalent than typically measured, affecting a larger cross-section of the population. Secondly, homelessness is more diverse in length and severity with a larger population experiencing temporary and episodic homelessness than point-in-time estimates indicate. In this chapter, the effects on estimates by age, sex and accommodation type were reasonably modest, though associations between annual homelessness and personal characteristics and attributes remain a topic for future research. Thirdly, staying with family/friends and in various forms of marginal and sub-market accommodation is as common if not substantially more so than street and sheltered homelessness. While it is a long running topic of debate whether these constitute homelessness (Rossi 1989; Chamberlain and Mackenzie 1992; Koebel and Murray 1999), it is noteworthy in the GSS questionnaire that survey respondents self-report staying in these forms of accommodation specifically because they do “not have a permanent place to live” (ABS 2015, p.97) and for reasons related to previous housing loss and homelessness. Whether considered ‘homeless’ or not, interpersonal housing support is evidently a common means through which young adults, in particular, manage a lack of permanent, independent housing.

These points offer theoretical and practical insights into the nature of homelessness. Consideration of the greater prevalence and diversity of homelessness gives rise to the hypothesis that social and economic structures expose a larger population to housing loss and

homelessness than generally understood. The experience for many individuals and families however is relatively transitory, perhaps owing to the personal, interpersonal and institutional resources they utilise to avoid or escape the most severe and long-lasting consequences of homelessness including chronic 'rough sleeping' (Piliavin et al. 1993; Wong and Piliavin 1997; Shinn et al. 1998; O'Donnell 2019). In particular, people with well-developed support networks draw on these supports to a very large extent in managing housing loss, family breakdown and economic crises. For many, this may be a positive mechanism, providing a stepping stone back into stable housing. For others though, it may be a pathway to deeper housing deprivation and homelessness.

4

The suburbanisation of homelessness in Sydney, Australia[3]

Abstract

Homelessness in recent decades has been seen as highly spatially concentrated in the inner areas of large cities. Recent research suggests that homelessness remains spatially concentrated, though with some evidence of dispersion and the development of multiple clusters. This chapter analyses the spatial patterns of different types of homelessness under a relatively broad definition in Sydney, Australia using data from the national Censuses of 2001, 2006 and 2011. Convergence analysis is used to assess whether homelessness rates in different regions of the city have been converging or diverging. Homelessness in private dwellings, particularly in severely crowded dwellings, have indeed created clusters in Sydney's western suburbs, while homelessness on the streets, in shelters and boarding houses remains concentrated in inner city areas. Growth in severe crowding in these suburban clusters and an increased concentration of boarding houses in inner city areas appears to have increased the spatial concentration of homelessness in Sydney over time. These findings are argued to

[3] This chapter was published as:
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be important for understanding the relationships between point-in-time homelessness distributions, the dynamics and processes that lead to these distributions and the underlying structural causes of homelessness.

Introduction

In recent decades, homelessness has been seen as a highly spatially concentrated phenomenon. Often associated with vagrancy and itinerant labour in past centuries, the spatial characteristic of homelessness came to be seen as distinctly urban in the works of the 'Skid Row' researchers of the 1950s, 1960s and 1970s (Wallace 1965). Since then, new and expanded definitions of homelessness have increasingly enumerated people living in private dwellings as homeless and consequently given rise to suburban clusters (ABS 2012c). Under a variety of definitions, researchers have examined the spatial patterns and dynamics of homelessness and sought to identify some of the neighbourhood and city-level structural causes from these patterns and dynamics (Lee et al. 2003; Culhane et al. 1996; Byrne et al 2013; Johnson et al. 2015). This chapter contributes to this field by examining the spatial patterns of different forms of homelessness under Australia's statistical definition (ABS 2012a). Taking the city of Sydney as a case study, the chapter shows that a relatively broad definition of homelessness creates a multi clustered spatial pattern.

Understanding the spatial distribution of different types of homelessness is important for at least two reasons. Firstly, it improves our understanding of the relationship between point-in-time counts of homelessness, the processes and dynamics that produce these counts and hypothesised structural drivers, such as local and city-level housing and labour market deficiencies. Secondly, the spatial pattern of homelessness is an important determinant of resource allocation, particularly where accommodation and non-accommodation services, such as homeless shelters, should be located. Understanding the patterns of different forms of homelessness is important given the likelihood that different resources and strategies are required to locate, enumerate and assist populations experiencing homelessness in different forms.

Background

According to various studies, homelessness shifted from a widely spatially dispersed to a tightly concentrated urban phenomenon over the course of the late 19th and 20th centuries. Wallace (1965) argued that homelessness existed in the United Kingdom for many centuries in the form of vagrants and 'drifters' who wandered through rural England, a form that appeared in countries like Australia and the United States (Wallace 1965; Rossi 1989; Garton 1990). According to Wallace (1965), homelessness in the US came to be a much more spatially fixed phenomenon by the 1870s, driven principally by the rapid growth and concentration of poverty, single room boarding houses and shelters in run-down inner city areas that came to be known as 'Skid Rows'. Skid Rows were the subject of a large body of research in the 1950s, 1960s and 1970s, perhaps most famously through research on the Bowery district of New York City (e.g. Bahr 1967; Bahr 1968). This research was highly influential in Australia, inspiring studies on urban homelessness in Melbourne (Jordan 1965), Sydney (de Hoog 1972) and Brisbane (Ward 1977). De Hoog's (1972) ethnographic research suggested that Sydney's homelessness was largely concentrated at the southern end of the Central Business District (CBD), though Jordan (1965) and Ward (1977) argued that Australian Skid Rows were much less geographically defined and concentrated than in the US, albeit distinctly urban.

Efforts to rigorously measure the scale of homelessness led to more precise definitions of homelessness. In the 1980s and 1990s, large scale national and sub-national studies in the US, including the 1990 Census, opted for a relatively narrow definition focused on people living on the streets and in homeless shelters (Elliot and Krivo 1991; Rossi 1989; Burt 1992; Barrett et al. 1992). In Australia, homelessness was first counted in the national Census in 1996 under the broader cultural definition (Chamberlain 1999). As discussed in Chapter 2, the cultural definition included people on the streets, in shelters, boarding houses and crucially in private households in the form of people staying temporarily with friends and family. In recent years, new definitions including in Europe (FEANTSA 2005) and Australia (ABS 2012c) have gone

further into private dwellings. The Australian Bureau of Statistics (ABS 2012a) statistical definition, for example, includes people living in 'severely crowded' dwellings, measured by subtracting the number of bedrooms in each private dwelling from the number of bedrooms required to adequately house all usual residents, as defined by the Canadian National Occupancy Standard (CNOS). CNOS assumes all single and couple adults require their own bedroom, children under five years can share a bedroom and children aged five to 17 years can share a bedroom if they are of the same sex. All individuals living within dwellings that require four or more extra bedrooms are defined to be living in severely crowded dwellings and therefore homeless under the ABS statistical definition. Though not well researched to date, the inclusion of severe crowding potentially alters the spatial pattern of homelessness, largely because of the size, growth and suburban character of severe crowding (ABS 2012c).

The relative spatial concentration of homelessness under various definitions has been the subject of recent research. Lee and Price-Spratlen (2004) analysed the spatial distribution of homelessness on the streets and in shelters from the 1990 US Census. They found that homelessness in these forms was spatially concentrated in central city areas including many of the former Skid Rows. New pockets of homelessness had also emerged, in what the authors describe as a polynucleated pattern. In Australia, Wood et al. (2014) analysed national changes in the spatial concentration of homelessness under the statistical definition in the 2001, 2006 and 2011 Censuses, finding that homelessness, although highly spatially concentrated, became more dispersed over time. A number of studies have also sought to identify the structural causes of homelessness based on spatial patterns. These studies associate point-in-time estimates of homelessness in particular areal units to housing, economic and demographic variables at the level of these units (Byrne et al. 2013). Studies invariably find that rent levels, poverty, unemployment rates and/or the proportion of single person and female headed households at the neighbourhood or city level are significantly associated with homelessness rates in the same area (e.g. Blid et al. 2008; Byrne et al. 2013; Elliot and Krivo 1991; Fargo et al. 2013; Lee et al. 2003; Wood et al. 2014). These studies

argue that in identifying these spatial associations, they are revealing some of the structural drivers of homelessness.

A criticism of such spatial-structural approaches is that they seek to identify the causes of homelessness often without reference to the spatial and temporal dynamics of homelessness. Lee and Price-Spratlen (2004) warn that spatial patterns derived from point-in-time counts ignore the underlying spatial flux caused by shelters closing and relocating and street homelessness shifting in response to the weather, income earning opportunities, urban development and the local authorities. A number of studies have sought to take account of these dynamics by analysing, for example, the spatial dynamics of homeless people over a multiple wave survey (Alexander-Eitzman et al. 2013), the socioeconomic variables of the neighbourhoods people resided in before entering homeless shelters (Culhane et al. 1996), the previous migration histories of people experiencing homelessness at the time of survey (Somers et al. 2016) and the probabilities of entering and exiting homelessness by the socioeconomic characteristics of origin locations (Johnson et al. 2015). In the absence of longitudinal or retrospective data, spatial autocorrelation models may at least control for homelessness clusters and spatial dynamics that spill across neighbouring areal units – something that Iwata and Karato (2010) found to be the case in their study of the spatial pattern of homelessness in Osaka City, Japan. Such studies identify and/or control for population dynamics that may confound spatially fixed causal models of homelessness.

The inclusion of severe crowding in Australia's definition of homelessness complicates the interpretation of spatial patterns. US studies from the 1990 and 2000 Censuses found that household crowding, as measured by the proportion of households with a person per room ratio of greater than one, has been spatially concentrated in metropolitan areas with highly ethnically diverse populations, most notably California, Hawaii and Texas (Myers et al. 1996; Simmons 2005). These spatial patterns are the result of high levels of crowding in Hispanic and Asian households, particularly among recent immigrants to the US (Clark 2000; Myers et al. 1996; Myers and Lee 1996). In New Zealand, results from national Censuses between

1986 and 2006 indicate that rates of household crowding, as measured by the CNOS, are highest for Pacific Islander (particularly Tongan), Maori and Asian households (Statistics New Zealand 2012), suggesting that spatial patterns of crowding in New Zealand are also likely to reflect ethnic population distributions. The association between ethnicity and these measures of crowding has been a source of controversy within the literature. A number or researchers argue that measures of crowding such as the persons per room ratio and the CNOS are inapplicable to other ethnic groups where cultural norms and family ties support higher households densities (Lauster and Tester 2010; Memmott et al. 2012; Myers et al. 1996) and have relatively weak associations with individual and family perceptions of crowding and potential adverse consequences (Booth and Edwards 1976; Edwards et al. 1994). Studies have found though that rates of household crowding within ethnic groups are also strongly associated with levels of socioeconomic disadvantage, including as measured by personal and household income and poverty levels (Clark 2000; Myers et al. 1996; Myers and Lee 1996). Although some of these authors argue that socioeconomic disadvantage is of secondary importance to ethnic household composition, their results suggest that rates of crowding within ethnic groups decline substantially with increases in income. This raises the possibility that entering a crowded household is an ethnic-specific strategy, particularly among recent immigrants, to manage and mitigate poverty and financial stress perhaps by drawing on the support of extended family networks. This proposition would support a hypothesis that severe crowding in Australian cities under the ABS (2012a) definition is spatially concentrated in suburban areas with large immigrant populations and relatively high levels of socioeconomic disadvantage.

The present chapter aims to analyse the spatial patterns of homelessness in Sydney, Australia using the ABS (2012a) statistical definition of homelessness. It is hypothesised that the spatial pattern of total homelessness will be the product of diverse spatial concentrations produced by each category of homelessness. Patterns will be analysed over time to determine whether homelessness under each category has become more or less spatially concentrated

and the resulting impact on total homelessness. It is proposed that any apparent concentration or dispersion may be the result of an actual dispersion or concentration in one or more homelessness categories and/or differential growth in the different homelessness categories.

Data

Point-in-time homelessness counts are sourced from the Australian Censuses in 2001, 2006 and 2011 (ABS 2012c; 2012d). Estimates are available by geographic area based on the different geographic structures used for each Census. Counts from the 2001 and 2006 Censuses are based on the 2001 and 2006 editions of the Australia Standard Geographic Classification (ASGC). Counts from the 2011 Census are based on the Australian Statistical Geography Standard (ASGS). The ASGC and ASGS are hierarchical classifications, in which a set of relatively large spatial units covering Australia are comprised of layers of increasingly smaller sets. Table 4.1 illustrates the geographic structures in Sydney – the focus of this chapter. The Statistical Division (SD) of *Sydney* under the ASGC and the Greater Capital City Statistical Area (GCCSA) of *Greater Sydney* under the ASGS define a very similar though not identical boundary around the greater metropolitan and surrounding areas of Sydney. The SD of *Sydney* is comprised of 14 Statistical Subdivisions (SSDs). SSDs are comprised of Statistical Local Areas (SLAs), which in turn are comprised of Collection Districts (CDs). The ASGS applies a similar hierarchy with the GCCSA being the largest spatial unit and Statistical Areas 1 (SA1) being the smallest. Sydney is defined in this chapter by the Greater Capital City Statistical Area (GCCSA) of *Greater Sydney* (ABS 2010).

Table 4.1 ABS Australian Standard Geographic Classification (ASGC) 2001 and 2006 and Australian Statistical Geography Standard (ASGS), Sydney

Australian Standard Geographic Classification (ASGC)	**2001**	**2006**	**Australian Statistical Geographic Standard (ASGS)**	**2011**
Statistical Division (SD)	*Sydney*	*Sydney*	Greater Capital City Statistical Area (GCCSA)	*Greater Sydney*
Statistical Subdivision (SSD)	14 in *Sydney*	14 in *Sydney*	Statistical Area 4 (SA4)	15 in Greater *Sydney*
Statistical Local Area (SLA)	49 in *Sydney*	64 in *Sydney*	Statistical Area 3 (SA3)	47 in *Greater Sydney*
Collection District (CD)		6,788 in *Sydney*	Statistical Area 2	279 in *Greater Sydney*
			Statistical Area 1	10,845 in *Greater Sydney*

Source: ABS (2010; 2006a; 2001)

Homelessness is defined under the ABS (2012a) statistical definition of homelessness. This definition categorises homelessness into six groups:

1. *Persons living in improvised dwellings, tents or sleeping out*: includes people 'sleeping rough', living on the streets, parks, unused buildings;
2. *Persons staying in accommodation for the homeless*: people staying in homeless shelters and refuges;
3. *Persons staying temporarily with other households*: people who are 'couch surfing' or 'doubled up', staying in private households with friends, relatives or in visitor-only households;
4. *Persons living in boarding houses*: people staying in single room occupancy lodgings or hotels that have shared bathroom and kitchen facilities and principally cater to homeless people;
5. *Persons living temporarily in other lodgings*: includes people staying in hotels and motels on a nightly basis and with no usual residence; and

6. *Persons living in severely crowded dwellings*: people living in private dwellings that require four or more additional bedrooms to adequately house all usual residents under the CNOS.

Table 4.2 shows for each homelessness category the smallest geographic area for which population estimates are available and the estimate for Sydney. The category *Persons living temporarily in other lodgings* has a small number of people (118-146 people in *Greater Sydney* in 2011) and is combined with the *Persons living in boarding houses* category. This chapter groups homelessness into two categories, homelessness in non-private dwellings (categories 1, 2, 4 and 5 in the above list) and in private dwellings (categories 3 and 6). The ABS did not retain information on the location of people staying in supported accommodation for the homeless after the 2001 Census, so estimates by geographic area are not available for this category or for total homelessness in 2001. Rates of people experiencing homelessness per 10,000 residents are reported for geographic areas using ABS Estimated Resident Populations (ERP) as at 30 June on the year of the Census (ABS 2015).

Table 4.2 Smallest geographic area of homeless counts and total counts for Sydney

	Smallest geographic area of estimates			Estimate of homeless in Sydney		
	2001	2006	2011	2001[a]	2006[a]	2011
Living in improvised dwellings, tents, sleeping out	SLA	SLA	SA3	700	739	1,003
Staying in accommodation for the homeless	NA[b]	SSD	SA3	NA[b]	2,322	2,831
Staying temporarily with other households	SSD	SLA	SA3	2,779	2,613	2,690
Living in boarding houses and temporary lodgings	SSD	SSD	SA3	6,013	5,016	5,454
Living in severely crowded dwellings	SLA	SLA	SA3	3,979	4,687	8,261
Total homelessness	**NA[b]**	**SLA**	**SA2**	**NA[b]**	**15,377**	**20,239**

[a] In 2001 and 2006, Sydney is defined by the *Sydney* Statistical Division under the ASGC 2001 and 2006 – similar though not identical to the *Greater Sydney* GCCSA.

[b] Estimates of people staying in accommodation for the homeless by geographic area are not available for 2001. As a result, total homelessness is not available either.

SLA: Statistical Local Area; SSD: Statistical Subdivision; SA2/3: Statistical Area 2/3

Source: ABS (2012c; ABS 2012d)

The ABS (2006b; 2011) publish counts of the number of people enumerated on Census nights 2006 and 2011 in different dwelling types. For example, counts are produced of the number of people enumerated in various types of private dwellings such as detached houses, apartments, houseboats and caravans and non-private dwellings such as hospitals, hotels and motels and nursing homes. In addition, the ABS publish the number of people enumerated in *improvised dwellings, tents and sleeping out*, which directly corresponds to homelessness category 1 above. Also published are the number of people in *accommodation for the homeless* corresponding to homelessness category 2 and the number of people enumerated in *boarding houses* corresponding to category 4. Counts of people enumerated in these dwelling types are available by CD in 2006. Importantly, people who are enumerated in these dwelling types on Census night are not automatically considered homeless. The ABS (2012b) estimate homelessness by taking these counts and filtering out those people who usually resided elsewhere or for a variety of reasons were considered unlikely to be experiencing homelessness. In producing the homelessness estimates, the ABS may also reclassify dwellings based on the characteristics of usual residents or from additional information such as administrative data. The ABS may for example reclassify a private dwelling as a homeless shelter based on administrative homelessness services data. This reclassification may add to or subtract from the total homelessness count. The example of the *Inner Sydney* SSD is given in Table 4.3. On Census night 2006, 1,915 people were enumerated in boarding houses (column 2) in *Inner Sydney*. After additions and subtractions, 2,270 people were estimated to have been experiencing homelessness in boarding houses. This estimate is only published at the SSD level, while the number of people enumerated on Census night (1,915 people) is published at the CD level, including the 646 CDs that make up the *Inner Sydney* SSD.

Table 4.3 Persons enumerated in dwelling types, 2006 and homelessness estimates, 2001 and 2006, *Inner Sydney* Statistical Subdivision

***Inner Sydney* SSD: 646 CDs**		**Estimated homeless population**	
Dwelling type	**Population on Census night 2006**	**2001**	**2006**
Non-private dwellings			
Improvised dwellings, tents, sleeping out	345	316	387
Accommodation for the homeless (e.g. shelters)	718	NA	443
Boarding houses and temporary lodgings	1,915	2,246	2,270
Private dwellings			
Staying temporarily with other households		316	402
Severely crowded dwellings		467	239
Total private dwellings	305,442		
Total homeless		**3,345**[a]	**3,640**

[a] Excluding people staying in accommodation for the homeless

Source: ABS (2006b; 2012d)

Method

These Census night counts are used to match homelessness estimates by SLA and SSD in 2001 and 2006 to SA3s. This is for the purpose of comparing homelessness spatial patterns in these years to the patterns in 2011. In this chapter, homeless counts at the SLA or SSD level are predicted at the CD level. CDs are small enough that the vast majority (95%) fall entirely within SA3 boundaries. Thus if homelessness can be accurately predicted at the CD level, the potential for errors in matching 2001 and 2006 homelessness data to SA3s is greatly reduced. A Monte Carlo microsimulation model was built in *Microsoft Excel* to probabilistically assign homeless populations to CDs. The model constructs a synthetic population of all people estimated to be homeless in 2001 and 2006. Each person is assigned to a homeless category and SLA or SSD based on the smallest geography available in Census data for their homeless category (see Table 4.2). The conditional probability of being assigned to a particular CD given their SLA is set equal to the proportion of people enumerated on Census night 2006 in a corresponding dwelling type who were located in that CD,

$$p\left(H_j^i \middle| H_j^k\right) = \frac{N_j^i}{N_j^k} \qquad 4.1$$

where H is the number of homeless people in 2001 or 2006; i is the CD; j is the homeless category; k is the SLA; and N is the number of people enumerated on Census night 2006. The corresponding dwelling type for people homeless and staying temporarily with other households and in severely crowded dwellings is all private dwellings. Individuals are probabilistically assigned to CDs by generating a random number for each individual. If the random number is less than or equal to the probability of being in a particular CD then the individual is assigned to that CD, otherwise a different one. This step assumes that, with an allowance for random variability, the distribution of the homeless population across CDs in 2001 and 2006 is equal to the distribution of the population enumerated in corresponding dwelling types in 2006.

An additional step involving Iterative Proportional Fitting (IPF) is applied for homelessness counts that are only available by SSD. These counts are of homelessness in boarding houses and accommodation for the homeless in 2006 and boarding houses and temporarily with other households in 2001. In these cases, homelessness is first predicted at the SLA level using the same procedure as above. The accuracy of these SLA estimates are improved through IPF by repeatedly and sequentially adjusting the estimates to fit row and column totals. The row totals are the homeless counts in each category at the SSD level and the column totals are the total homeless counts at the SLA level. Revised SLA estimates are produced through IPF that correctly sum to the row and column totals. The IPF procedure is described in detail in Lomax and Norman (2016). Homeless counts in these categories are then predicted at the CD level using these revised SLA estimates and equation 4.1 above.

Based on their assigned CD, individuals in the model are probabilistically matched to a Statistical Area 3. This probability is assumed to equal the proportion of the total general population of the CD that live in each SA3, extracted from the ABS (2012e) CD 2006 to SA3 correspondence file. Thus,

$$p\left(H_j^{i\,x}\middle|H_j^i\right) = \frac{N^{i\,x}}{N^i} \qquad 4.2$$

where $i\,x$ is an areal polygon in which CD i and SA3 x intersect; $N^{i\,x}$ is the total population of this polygon; and N^{i} is the population of CD i. In the example given in Figure 4.1, 12 people were estimated to be homeless in shelters in SLA 1.1. On Census night, 10 people in enumerated in shelters, 40% of whom were in the top right hand CD and 10% in the bottom right. The estimate of homelessness in these two CDs is 12(0.4 + 0.1) = 6 people. These two CDs fall wholly within SA3 5.1, so all six people are estimated to be in SA3 5.1.

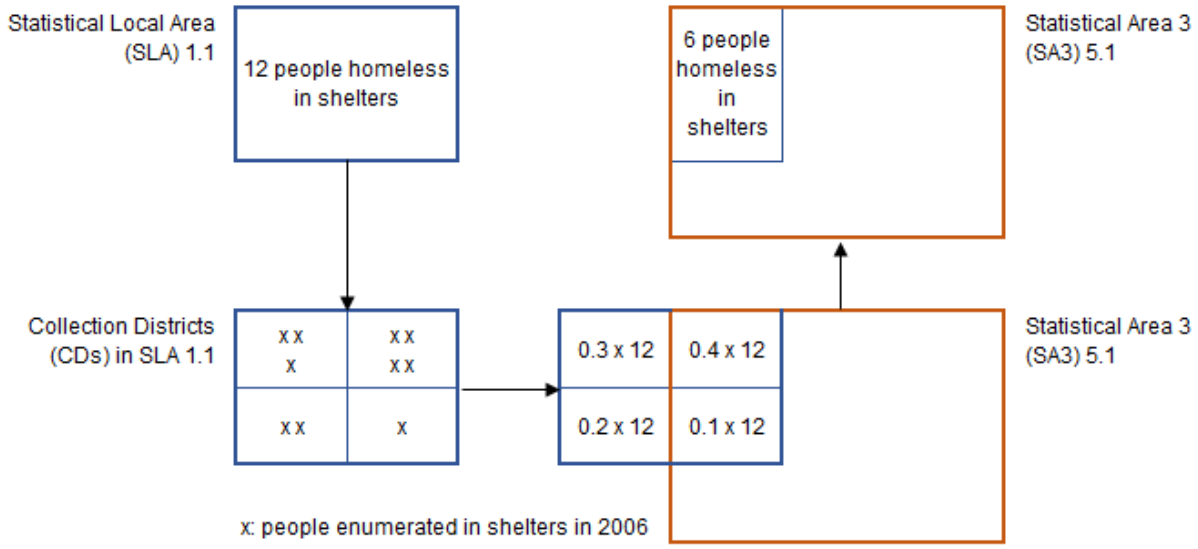


Figure 4.1 Illustration depicting how homelessness estimates in 2001 and 2006 were matched to SA3s

The microsimulation model is run 999 times to generate a range of homelessness estimates by SA3. A central estimate of the spatial pattern was calculated by assuming conditional probabilities are deterministic and used throughout this chapter as the estimates of homelessness in 2006 and 2001.

A series of maps depicting the spatial patterns of homelessness were produced in *QGIS* (QGIS Development Team 2016). Homelessness rates per 10,000 people were mapped using choropleth mapping to illustrate spatial clusters. Homelessness rates were classified into five groups based on natural breaks, justified on the grounds that homelessness rates are positively skewed across SA3s.

Convergence analysis was performed to analyse whether homelessness in Sydney became more or less spatially concentrated or dispersed over time. Borrowed from the economics literature (e.g. Sala-i-Martin 1996) and also used in the homelessness literature by Wood et al. (2014), convergence analysis specifies two types of convergence, δ and β. In this case, δ convergence, as measured by a decline in the standard deviation of SA3 homelessness rates, implies homelessness rates are converging across SA3s – or in other words, homelessness is becoming more dispersed. If the standard deviation is increasing, homelessness is becoming more spatially concentrated. β convergence is a necessary but not sufficient condition for δ convergence, implying that homelessness rates will eventually converge and become more spatially dispersed if SA3s with smaller homelessness rates have faster growth rates over a long enough period of time than SA3s with larger homelessness rates. If SA3s with larger homelessness rates have faster growth rates over time, then homelessness is becoming more spatially concentrated. β convergence is tested by regressing the growth rate of SA3 homelessness rates between 2006 and 2011 (dependent variable) on the 2006 homelessness rate (independent variable). If the coefficient on the independent variable is less than 0, then there is a negative correlation between homelessness rates in 2006 and the growth rate of homelessness to 2011, evidence that homelessness may have become more dispersed. The unit of analysis for testing δ and β convergence is the SA3. Forty six SA3s were included in the analysis, comprising all SA3s in the *Greater Sydney* GCCSA excluding *Blue Mountains – South*, a largely uninhabited SA3. Models were run for total homelessness and for total homelessness excluding each individual category of homelessness to analyse the impact of each category on the total concentration or dispersion of homelessness.

In this chapter, β convergence is analysed while controlling for spatial autocorrelation. This is important because any apparent change in the spatial distribution of homelessness between Censuses may be the result of random and non-random variability along SA3 boundaries. A large homeless shelter, for example, may have moved down the road and

across SA3 boundaries between Censuses or a group of people who usually stay in a city park may have been enumerated in the neighbouring SA3 on Census night. In either case, homelessness reported at the SA3 level may show more or less spatial concentration despite only small changes in the actual location of homelessness. The process for controlling for spatial autocorrelation follows Anselin (2003). The models were first run using Ordinary Least Squares regression in *R* (R Core Team 2016). Global Moran's I tests were run to determine whether residuals were spatially autocorrelated using the *spdep* package (Bivand and Piras 2015) and a contiguous spatial weights matrix created in *GeoDa* (Anselin et al. 2006) in which every combination of two SA3s are assigned either a one or a zero depending on whether they share a contiguous border ('rook'). If residuals were correlated, Lagrange Multiplier tests determined whether to specify a spatial error model or a spatial lag model. The spatial error model is the preferred model, in which spatial autocorrelation is modelled in the regression residuals,

$$log\left(\frac{h_j^{2011}}{h_j^{2006}}\right) = \alpha + \beta\,.\,log(\,h_j^{2006}) + \varepsilon; \quad \varepsilon = \lambda\,.\,W.\,\varepsilon + \mu \qquad 4.3$$

h_j^{2011} is a vector of the SA3 rates of homelessness per 10,000 people in 2011 and homeless category *j*; h_j^{2006} are the equivalent rates for 2006; α is the intercept; β is the coefficient that measures the extent of convergence; ε is a vector of spatially autocorrelated SA3 regression residuals; W is the spatial weights matrix (contiguity); λ is the coefficient on W; and μ is the normally distributed residual term.

Results

Homelessness in Sydney is spatially distributed across inner urban and suburban areas, particularly in the south and western suburbs. Figure 4.2 depicts the 2011 distribution of homelessness in Sydney by Statistical Area 2 (SA2). The map points to the existence of a polynucleated pattern of homelessness rates in Sydney with clusters of homelessness in the inner city and inner south and the western and southwestern suburbs. The global Moran's I statistic is equal to 0.440 ($p<0.01$), indicating a positive level of spatial autocorrelation across

Greater Sydney. Analysis of Local Moran's I reveals high levels of positive spatial autocorrelation and therefore clustering of homelessness across SA2s in and around the CBD, inner south and inner west. At the SA3 level, the SA3 of *Sydney Inner City,* which takes in the Central Business District (CBD), recorded the largest number and rate of people experiencing homelessness in 2011 (3,306 people or 175 homeless per 10,000 residents), followed by the neighbouring SA3 of *Marrickville – Sydenham – Petersham* (169 homeless per 10,000 residents). In the inner and outer western suburbs, homelessness rates were also relatively high in *Strathfield – Burwood – Ashfield*, *Auburn*, *Fairfield* and *Mount Druitt* (98, 78, 71 and 64 homeless persons per 10,000 residents respectively). Figures 4.3 and 4.4 show the estimated distribution of homelessness in 2006 and 2001 across metropolitan Sydney SA3s. As can be seen, spatial patterns have changed over time though the general polynucleated pattern has been evident since at least 2001.

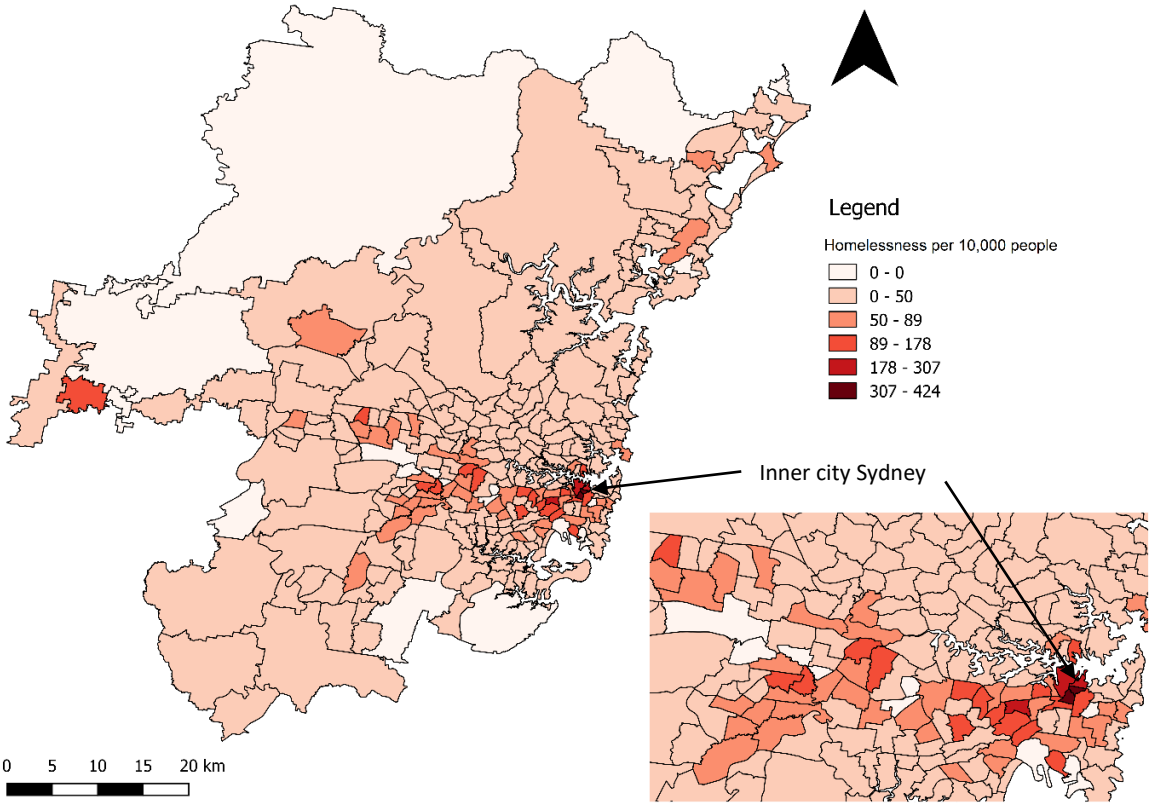


Figure 4.2 Homelessness rates in *Greater Sydney* by SA2 (metropolitan Sydney inset), 2011

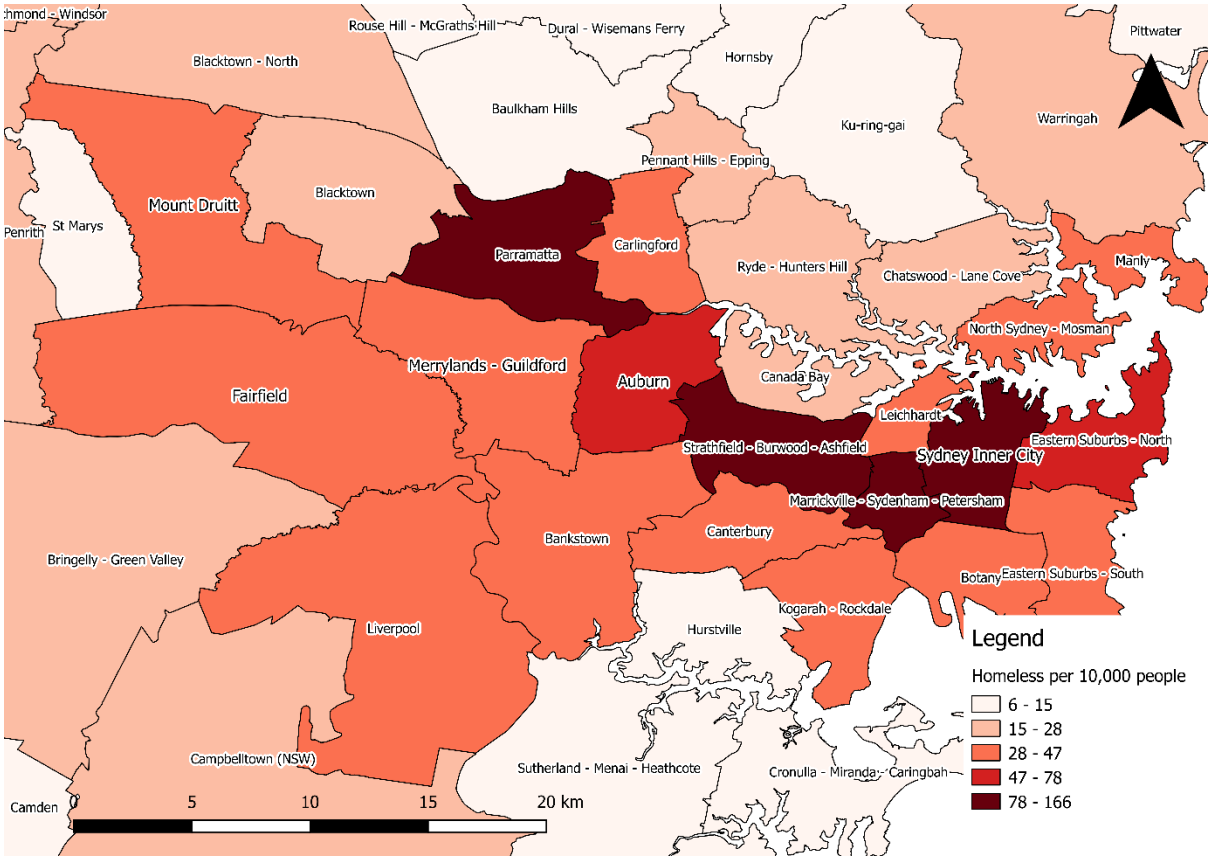


Figure 4.3 Homelessness, metropolitan Sydney SA3s, 2006

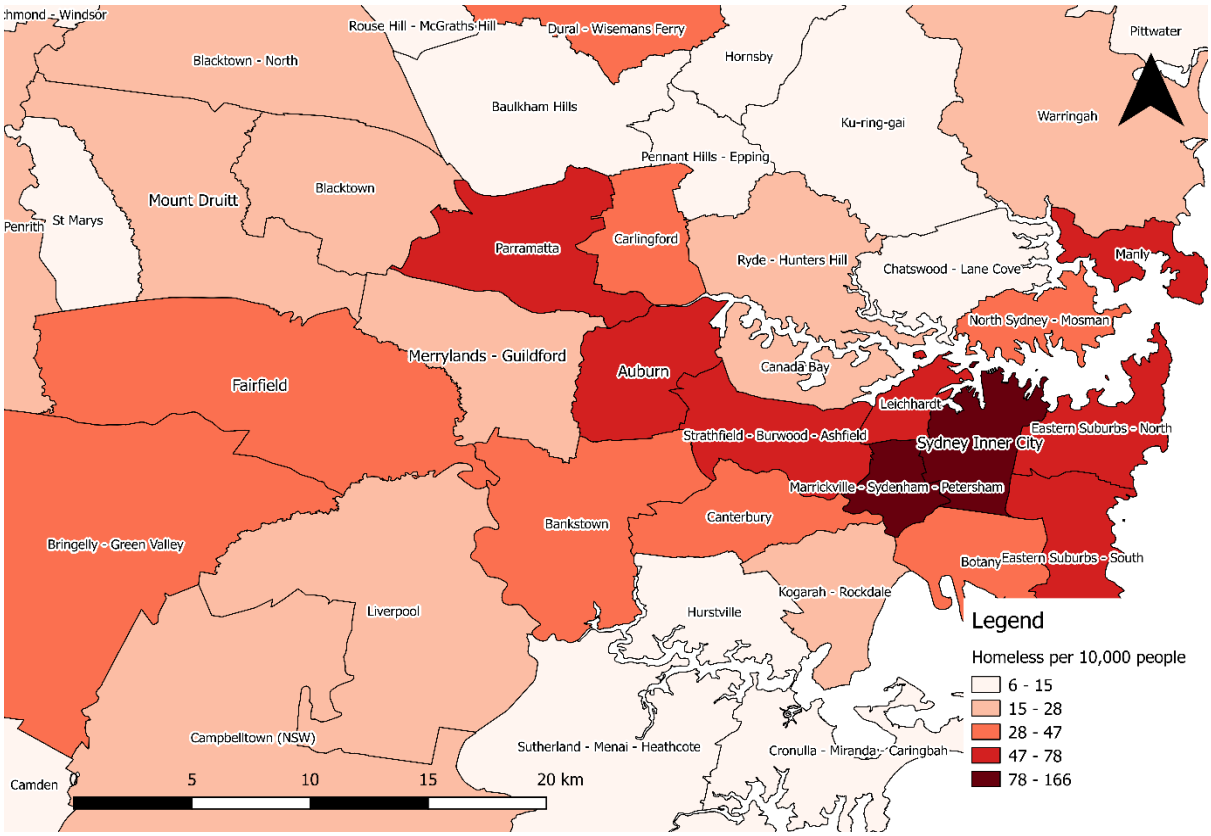


Figure 4.4 Homelessness (excluding homeless shelters), metropolitan Sydney SA3s, 2001

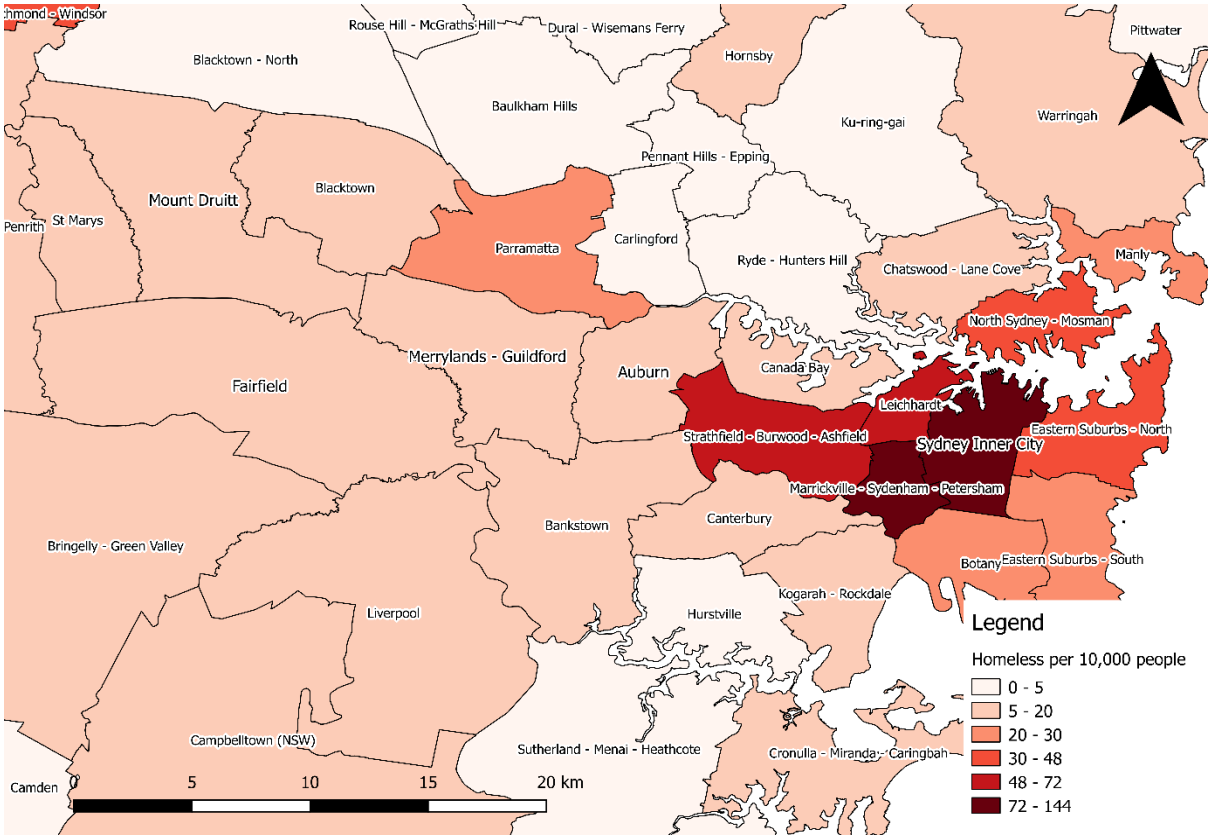


Figure 4.5 Homelessness in non-private dwellings by SA3, metropolitan Sydney, 2011

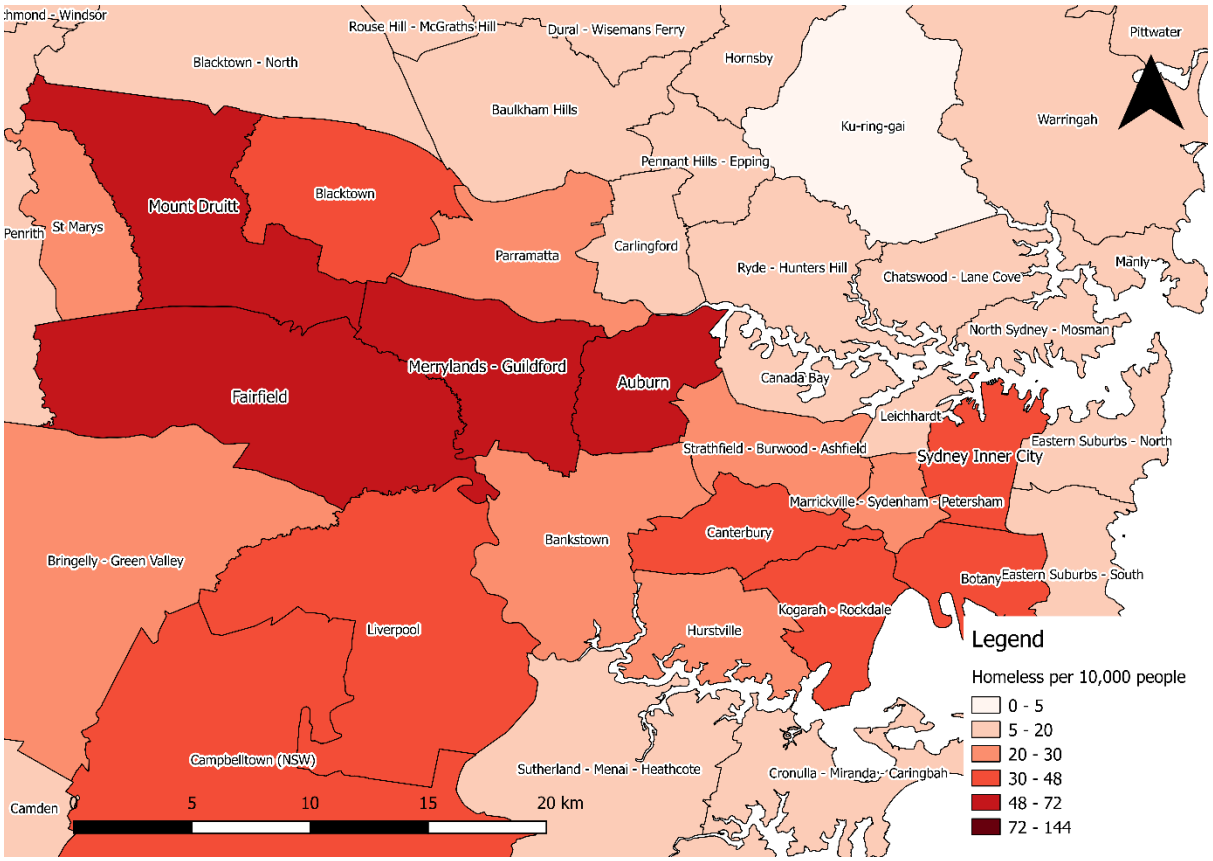


Figure 4.6 Homelessness in private dwellings by SA3, metropolitan Sydney, 2011

This is driven by the spatial patterns produced by each of the categories of homelessness. As seen in Figure 4.5, homelessness in non-private dwellings was heavily concentrated in and around inner city areas in 2011. Almost one half (49%) of all people living on the streets and in improvised dwellings in *Greater Sydney* were enumerated in the *Sydney Inner City* SA3. The rate of homelessness on the streets in *Sydney Inner City* in 2011 was 26 homeless per 10,000 residents, substantially higher than the rate for any other SA3 in Sydney. Homelessness in shelters and boarding houses had a somewhat wider dispersion through the inner city and neighbouring suburbs. *Sydney Inner City* had Sydney's second highest rate of homelessness in shelters and boarding houses in 2011 (116 homeless per 10,000 residents) behind the neighbouring SA3 of *Marrickville – Sydenham – Petersham* (143 homeless per 10,000 residents). Overall, one half (51%) of all homelessness in non-private dwellings, including on the street, in shelters and boarding houses, in *Greater Sydney* was located in the *Sydney Inner City* SA3 or in one of the five adjoining SA3s. These six SA3s combined form a relatively large cluster of homelessness on the street, in shelters and boarding houses in Sydney's inner city and surrounding suburbs.

Homelessness in private dwellings, by contrast, has a more suburban character. More than two-thirds (68%) of Sydney's homeless population in SA3s outside of these six inner city SA3s were living in private dwellings in 2011. Figure 4.6 reveals clusters of homelessness in private dwellings (people staying temporarily with other households and in severely crowded households) in Sydney's western and southwestern suburbs, namely *Auburn, Fairfield, Mount Druitt* and *Merrylands – Guildford*. These four SA3s had the highest rates of homelessness in private dwellings in 2011 of 71, 60, 59 and 50 homeless persons per 10,000 residents respectively, compared with a city-wide average of 24 homeless per 10,000. Suburban homelessness is dominated in particular by severe crowding, which makes up the large majority of total homelessness in *Auburn* (84%), *Fairfield* (79%), *Mount Druitt* (79%) and *Merrylands – Guildford* (78%). Thus, as one moves from Sydney's CBD to the outer western suburbs, homelessness becomes less concentrated on the streets and in specialist

accommodation providers and more concentrated in private, and particularly severely crowded, households.

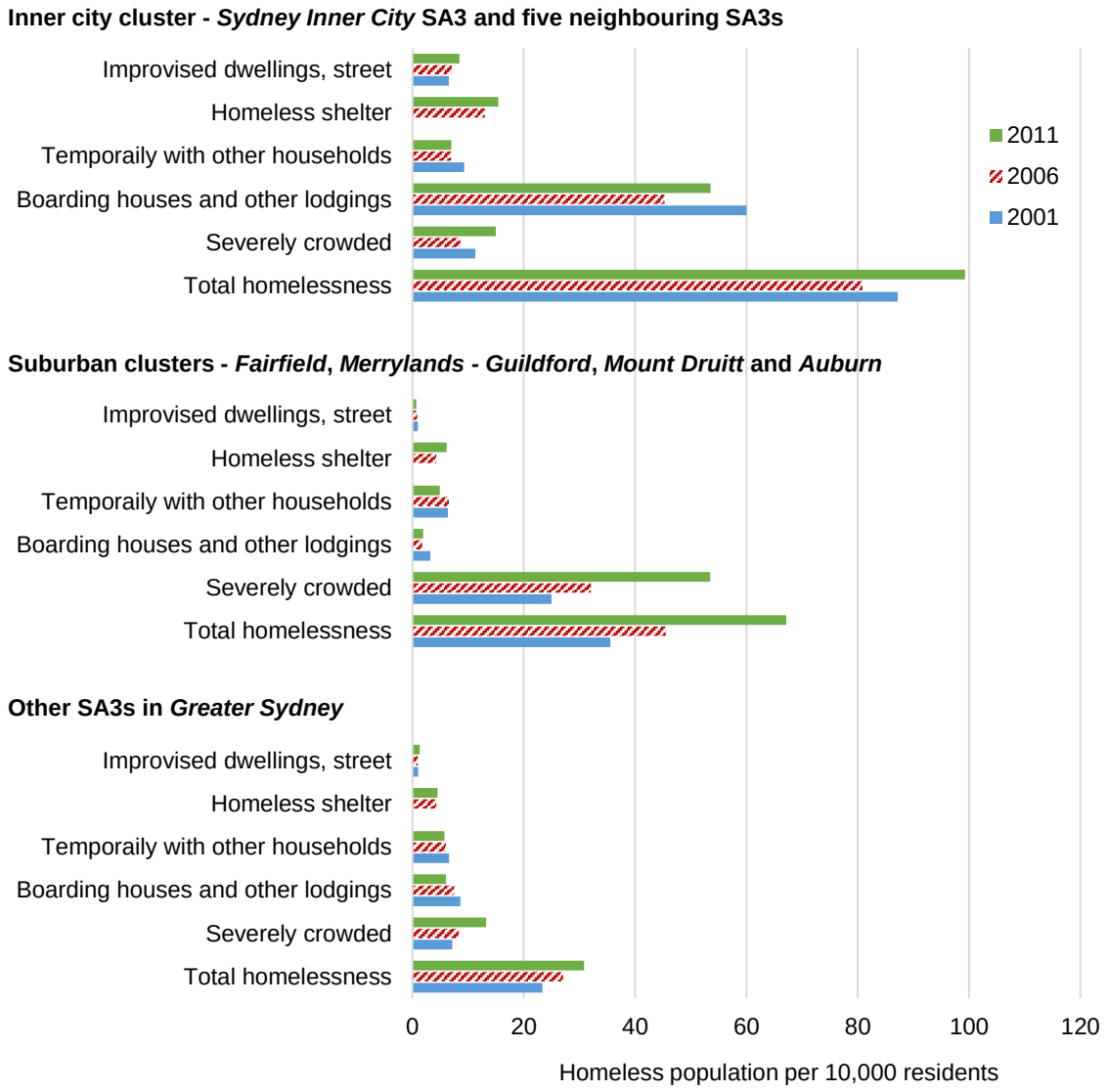
The high rates of severe crowding in these suburban clusters is likely related to high levels of socioeconomic disadvantage experienced within ethnically diverse family households. All four SA3s in the suburban clusters have very high levels of socioeconomic disadvantage. Measured against the ABS (2013) Index of Relative Socioeconomic Disadvantage, 52% of the population in *Fairfield*, 37% in *Mount Druitt*, 36% in *Auburn* and 29% in *Merrylands-Guildford* lived in SA1s ranked in the most disadvantaged 10% of SA1s in Australia at the 2011 Census, compared with 10% of *Greater Sydney's* population and 4% of the population living in the inner city cluster. The populations of the suburban SA3s are also highly ethnically diverse, particularly in *Auburn*, *Fairfield* and *Merrylands – Guildford* where 79%, 74% and 62% of the population respectively reported speaking a language other than English at home in 2011, compared with 38% of *Greater Sydney's* population and 36% of the inner city cluster's population (ABS 2011). The most common language groups in the suburban clusters were Middle Eastern and South East Asian. Severe crowding appears most prevalent in family households particularly multiple family households. The average size of family households in the suburban clusters was 3.6 persons per household and 1.2 persons per bedroom at the 2011 Census (3.2 and 1.0 persons across *Greater Sydney* respectively) (ABS 2011). These averages were elevated by the large proportion of households with more than one nuclear family (5.1% in the suburban cluster, compared with 2.5% across *Greater Sydney*). The average size of multiple nuclear family households was 5.9 persons per household and 1.6 persons per bedroom in the suburban clusters. This indicates that the prevalence and size of multiple family households increased average household sizes and potentially contributed to the level of severe crowding in suburban Sydney.

Homelessness in private and non-private dwellings may have become more concentrated in the inner city and suburban clusters over time. Figure 4.7 shows homelessness rates per 10,000 people in these clusters and all remaining SA3s in 2001, 2006

and 2011. An increase in the rate of homelessness in boarding houses in the inner city between 2006 and 2001, combined with decreased rates in other parts of Sydney, led to an increase in the concentration of boarding houses in the inner city cluster. In the suburban clusters, sharp growth in the rates of severe crowding led to a substantial increase in total homelessness rates. Overall, these had the effects of further concentrating homelessness in the inner city and suburban clusters, with the combined share of Sydney's total homelessness population in these clusters growing from 43% in 2006 to 47% in 2011. Thus, the spatial pattern of homelessness in Sydney was driven over time by at least two competing influences, the first being the growth in homelessness in non-private dwellings which drove growth in inner urban homelessness and the second being the growth in homelessness in private dwellings, particularly severe crowding, which led to an increase in suburban homelessness.

Convergence analysis suggests that homelessness in Sydney became more concentrated over time. The standard deviation of SA3 homelessness rates increased from 29.1 in 2006 to 34.8 in 2011, indicating greater spatial concentration. Regression results, however, suggest that SA3s with smaller homelessness rates in 2006 experienced slightly faster growth rates to 2011. OLS regression without a spatial term produces a β coefficient of -0.11 (95% CI: [-0.29, 0.07]). The global Moran's test finds evidence of spatially autocorrelated residuals (Moran's I = 0.17, p=0.027). A spatial error model was specified, producing a coefficient of -0.16 (95% CI: [-0.35, 0.03]) on the 2006 homelessness rate. That the coefficient is smaller when controlling for spatial autocorrelation is an interesting finding, suggesting that the dispersion of homelessness between 2006 and 2011 may have been greater if not for spatial autocorrelation. One possible explanation for this finding is that the matching of 2006 homelessness to SA3s distributed homelessness to a wider range of SA3s than is justified or indicated by the 2011 pattern. Another possible explanation is that people experiencing homelessness near SA3 boundaries were more likely to be enumerated in one SA3 over another in 2011 than they were in earlier Censuses. The inclusion of the spatial lag, therefore, potentially helps to control for matching errors, as well as variability along areal boundaries.

Thus, while homelessness rates in Sydney did not converge to 2011, growth rates of homelessness were, on average, somewhat higher in SA3s with smaller homelessness rates in 2006.



Source: author's calculation from ABS (2012c; 2012d; 2015)

Figure 4.7 Homeless rates per 10,000 resident in identified clusters, *Greater Sydney*

Boarding houses and homeless shelters had the largest effects on the change in the spatial concentration of homelessness. Table 4.4 shows the estimated standard deviations and β coefficients for total homelessness and total homelessness excluding each individual category. Irrespective of which category is removed from total homelessness rates, the standard deviation increased between 2006 and 2011, indicating greater spatial

concentration. The concentration of boarding houses and other lodgings substantially increased the concentration of total homelessness, judging from the fact that the standard deviations on homelessness rates excluding boarding houses and other lodgings (19.8 in 2011) were substantially smaller than total homelessness rates (34.8 in 2011). This spatial concentration appeared to weaken somewhat between 2006 and 2011 based on the change in standard deviations and the relatively large β coefficient on homelessness excluding boarding houses and other lodgings (-0.09; 95% CI:[-0.28, 0.00]). This finding combined with the apparent concentration of boarding houses in the inner city cluster (Figure 4.5) is explained by relatively fast rates of growth in SA3s with small and negligible boarding house rates in 2006 and an apparent growth of boarding house populations in SA3s neighbouring the *Sydney Inner City*. The relatively low coefficient on homelessness excluding homeless accommodation (-0.25; 95% CI: [-0.45, 0.02]), by contrast, suggests that SA3s with larger homeless accommodation rates in 2006 had faster growth on average than SA3 with smaller rates and that β convergence would have been larger if not for homeless accommodation. Overall and despite evidence for β convergence, growth rates were insufficient to prevent an increase in the spatial concentration of homelessness in Sydney.

Table 4.4 Results of convergence analysis analysing the effects of homeless categories on total homelessness

	Total homelessness excluding:					
	A. Improvised dwellings/tents/ sleeping out	B. Homeless accommodation	C. Staying with other households	D. Boarding houses and other lodging	E. Severely crowded dwellings	Total homelessness
Standard deviation δ						
2011	32.8	29.7	34.3	19.8	30.4	34.8
2006	27.7	25.8	28.7	14.7	25.9	29.1
β convergence, 2006						
Coefficient	-0.15	-0.25	-0.19	-0.09	-0.16	-0.16
95% Confidence interval						
Lower	-0.33	-0.45	-0.39	-0.28	-0.36	-0.35
Upper	0.03	0.02	-0.05	0.00	0.10	0.03
Spatial error						
p value	0.011	0.208	0.375	0.802	0.002	0.103

Discussion

The spatial pattern of homelessness is heavily influenced by how homelessness is defined. Traditionally recognised forms of homelessness in shelters, boarding houses and on the streets retain an inner urban characteristic in Sydney, particularly street homelessness which remains heavily concentrated in and around the CBD. Shelters and boarding houses appear to be more widely dispersed but still distinctly urban. By contrast, more recently recognised forms of homelessness in private dwellings, most particularly in severely crowded dwellings, have a much greater suburban orientation. Interestingly, homelessness in private dwellings has not been evenly distributed across suburban Sydney, but rather has formed clusters in the western suburbs. The formation of these clusters is likely to be related to ethnic diversity and socioeconomic disadvantage, given that large proportions of the populations of each of the four suburban clusters discussed in this chapter live in highly ethnically diverse and disadvantaged neighbourhoods. The substantial growth in severe crowding between 2006 and 2011 appears to have entrenched these suburban clusters and the suburban characteristic of

homelessness generally, while also combining with the inner city cluster to form a polynucleated pattern of total homelessness in Sydney.

These clusters became larger over time, leading to an increase in the concentration of homelessness. β convergence indicates that SA3s with smaller homelessness rates, on average, grew at faster rates than SA3s with higher homelessness rates. However, because of the heavy spatial skew of homelessness, faster growth rates did not correspond to higher growth in the levels of homelessness rates and subsequently, homelessness became more concentrated in Sydney between 2006 and 2011. Homelessness rates grew between 2006 and 2011 within and outside the inner city and suburban clusters, however, the *level* of growth was higher within the clusters, leading to an increase in the concentration of homelessness across Sydney. The drivers of growth were distinctly different between the inner city and suburban clusters, with the former being driven principally by a concentration in boarding houses and the latter by severe crowding. As a result, homelessness in non-private dwellings became more concentrated in the inner city cluster and homelessness in private dwellings became more concentrated in the suburban clusters.

These results are useful in understanding the structural drivers of homelessness. In particular, they suggest the importance of understanding the relationships between the structural causes of homelessness and the factors that drive the spatial patterns of different forms of homelessness. Street homelessness, for example, remains concentrated in inner city areas, perhaps because people in this situation gravitate to the inner city where accommodation and non-accommodation services and amenities are readily available and opportunities for earning money and maintaining social networks may be stronger (Iwata and Karato 2010; Lee and Price-Spratlen 2004; Somers et al. 2016). The spatial pattern of homeless shelters and boarding houses are likely to be driven less by the choices and experiences of people entering homelessness and more by various and often competing political, community, historical, theoretical and demand-driven influences as to how and where shelters and boarding houses should be located (Lee and Farrell 2005). Thus, the spatial

patterns of different forms of homelessness at particular points in time do not necessarily result from structural deficiencies in local economies and housing markets so much as from individual and societal processes and dynamics leading up to those points in time. As a result, ecological fallacies may arise from efforts to identify the causes of homelessness from static associations between area-level socioeconomic variables and total homelessness counts.

There are some limitations associated with the study presented in this chapter. First, is the reliance on Census point-in-time homelessness counts, despite emerging research demonstrating that homelessness is not fixed across time and space (Alexander-Eitzman et al. 2013; Somers et al. 2016). Secondly, the study is restricted by the Census areal units for which homelessness counts are made available. SA3s are general purpose units that do not precisely capture the spatial dimensions and clustering of homelessness, potentially raising issues in the analysis associated with the Modifiable Areal Unit Problem (MAUP). Thirdly, the study was hampered by the unavailability of 2001 estimates of people staying in accommodation for the homeless, preventing a complete longer run analysis of changing spatial patterns of homelessness over time. The release of estimates from the 2016 Census in late 2017 will assist future work in this respect. Fourthly, spatial patterns produced from Census data are at least to some degree the product of national and area-level resources invested in the homelessness count. Counting people who are homeless on the streets and boarding houses, in particular, is notoriously difficult and prone to undercounts as well as potential overcounts (Lee and Price-Spratlen 2003; Rossi 1989). Whether these create errors in the apparent spatial distribution of homelessness depends on whether or not errors are uniformly distributed across space. Finally, the study relies on the ABS (2012a; 2012b) conceptualisation and operationalisation of homelessness which although providing for a relatively comprehensive and broad understanding of homelessness relies on a series of inferences, decision rules, judgements and cut-off points that may create distortions in the spatial patterns. The judgment that individuals are homeless if they are living in dwellings requiring four extra bedrooms, as opposed to three, five or some other measure of crowding,

for example, could have a substantial impact on the spatial pattern of total homelessness given the size, distribution and cultural norms of the population living in severely crowded dwellings

Conclusion

This chapter has analysed the spatial patterns of different types of homelessness in Sydney, Australia. In doing so, it has sought to contribute to existing knowledge in this field in three key ways. Firstly, the varied and unique spatial clusters of homelessness in private and non-private dwellings may have a tendency to produce a polynucleated, or multi-clustered pattern of total homelessness. Secondly, the growth in particular types of homelessness can grow and expand these clusters, potentially leading to a greater concentration of homelessness. Thirdly, the chapter has presented an approach to examining changes in the spatial concentration of homelessness over time while controlling for spatial autocorrelation. Controlling for spatial autocorrelation, it is argued, is a useful way of managing random and non-random variations, errors and dynamics along the boundaries of areal units that might otherwise give the impression of greater concentration or dispersion. Future research in this area will benefit from the use of updated Census, longitudinal survey and administrative data. This chapter sets out a strong rationale for explicitly considering the different types of homelessness in such research.

5

Life shocks and the housing and homelessness spectrum

Abstract

In this chapter, I explore relationships between housing, family and employment events and entries to different states of housing and homelessness. Housing transitions are hypothesised to be the product of two interconnected process: 1) the loss of previous accommodation, including through eviction and relationship breakdown; and 2) an entry into one of several housing/homelessness states. This is tested by analysing associations between events or shocks, housing exits and entries to housing and homelessness. Multilevel multinomial regression models are fitted to longitudinal data on a sample of disadvantaged adults in Australia. Privately rented housing, relationship breakdown, violence and job loss are significantly associated with contemporaneous housing loss. Personal, interpersonal and economic vulnerabilities are associated with entries to homelessness and doubling up. These findings point to the important multidimensional dynamics that shape housing and homelessness pathways among disadvantaged populations.

Introduction

The links between housing crises and homelessness are arguably under-theorised and under-studied. On the one hand, a body of literature has established that housing evictions and family breakdowns contribute to involuntary residential moves and can affect later housing and neighbourhood outcomes (e.g. Clark 2013, 2016; Clark and Davies Withers 2007; Desmond et al. 2015; Desmond and Shollenberger 2015; Feitjen and Mulder 2005; Mikolai and Kulu 2018; Morris 2017). On the other hand, an emerging literature is able to track longitudinal samples of vulnerable and previously homeless populations, and has thus begun to uncover the proximal effects of personal and family shocks on the risk of entry to homelessness (Curtis et al. 2013; Diette and Ribar 2018; McVicar et al. 2019; Moschion and van Ours 2019). In between these two sets of literature is a substantial gap in understanding the processes through which shocks lead to housing loss and subsequently homelessness. Addressing this gap is argued to be important on several fronts. An entry to street homelessness or a homeless shelter must result from a transition out of previous accommodation. Exits from previous accommodation therefore directly precipitate homeless entries and are likely to mediate and moderate the effects of more distal life events and crises on the risk of homelessness. Further, life shocks may lead to housing transitions, but whether that leads to street or sheltered homelessness is likely to depend on whether individuals and families have access to better alternatives whether provided by family, friends, the state or through their own personal and economic resources. Thus, access to personal, interpersonal and institutional resources are likely to moderate and delay the risk of homelessness after housing loss, adding complexity to the relationship between homelessness and its drivers.

In this chapter, I propose a conceptual model describing the processes through which poor and disadvantaged populations experience housing loss and homelessness. Aspects of this model are tested using the *Journeys Home* study, a longitudinal survey of income support recipients identified as experiencing, at risk of or vulnerable to homelessness, conducted in Australia between 2011 and 2014 (Wooden et al. 2012; Scutella et al. 2017). I analyse

transitions between different forms of housing and homelessness by the reasons given for moving to address the following questions:

1. How are employment and family transitions associated with housing transitions and loss?
2. What factors are associated with entry to homelessness and how do interpersonal and public supports affect these patterns?

The findings point to the important processes and interactions that underlie entries to homelessness and housing deprivation among disadvantaged and vulnerable populations. Evidence is found to support the hypothesis that private rental markets, job loss, relationship breakdown and violence expose people to the risk of housing loss. People draw on economic and interpersonal resources to find alternative accommodation, particularly through their employment and support networks of family and friends. Some evidence is found to suggest that those with greater personal, interpersonal and economic vulnerabilities face high risks of becoming homeless on the streets and in shelters. In this view, housing, family and economic crises conflict with protective factors to influence the risk of homelessness. Preventing and lessening the effects of crises while strengthening interpersonal and institutional resources is, thus, an important implication and objective for homelessness policy.

Background

A large body of literature examines the predictors and consequences of housing mobility and migration. Housing is commonly placed within a life course framework, where events such as finishing education, leaving the parental home, starting a career, marriage, child birth, home purchase and retirement are hypothesised to drive residential moves and thereby shape individual housing trajectories or careers (Clark and Davies Withers 1999; Coulter and Scott 2015; Mikolai and Kulu 2018). Scholars also consider the impact of adverse life events on mobility and in creating deviations from these trajectories (Clark 2016). Relationship breakdown, in particular, is strongly and positively associated with housing mobility (e.g. Clark 2013; Coulter and Scott 2015; Mikolai and Kulu 2018; Rabe and Taylor 2010). Separation has

been associated with immediate and longer term moves (Warner and Sharp 2016) and moves over short and long distances, particularly within the same city (Clark 2013). Some evidence suggests that separation is associated with adverse housing outcomes, including higher probabilities of moving into smaller dwellings and out of home ownership (Feijten and Mulder 2005) and lower probabilities of moving into detached houses (Mikolai and Kulu 2018) and better neighbourhoods (Morris 2017).

Job loss is also hypothesised to influence the risk of moving. However research findings are equivocal, perhaps signalling complexity in the relationship between employment volatility and housing (Clark 2013; Clark and Davies Withers 2007; Morris 2017; Rabe and Taylor 2010; Wang et al. 2018; Warner and Sharp 2016). Research suggests, for example, that transitions out of employment are positively associated with immediate and long distance moves, negatively associated with long term moves and have no relation to short term moves (Clark 2013; Clark and Davies Withers 2007; Warner and Sharp 2016). Wang et al. (2018) find that among subsidised housing tenants, gaining employment increases mobility and losing employment decreases mobility, while Rabe and Taylor (2010) find positive but insignificant associations between unemployment and mobility. For those who do move, unemployment has been associated with declines in housing size and transitions out of home ownership (Feijten and Mulder 2005) and moves among couples into poorer quality neighbourhoods (Rabe and Taylor 2010). Paradoxically though, job loss has also been associated with moves into lower poverty neighbourhoods (Wang et al. 2018).

Identifying the reasons for moving is potentially important for understanding the relationship between job loss and housing transitions. Arguably, voluntary moves are based on decisions that advance or protect the economic, housing and family objectives of individuals and couples. By contrast, certain factors such as formal and informal evictions and relationship breakdowns impose upon individuals and families the need to move, creating an involuntary or unintended move. Collectively, these have been shown to be among the most common reasons for moving (Clark and Davies Withers 2007; Desmond et al. 2015; Hartman

and Robinson 2003). Research indicates that young adults, singles, renters, ethnic minorities and those with low education and income, criminal records, mental health and substance use problems and living in neighbourhoods with high levels of crime and eviction rates have the highest risks of eviction or making involuntary or unwanted moves (Coulter and van Ham 2013; Coulter and Scott 2015; Desmond and Shollenberger 2015; Desmond and Gershenson 2017; Kahlmeter et al. 2018; Phinney 2013). With respect to employment, Desmond and Gershenson (2017) find that job loss is a significant predictor of eviction among renters. Combined with the findings of Wang et al. (2018), this suggests that job loss impedes housing progression and increases the risk of housing loss through rent stress, arrears and eviction and subsequent involuntary moves. Housing loss is thought to have adverse consequences, with associations found with increased reliance on social assistance (Kahlmeter et al. 2018), moves into neighbourhoods with higher poverty and crime rates (Desmond and Shollenberger 2015), lasting housing problems, moves into lower quality housing and repeat evictions (Desmond et al. 2015).

Homelessness is another severe consequence of housing loss. Some evidence suggests that evictions are associated with increased risk of entry and return to homelessness (Crane and Warnes 2000; Cusack and Montgomery 2017; Hartman and Robinson 2003), while housing and family crises, including eviction, family violence and breakdown, are the most common reasons cited for presenting to homelessness services (AIHW 2018). The connection between housing loss, involuntary moves and homelessness is not often made elsewhere in the literature on homelessness transitions. Nevertheless, there is growing recognition of the importance of events or shocks that may push already disadvantaged and vulnerable populations into homelessness (O'Flaherty 2009). Recent research suggests parental separation (Moschion and van Ours 2019), child health shocks (Curtis et al. 2013), violence (Diette and Ribar 2018) and onset of drug use (McVicar et al. 2019) are positively associated with entries to homelessness among vulnerable individuals and families. Job loss is another hypothesised shock, though evidence is limited (Chigavazira et al. 2014). In the

context of the wider homelessness literature, these shocks may be seen to mediate observed associations between personal and macro-structural factors such as mental health, education, employment, housing and labour market conditions and entry to homelessness. Access to interpersonal and institutional support, meanwhile, including rent subsidies, social housing and family support, arguably, moderate their effects (Johnson et al. 2019; O'Donnell 2019; Shinn et al. 1998; Shinn and Gillespie 1994; Wong and Piliavin 1997).

The majority of this research focuses on dichotomous transitions between housing and homelessness. Emerging out of conceptual and qualitative work is a view that instances of homelessness are embedded within long run housing pathways that are shaped by personal, interpersonal and structural factors and their interactions (Clapham 2003; Fitzpatrick 2005; Martijn and Sharpe 2006; Piat et al. 2015; Sharam and Hulse 2014; Skobba 2016; Tyler and Schmitz 2013). Such a perspective has a number of interpretations. One is that there are multiple pathways leading to homelessness. An important intermediary stage between housing and homelessness are episodes spent staying 'doubled up' or 'couch surfing' with family or friends. Such accommodation has been found to be common, particularly among young and disadvantaged populations and those escaping or seeking to avoid more severe homelessness and deprivation (Entner Wright et al. 1998; O'Donnell 2019; Shinn et al. 1991; Wiemer 2014). Cohorts of individuals and families have been found to utilise interpersonal housing support after housing, employment and other crises (Chamberlain and Johnson 2013; Kuhn and Culhane 1998; Wiemer 2014). Homelessness can result where individuals and families exhaust, and perhaps, erode their interpersonal support (Shinn et al. 1991; Skobba and Goetz 2015). As a consequence, the effects of job and housing loss and relationship breakdown on entries to street and sheltered homelessness are likely to be delayed or moderated by the interpersonal support that people can draw upon.

Theorising housing and homeless transitions

I propose a model for exploring and understanding housing and homeless transitions within a multidimensional, longitudinal and ecological context. The model draws on the concept of housing pathways (Clapham 2003) and the theory of the life course (Elder et al. 1985), particularly in its applications to housing (Beer and Faulkner 2011). Different types of housing and homelessness are conceived to lie along a spectrum, with street homelessness at one end and secure housing at the other (Watson 1984). In between are graduated levels of housing deprivation that could be defined on several physical, legal, economic and psychological dimensions including dwelling type, tenure, affordability, safety and emotional well-being (Somerville 1992). For the purposes of this research, dwelling type and tenure are likely to be important differentiators between types of housing and homelessness and are readily available in many datasets. In this instance, tenure refers to the legal and social rights individuals have to occupy their current dwellings.

Individuals and families reside in forms of housing and homelessness within specific episodes of accommodation. Residential moves or transitions are made between episodes, often in pursuit of housing and life course objectives but also in response to adverse life events and cumulative disadvantage (Beer and Faulkner 2011). Drawing on the housing pathways perspective (Clapham 2003), transitions coalesce over time to create long-run housing trajectories. The literature on housing pathways as explicated by Clapham (2002, 2003) is grounded within post-modernism and social constructionism, thus placing individual experience and meaning at the centre of any analyses of housing. Nevertheless, there are valuable insights for more positivist and purely quantitative research. Most notably, the housing pathways perspective provides a framework through which to theorise and analyse the longitudinal dynamics of housing and homelessness within an ecological context (Fitzpatrick 2005), complementing earlier work by Toro et al. (1991) in recognising the potential ways in which personal characteristics and histories intersect with life events,

interpersonal connections and dynamics and the broader economic and macro-structural environment.

Through an ecological perspective, housing transitions can be seen to be comprised of two interconnected parts. These parts are: 1) exit from previous accommodation; and 2) an entry into one of several potential states along the housing and homelessness spectrum. Push factors, both positive and adverse, are theorised to drive exits. Housing, family, economic and personal shocks, including evictions, job loss and relationship breakdown, have proximal and adverse effects. Rather than treat shocks as independent factors that compete with personal deficits and vulnerabilities on the one side and macro-structural deficiencies on the other – as is implicit in many empirical models of homelessness – macro-structural changes are likely to exert their influence through the income and employment shocks they create for individuals and families. Further and similar to how neoclassical housing theory posit that the effects of income shocks depend on their relation to the size of permanent income (O'Flaherty 2009), so the effects of broader life shocks on the risk of homelessness are moderated by personal histories, vulnerabilities and access to economic, social and institutional capital. Shocks thus interact with cumulative advantage and disadvantage and more distal factors to create tipping points that push people into housing exits (Curtis et al. 2013; Wiemer 2014; Clark 2016).

On losing housing, those with the most economic capital and access to affordable housing are best placed to secure alternative housing. Individuals and families with fewer economic resources but well-formed support networks are most likely to 'double up' with family and friends. Those with the least resources and deepest vulnerabilities are most likely to become homeless on the streets or in improvised dwellings. Resource levels are not likely to be static, rising and falling with changes in housing and life circumstances. Continuous cycles of housing and economic disadvantage may weaken resources and deepen vulnerabilities, thereby exposing people to the most severe and entrenched forms of housing disadvantage over time (Vacha and Marin 1993; Skobba and Goetz 2015). The state has power to disrupt these patterns through the provision and rationing of shelter and refuge accommodation,

transitional, social and subsidised housing and non-accommodation support services (Wong and Piliavin 1997; Shinn et al. 1998; Metraux and Culhane 1999; Tsemberis et al. 2004). However, governments may have little or no direct impact on many households, meaning that individuals often choose or are compelled to rely on their own economic and social resources (Clapham 2002).

Data

Aspects of the model are tested using the *Journeys Home* study (Wooden et al. 2012; Scutella et al. 2017). Across the six waves, respondents were recorded as homeless on the streets or in improvised dwellings in 2.7 per cent of person-waves, staying in homeless accommodation such as shelters and refuges in 5.3 per cent of person-waves, staying with family or friends in 32 per cent of person-waves and staying in sub-market accommodation such as hotels, motels, hostels, boarding/lodging houses of caravans/mobile homes in 6.7 per cent of person-waves. Further descriptive statistics are provided in the Appendix. Details on the survey design are provided in Chapters 2 and 3, as well as Wooden et al. (2012) and Scutella et al. (2017).

In this chapter, I use the accommodation calendar in *Journeys Home* to provide information on the timing and type of housing/homelessness episodes, including those occurring between waves. As discussed in Chapter 2, respondents reported the type of accommodation they were staying in for each 10 day block since the previous interview – or the time they had spent in the current accommodation at wave one. The calendar contains 7,234 unique episodes across 14 accommodation types. Of these, 310 episodes do not have a start date. A small number of these (less than 20) are the first episode reported by respondents. These are excluded from the analysis. For the remainder, start dates were imputed by randomly assigning a date between the start of the respondent's previous episode and the start of their next. Assuming accurate respondent recall, I have used this information to estimate the duration of accommodation episodes at each wave and the timing of transitions

to subsequent episodes. One proviso is that the accommodation calendar does not distinguish housing episodes in the social and private market sectors. This distinction is made for ongoing episodes at the time of each survey wave. However, there were 93 transitions to housing episodes that began and ended between survey waves, for which a sector was not defined. In these cases, the sector is imputed by randomly assignment based on the origin-specific probability of transitioning to social or private rental housing. Testing different approaches, for example treating all unknown episodes as private rental, suggests these do not substantially impact the results.

Housing and homeless spectrum

A housing and homeless spectrum is operationalised by categorising different forms of accommodation reported by *Journeys Home* respondents. Similar to the conceptual model described in Chapter 2, these categories are shown in Table 5.1 along with the number of person-waves in and entries to each. At one end of the spectrum are respondents living in private market housing, including renters and a small number of owners/mortgagees, and those living in social housing, renting from government housing authorities or not-for-profit community organisations. At the other end are those ‘sleeping rough’ on the street, in parks, improvised dwellings and abandoned buildings. These are combined with those staying in emergency or crisis accommodation or some form of temporary accommodation provided by government or a community organisation. In this chapter, these accommodation forms are collectively referred to as street and sheltered homelessness. Combining them improves the statistical strength of the analysis that follows and aligns with definitions of homelessness that have been widely used in the literature since at least the 1980s (Rossi et al. 1987; Burt 1992).

Table 5.1 Housing and homelessness spectrum

Housing and homelessness states	Number of: Person-waves	Entries
1. Street/shelter Episodes where respondents: - stay in emergency or crisis accommodation - stay in temporary accommodation provided by government or community service provider - sleep rough (the street, a park, a car, tent, train station or improvised shelter) - squat in an abandoned building	720	291
2. Private sub-market Episodes where respondents stay in a/an: - boarding/rooming/lodging house / Single Room Occupancy - hotel or motel room - hostel - caravan/mobile home - other temporary private market accommodation	599	249
3. Staying with family/friends Episodes where respondents stay with or live in the home of: - parents (commencing before age 15) - parents (commencing after age 15) - other relatives - friends	2,764	1,242
4. Social housing Episodes where respondents rent from a: - government housing authority (public housing) - not-for-profit community housing provider (community housing)	1,772	241
5. Private market housing Episodes where respondents are: - renting from a private landlord - buying or owning their housing	2,813	784
6. Other (including Institutional settings) - Hospital, nursing home, health or other treatment facility - Juvenile or youth detention centre, an adult prison or remand centre - Other (unspecified)	75	93
Total	**8,743**	**2,900**

Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

In between these extremes are different forms of accommodation. Respondents were reported to be staying with family or friends in a large proportion of person-waves. In some cases, they were living with their parents in what appeared to be their childhood home. In most cases though, respondents were living with other relatives or friends or appeared to have moved back in with their parents after their fifteenth birthday. These individuals are included in some definitions of homelessness as the 'doubled up' or 'couch/sofa surfers' depending on factors such as the permanency of their living arrangement (Chamberlain and Mackenzie

1992; Link et al. 1994). Also notable is the number of respondents living or staying in a range of marginal or sub-market accommodation including boarding/lodging/rooming houses or single room occupancies, hotel/motel rooms, hostels and caravans or mobile homes. These are grouped together as *private sub-market* accommodation. This form of accommodation is approximately as common among this respondent group as street and sheltered homelessness, while staying with family or friends is much more common. That these are so common for disadvantaged groups outside of tenured housing underscores the utility of considering housing and homelessness along a spectrum.

There are other types of accommodation observed in the data. This includes respondents staying in hospitals, health and treatment facilities and prisons. While entries to and exits from institutional settings are of interest in their own right, respondents were out-of-scope of the survey while institutionalised. Data collected most often came through respondents recording past episodes in the accommodation calendar after they had exited these settings and returned to the sample. Thus, a potential bias exists as those institutionalised longer term are excluded. An *other* category of accommodation is created to at least account for these episodes.

Reasons for housing transitions

The data suggest that transitions are common among poor and disadvantaged populations. A weighted estimate of 42 per cent of private renters (95% confidence interval: [38; 45]), 22 per cent of social housing renters (95% CI:[18; 27]) and 47 per cent of people staying with family or friends (95% CI:[43; 51]) changed accommodation between waves. These transitions are classified by the reasons for moving, reported by respondents at the subsequent wave. The most common reasons are shown in Figure 5.1a. Respondents were able to provide multiple reasons which could be both positive and negative. An involuntary move and indeed housing loss, as opposed to mobility generally, could be argued to occur where one or more negative reasons are reported. Whether a move is strictly positive or

negative though is difficult to ascertain, so a broader classification of reasons is used. Other reasons include problematic gambling, exit from state care, natural disaster and other unspecified reasons. Respondents who were living in privately rented housing at the previous wave most often cited the end of a lease, relationship breakdown, eviction or wanting to relocate or find better accommodation. Relationship breakdown and wanting to relocate were the most common reasons among people staying with family or friends. Social housing tenants were significantly less likely to move than private renters ($p<0.001$) or those staying with family or friends ($p<0.001$). When they did move, the most common reason given was to relocate/find better accommodation. In many, though not all cases, this may indicate a progression up the housing ladder, which together with instances where respondents moved to be with family, might be considered positive reasons, at least to the extent there appears to be a greater degree of agency involved and a realised intention to improve housing and social situations.

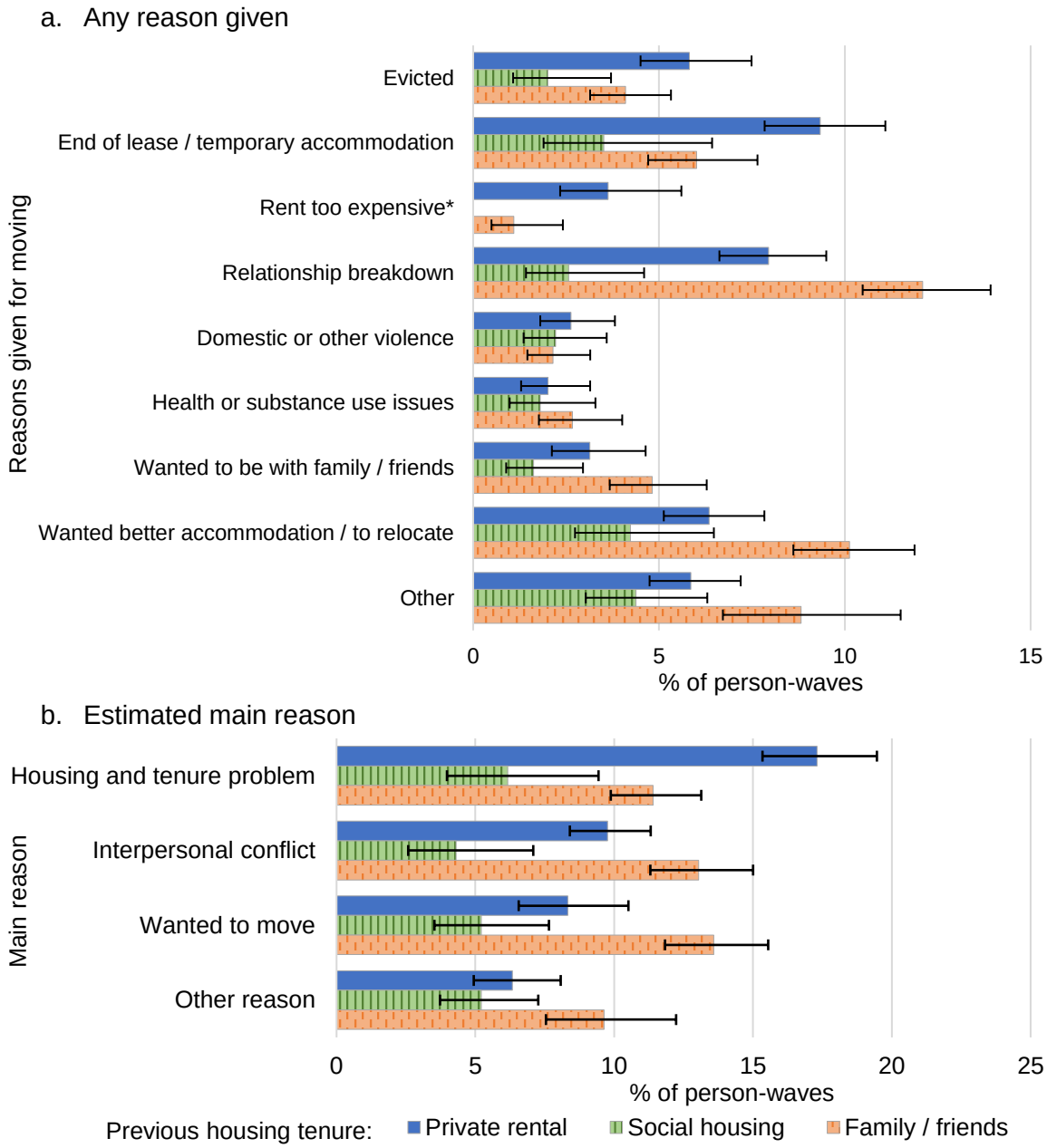
Mobility and housing loss is often driven by multiple factors and any particular reason given may be a contributing factor rather than a direct driver. Although respondents may intend to relocate, it may not be a positive move if they were also evicted from their previous accommodation or experienced a relationship breakdown. Arguably, an eviction or loss of tenure acts as the most immediate factor precipitating housing loss. In many cases, relationship breakdown is also likely to act as direct catalyst for housing loss at least for one of the parties involved. Other factors may contribute in a less direct (though no less important) way where housing or relationship factors are also present. A move is most likely to be positive where none of these factors are present. On this logic, Figure 5.1b. presents estimates of the main driver of mobility. *Housing and tenure* related factors (eviction, end of lease, temporary accommodation and expensive rent) are grouped together, as is *interpersonal conflict* (relationship breakdown and domestic or other violence). There were a small number of cases (40) in which respondents identified both housing and tenure factors and interpersonal conflict as reasons for moving. In these cases, if the respondent cited an eviction, their move was classified as due to housing and tenure factors, otherwise it was classified as due to

interpersonal conflict. If the respondent cited neither housing and tenure factors nor interpersonal conflict, their move was classified as *other* if they gave one of the other reasons for moving, including health or substance use issues. If respondents said they wanted better accommodation, to relocate and/or be with family and cited no housing, relationship or other reasons, their move was classified as *wanting to move*.

Housing and homelessness transitions

A two-stage random effects regression model is designed to analyse the incidence of housing mobility and transition to different forms of housing and homelessness. Two equations are estimated simultaneously using Generalised Structural Equation Modelling (GSEM) in Stata 14 (Statacorp 2015). Both equations are estimated with multinomial logistic regression and with individual-level random effects. The first equation estimates the probability of changing residence between one wave and the next by the main reason for moving. The independent variable has four categories: 1) no move; 2) move due to housing/tenure problem; 3) move due to interpersonal conflict; 3) move due to wanting to move; and 4) move due to other reasons. The second equation estimates the destination housing or homeless type among those who change residence. The independent variable has six categories based on the housing/homelessness categories shown in Table 5.2. To aid in computing the model, the sample is restricted to inter-wave observations in which the respondent is living in private rental housing, social housing or staying with family or friends at the initial wave (5,682 observations of a total 6,962). The family and friends category excludes instances where respondents were staying in their childhood home, defined as accommodation episodes staying with a parent or guardian that commenced before the respondent's fifteenth birthday. A respondent is classified as changing their residence where they record in the accommodation calendar a change in one spell of accommodation to another on or prior to the date of the next survey wave. The model is an extension of the multistate approach in considering transitions between multiple origin and destination states (Steele et al. 2004;

Putter et al. 2007). The multistate space depicting the housing and homelessness states and transitions between them that are of interest is shown in Figure 5.2.



** Result for social housing suppressed due to small numbers*

Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

Figure 5.1 Probability of moving housing/accommodation between waves by reason

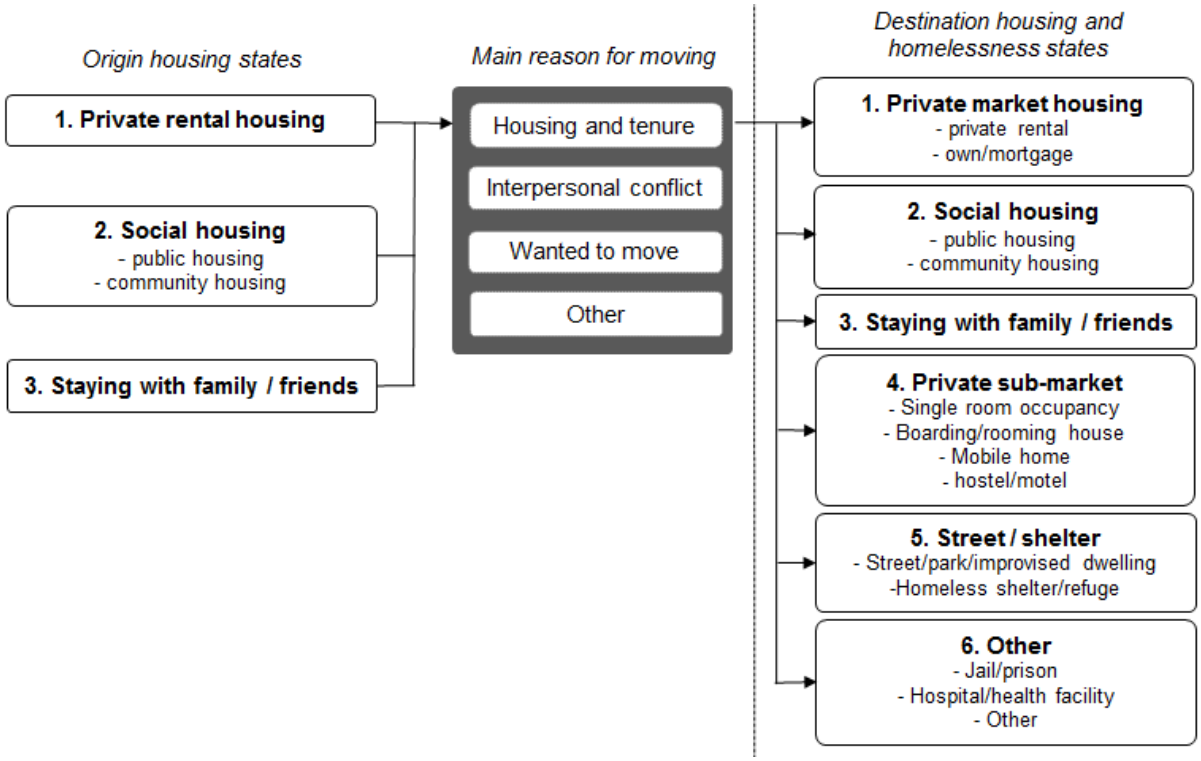


Figure 5.2 Housing and homelessness multistate space

Transitions between waves in employment, relationship status and violence are used to proxy shocks. These are included as dependent variables in both equations. The employment transition variable has eight categories including keep, change or leave a job. Those who leave a job and are looking for a job are distinguished from those who have left the labour force. This categorisation is augmented with information respondents gave on whether they worked between waves. For example, transitions into unemployment are identified where respondents were unemployed at one wave and employed at the previous wave or spent time in paid employment between waves. The variable also includes categories for those not participating in the labour force, unemployed and out of work for less than one year and unemployed and out of work for one or more years. An interaction between employment change and staying with family/friends is included to analyse whether associations between job and housing loss are different for those renting their own housing. The employment transitions variable

Change in relationship status is analysed with a single dichotomous variable, indicating whether the respondent transitioned from married/co-habiting to single between waves. Relationship breakdown is relatively rare in this sample dominated by single adults, preventing a more detailed analysis. Violence is analysed with a categorical variable indicating whether the respondent reported being the victim of violence from a current or former partner (domestic violence) or another person (other violence) in the previous six months. Interactions between domestic violence, sex of the respondent and separation are included to examine gendered aspects of housing moves. Associations between these shocks and housing transitions are measured in contemporaneous inter-wave periods. The precise timing of the shocks are unknown, so whether the shocks precede housing transitions or vice versa is unknown.

Background characteristics relating to the housing, socio-demographic, health and personal histories of respondents are drawn from the literature on housing mobility and homelessness. The housing variables are the housing tenure type, the duration of time in months spent in the origin housing type and the rent burden (O'Donnell 2019; Shinn et al. 1998). Associations with government rent subsidies are tested by comparing instances where respondents pay no more than 30 per cent of their income in rent without any subsidy with instances where subsidies push the rent burden from above 30 per cent of income to below and instances where the rent burden is greater than 30 per cent with or without subsidisation. Socio-demographic factors include age, the sex and family structure and highest education of the respondent (Basolo and Yerena 2017; Bramley and Fitzpatrick 2018; Byrne et al. 2013; Chamberlain and Johnson 2013; Clark 2016; Culhane et al. 2007, 2013; Johnson et al. 2019; Phinney et al. 2007; Scutella et al. 2013; Wong and Piliavin 1997). Health variables include whether the respondent has ever been diagnosed with bipolar disorder, schizophrenia, depression or anxiety, has a self-assessed problem with alcohol or drugs or received treatment in the previous six months (Culhane et al. 2007; Diette and Ribar 2018; Martijn and Sharpe 2006; McVicar et al. 2019; Metraux and Culhane 1999; Piat et al. 2015; Wong and Piliavin 1997; Scutella et al. 2013). Personal history variables include whether the respondent

has ever been incarcerated, placed in State care, experienced homelessness as a child or adult or violence as a child (Culhane et al. 2007; Desmond et al. 2015; Johnson et al. 2019; Martijn and Sharpe 2006; O'Donnell 2019; Piat et al. 2015).

The regression equations take the forms

$$ln\left(\frac{P_r^{t+1}}{P_0^{t+1}}\right) = \beta_0 + \beta_{0i} + \beta_1 H_o^t + \beta_2 S_k^{t+1} + \beta_3 X_l^t \quad 5.1$$

$$ln\left(\frac{P_j^{t+1}}{P_H^{t+1}}\right) = \beta_4 + \beta_{0i} + \beta_5 R_r^{t+1} + \beta_6 H_o^t + \beta_7 S_k^{t+1} + \beta_8 X_l^t \quad 5.2$$

ln is the natural logarithm; P_r^{t+1} is the probability of changing residence between waves t and $t+1$ due to reason r; P_0^{t+1} is the probability of not moving; P_j^{t+1} is the probability of moving to housing/homelessness type j; P_H^{t+1} is the probability of entering/re-entering the private housing market; H_o^t is the housing tenure type at wave t; S_k^{t+1} represents the employment, relationship and violence shocks between waves t and $t+1$; X_l^t represents the background characteristics; R_r^{t+1} is the main reason given for moving between waves t and $t+1$; the βs are the parameters to be estimated by the models; and β_{0i} is an individual-level random effect that varies between each of the possible outcomes. These equations are estimated for all housing and homelessness states except the *Other* category. Probabilities of transitioning into the *Other* state are estimated with a fixed and random intercept but no explanatory variables.

Model outputs are reported in the form of relative risk ratios (RRR) and predicted transition probabilities. The RRR are the exponentials of the β regression parameters. In the first equation, the relative risk is the probability of moving due to reason r divided by the probability of not moving. The RRR is the relative risk for one category of an explanatory variable divided by the relative risk of a base category. The RRR on transitioning from employment to unemployment, for example, is the predicted relative risk of moving due to reason r where a person becomes unemployed divided by the relative risk where a person remains employed. In the second equation, the relative risk is the probability of moving into

housing/homelessness state o, divided by the probability of moving into the private housing market (renting or buying). Predicted transition probabilities give a more intuitive sense of the results and combine the results of both equations. These represent the probabilities of transitioning from one state to another over a six month period for a given set of variables holding all others constant. They are predicted for each respondent and origin housing state. The average probability is then calculated over all respondents.

Results

The results suggest significant associations between housing loss and events such as job loss, divorce/separation and violence. The results for the part of the model predicting housing transitions by reason are shown in Table 5.4. The transition between employed and unemployed is significantly associated with housing transitions for any reason, most particularly and interestingly, interpersonal conflict and other reasons. The estimated relative risk ratios (RRR) suggests that entry to unemployment is associated with a 163 per cent higher relative risk of moving due to interpersonal conflict (RRR = 2.63; $p<0.01$), a 193 per cent higher relative risk of moving due to other reasons (RRR = 2.93; $p<0.01$) and a 56 per cent higher relative risk of moving due to housing and tenure problems (RRR = 1.56; $p<0.05$), relative to those who remain employed in the same job. To the extent this may reveal a causal relation, the direction is unclear as the job loss may have occurred after the housing transition. Potentially indicating that job losses precede housing moves are the positive – though not always significant – associations between longer term unemployment and housing moves. Also of interest, interactions with housing type suggest people not participating in the labour force have significantly higher risks of moving for housing and interpersonal reasons if they are staying with family or friends. This might indicate that lack of employment strains relationships and support networks. Predictably, gaining (RRR = 2.20; $p<0.01$) and changing (RRR = 2.22; $p<0.05$) jobs are positively associated with moves due to people wanting to relocate, though interestingly, transitions into unemployment are also positively associated with wanting to move (RRR = 1.76; $p<0.05$). There are several possible explanations for this

latter finding, including measurement issues, unobserved factors and reverse causation, as well as the possibility that losing or leaving a job is coupled with or provokes a desire to move house.

Family conflict including relationship breakdown and domestic violence are also significantly associated with housing moves. The transition from marriage/cohabiting to being single is relatively rare in this sample (Table 5.2). Nevertheless, it is also significantly associated with housing transitions due to housing and tenure problems (RRR = 2.55; $p<0.01$), not surprisingly, interpersonal conflict (RRR = 5.46; $p<0.01$) and other reasons (RRR = 2.81; $p<0.01$). Interactions with sex suggests these risks are higher for women for the first two reasons, however these are not significant. Being the victim of violence between waves, whether the perpetrator was a current of former partner or another person, is also significantly associated with moves for housing and interpersonal reasons. The size of the effect appears larger where the perpetrator is a current or former partner. Interactions between domestic violence (from a current or former partner), relationship separation and sex are not significant.

The risk of housing loss is strongly associated with tenure types. Relative to private renters, social tenants are less likely to move due to housing reasons (RRR = 0.28; $p<0.01$), interpersonal conflict (RRR = 0.37; $p<0.01$), wanting to move (RRR = 0.66; $p<0.05$) and for other reasons (RRR = 0.59; $p<0.01$). The length of time spent in the current housing episode is negatively associated with moving, suggesting the risk of moving is higher in the early part of housing episodes. The rent burden and subsidy variables, by contrast, are not significant. Of the background variables, young adults in the 15-24 year age group are more likely to move, particularly due to interpersonal conflict or because they want to move. People who say they have an alcohol or drug use problem or were treated in the previous six months are significantly more likely to move due to other reasons (RRR = 1.74; $p<0.01$), as are people who have been ever diagnosed with Bipolar Disorder or Schizophrenia (RRR = 1.38; $p<0.05$). Those who have ever been incarcerated in adult or juvenile detention appear more likely to

move for positive reasons (RRR =1.51; p<0.01), while those with Depression or Anxiety appear less likely (RRR = 0.77; p<0.05).

Table 5.2 Predicting housing moves by reason, regression results

	Main reason for moving (base = no move)			
	Housing and tenure	Inter-personal conflict	Wanted to move	Other
	Relative Risk Ratio (standard error)			
Housing/accommodation type (base = private rental)				
Staying with family/friends	0.69 (0.25)	1.13 (0.56)	1.07 (0.42)	0.83 (0.39)
Social housing	0.28** (0.04)	0.37** (0.07)	0.66* (0.12)	0.59** (0.11)
Duration of housing episode				
Months	0.91** (0.02)	0.91** (0.02)	0.92** (0.02)	0.91** (0.02)
Months squared	1.001 (0.001)	1.001 (0.001)	1.001 (0.001)	1.002† (0.001)
Rent burden (base = pays no rent)				
Rent < 30% of income before subsidy	0.97 (0.24)	1.56 (0.54)	0.93 (0.26)	0.78 (0.24)
Rent < 30% of income with subsidy	1.22 (0.32)	1.24 (0.48)	0.62 (0.21)	0.94 (0.31)
Rent > 30% of income with subsidy	1.28 (0.34)	1.16 (0.45)	0.68 (0.23)	0.83 (0.28)
Rent > 30% of income, no subsidy	1.18 (0.31)	2.04† (0.74)	0.71 (0.23)	0.72 (0.24)
Sex and family type (base = single male)				
Single female	1.27 (0.20)	1.51† (0.32)	0.87 (0.19)	1.45† (0.29)
Couple	0.63* (0.12)	0.92 (0.21)	0.71 (0.17)	0.82 (0.20)
Single parent	1.14 (0.19)	0.76 (0.20)	0.73 (0.17)	0.73 (0.17)
Couple parents	0.98 (0.18)	1.13 (0.27)	0.88 (0.20)	0.50* (0.15)
Sex and family type - staying with family/friends (base = single male)				
Single female	0.87 (0.20)	0.85 (0.23)	1.76* (0.48)	0.75 (0.21)
Couple	1.07 (0.32)	1.11 (0.33)	1.80† (0.57)	1.31 (0.45)
Single parent	0.67 (0.21)	2.32* (0.82)	2.88** (0.91)	1.36 (0.53)
Couple parents	0.84 (0.35)	1.11 (0.46)	2.10† (0.80)	1.78 (0.95)
Transition between waves				
Married/co-habiting -> single	2.55** (0.83)	5.46** (1.58)	0.79 (0.37)	2.81** (1.05)
Separation × female	1.79 (0.78)	1.75 (0.67)	2.13 (1.34)	0.83 (0.48)
Labour force transition (base = keep job)				
Change job	1.25 (0.35)	1.01 (0.43)	2.22* (0.72)	1.52 (0.66)
Employed -> unemployed	1.56* (0.34)	2.63** (0.72)	1.76* (0.49)	2.93** (0.90)
Employed -> not in labour force	1.20 (0.30)	1.93* (0.64)	1.69† (0.53)	2.61** (0.89)
Not employed -> employed	1.48† (0.33)	1.50 (0.48)	2.20** (0.64)	1.86† (0.65)
Not employed -> not in labour force	0.80 (0.16)	0.69 (0.20)	0.83 (0.22)	1.18 (0.35)
Not employed <1 year -> unemployed	1.36 (0.32)	1.52 (0.49)	1.10 (0.38)	2.31* (0.78)
Not employed ≥ 1 year -> unemployed	1.29 (0.27)	1.97* (0.54)	0.97 (0.29)	1.36 (0.44)
Labour force transition - staying with family/friends (base = keep job)				
Change job	0.98 (0.47)	2.91† (1.73)	0.84 (0.39)	1.02 (0.65)
Employed -> unemployed	1.45 (0.52)	1.85 (0.80)	1.44 (0.55)	1.01 (0.47)
Employed -> not in labour force	1.31 (0.62)	1.17 (0.67)	0.78 (0.38)	0.70 (0.41)
Not employed -> employed	1.05 (0.40)	1.66 (0.81)	0.68 (0.27)	1.10 (0.56)
Not employed -> not in labour force	2.40** (0.80)	3.9** (1.73)	1.84† (0.68)	1.35 (0.62)
Not employed <1 year -> unemployed	1.35 (0.50)	2.78* (1.29)	1.08 (0.48)	1.39 (0.66)
Not employed ≥ 1 year -> unemployed	1.04 (0.34)	1.44 (0.60)	1.27 (0.49)	1.30 (0.59)
Income support suspended between waves	1.05 (0.15)	1.03 (0.19)	0.98 (0.19)	1.03 (0.21)
Victim of violence between waves (base = no)				
Current or former partner	3.01** (1.09)	3.91** (1.40)	1.14 (0.59)	0.72 (0.48)
Other person	1.60** (0.22)	3.02** (0.42)	1.1 (0.19)	1.39† (0.24)
Opt out / Not defined	1.23 (0.31)	1.45 (0.40)	1.34 (0.35)	1.33 (0.40)
Interactions with violence				
Current or former partner × separation	0.46 (0.27)	0.46 (0.24)	0.84 (0.78)	0.83 (0.78)
Current or former partner × female	0.64 (0.26)	0.95 (0.38)	0.78 (0.47)	1.01 (0.75)

Age group (base =15-24 years)				
25-34 years	0.84 (0.10)	0.66** (0.10)	0.73* (0.10)	1.00 (0.16)
35-44 years	0.85 (0.12)	0.70* (0.12)	0.69* (0.12)	0.91 (0.17)
45-54 years	0.67* (0.12)	0.62* (0.13)	0.51** (0.11)	0.95 (0.21)
55+ years	0.98 (0.26)	0.43† (0.19)	0.43* (0.16)	1.01 (0.33)
Highest education (base = post-school qualification)				
High school	1.11 (0.16)	0.87 (0.16)	1.12 (0.19)	0.79 (0.16)
Less than high school	1.28* (0.13)	1.19 (0.14)	1.25† (0.15)	1.04 (0.13)
Self-assessed alcohol or drug use problem				
Yes or treated in the last 6 months	1.08 (0.13)	1.35* (0.18)	0.87 (0.13)	1.74** (0.24)
Ever diagnosed with:				
Bipolar/schizophrenia	0.96 (0.12)	0.97 (0.14)	1.14 (0.16)	1.38* (0.21)
Depression/anxiety	0.84† (0.08)	1.15 (0.13)	0.77* (0.08)	0.98 (0.13)
Experienced violence as a child				
Yes	0.96 (0.09)	1.06 (0.12)	1.02 (0.11)	1.06 (0.13)
Opt out / Not defined	1.04 (0.20)	0.69 (0.18)	0.90 (0.20)	0.87 (0.23)
Ever in adult/juvenile detention	0.93 (0.10)	1.15 (0.14)	1.51** (0.18)	1.02 (0.14)
Age first homeless (base = never homeless)				
0-14	1.43† (0.30)	1.45 (0.35)	1.03 (0.24)	0.83 (0.22)
15-19 years	1.22 (0.23)	1.09 (0.24)	1.14 (0.23)	0.94 (0.22)
20+ years	1.14 (0.23)	0.9 (0.22)	1.21 (0.27)	0.74 (0.19)
Unknown	1.37 (0.60)	0.81 (0.53)	1.04 (0.54)	1.34 (0.67)
Ever been in foster care	1.06 (0.11)	0.89 (0.11)	0.90 (0.11)	0.89 (0.12)
Individual-level random effect	1.01 (0.21)	1.06 (0.28)	0.78 (0.17)	2.72
Intercept	0.35** (0.12)	0.08** (0.04)	0.24** (0.10)	0.16** (0.08)
Observations	5,682			

Source: author's calculations from Wooden et al. 2012 and Scutella et al. (2017)

Among those who move, individuals with the greatest personal vulnerabilities appear least likely to secure alternative housing and the most likely to experience street and shelter homelessness. These results are shown in Table 5.3. Those who transition out of employment and particularly those who are unemployed and have been out of work for one year or longer, victims of violence, single males, those aged 45 years and older and those with a childhood experience of homelessness are significantly more likely to transition into street and sheltered homelessness than into the private housing market. Middle and older aged people are also significantly more likely to transition to the private sub-market, while single males and females, those not working and victims of domestic or family violence are more likely to move in with family or friends. Those who move housing due to interpersonal conflict and those who were living in social housing or with family or friends are significantly less likely to secure housing in the private market. However, as these associations are only of people who move, whether they translate into higher probabilities of transitioning at all is best ascertained from predicted probabilities.

Table 5.3 Predicting housing and homelessness destinations, regression results

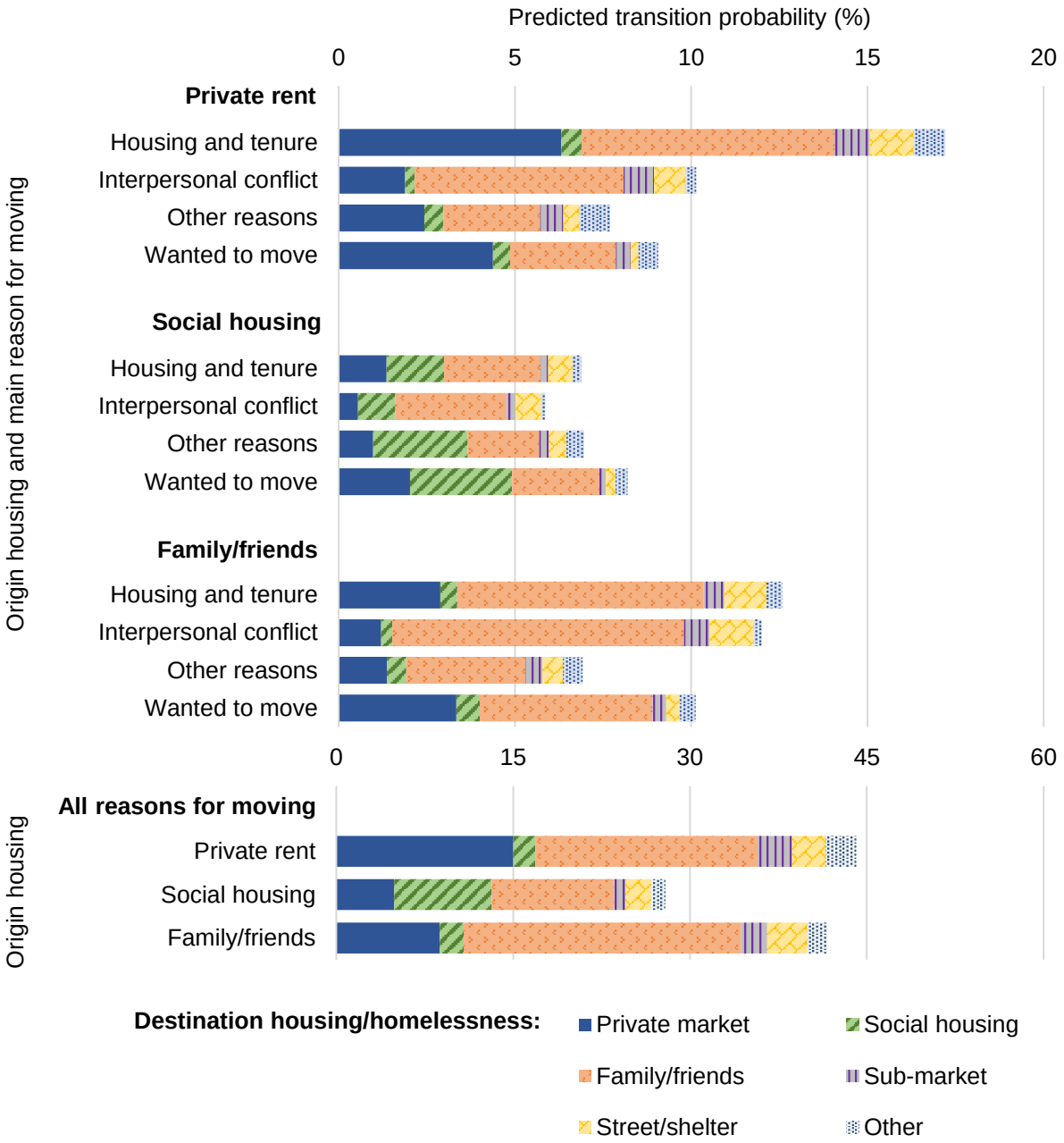
	Destination after moving (base = private rent)			
	Social housing	Family/ friends	Private sub-market	Street/ shelter
	Relative Risk Ratio (standard error)			
Duration of previous housing episode				
Months	0.94 (0.04)	0.97 (0.03)	0.92 (0.05)	0.90* (0.04)
Months squared	1.002 (0.002)	1.001 (0.001)	1.001 (0.003)	1.004* (0.002)
Main reason for leaving previous accommodation (base = housing reason)				
Interpersonal conflict	1.5 (0.47)	2.3** (0.35)	3.21** (0.92)	2.2** (0.53)
Wanted to move/be with family	1.32 (0.34)	0.61** (0.09)	0.69 (0.22)	0.28** (0.09)
Other	2.28** (0.67)	0.79 (0.13)	1.00 (0.31)	0.74 (0.22)
Previous housing/accommodation type (base = private rental)				
Family and friends	1.88* (0.48)	2.24** (0.27)	1.24 (0.28)	2.26** (0.49)
Social housing	15.4** (4.13)	1.76** (0.37)	0.92 (0.37)	2.89** (0.92)
Sex and family type at previous wave (base = single male)				
Single female	1.61† (0.45)	1.04 (0.15)	0.51* (0.15)	0.65 (0.17)
Couple	1.11 (0.36)	0.65* (0.12)	0.62 (0.22)	0.75 (0.24)
Single parent	1.66† (0.49)	0.58** (0.10)	0.58 (0.20)	0.34** (0.12)
Couple parents	1.46 (0.50)	0.43** (0.09)	0.49† (0.21)	0.35* (0.14)
Married/co-habiting -> single	0.86 (0.43)	2.15** (0.57)	1.60 (0.83)	1.84 (0.85)
Labour force transition - (base = keep/change/gain job)				
Employed -> unemployed	1.37 (0.48)	1.45* (0.24)	1.47 (0.47)	2.89** (0.93)
Employed -> not in labour force	1.37 (0.58)	1.89** (0.45)	1.76 (0.77)	3.23** (1.38)
Not employed -> not in labour force	2.63** (0.78)	1.37† (0.23)	1.52 (0.49)	2.08* (0.70)
Not employed <1 year -> unemployed	1.29 (0.50)	1.60** (0.29)	1.13 (0.42)	1.65 (0.61)
Not employed ≥ 1 year -> unemployed	2.00* (0.65)	1.88** (0.31)	1.29 (0.43)	4.00** (1.24)
Victim of violence between waves (base = no)				
Current or former partner	1.15 (0.48)	1.52† (0.37)	0.95 (0.50)	2.06† (0.80)
Other person	1.95* (0.56)	1.34† (0.23)	1.53 (0.46)	1.98** (0.52)
Opt out / Not defined	2.34† (1.04)	1.17 (0.35)	1.07 (0.59)	1.37 (0.67)
Current or former partner × separation		0.86 (0.50)	1.25 (1.36)	2.47 (1.97)
Age group (base =15-24 years)				
25-34 years	1.72* (0.46)	0.79 (0.12)	1.74† (0.51)	2.52** (0.68)
35-44 years	2.11* (0.65)	0.71† (0.13)	1.39 (0.48)	2.13* (0.70)
45-54 years	2.84** (1.07)	0.73 (0.18)	4.69** (1.83)	7.56** (2.70)
55+ years	4.61** (2.51)	0.69 (0.30)	4.51** (2.59)	6.56** (3.70)
Highest education (base = post-school qualification)				
High school	1.11 (0.42)	0.89 (0.17)	0.79 (0.30)	1.99* (0.62)
Less than high school	1.5† (0.34)	1.07 (0.13)	0.99 (0.23)	1.03 (0.23)
Self-assessed or treated alcohol/drug problem	1.17 (0.29)	0.98 (0.15)	0.7 (0.20)	1.33 (0.31)
Ever diagnosed with:				
Bipolar/schizophrenia	1.03 (0.27)	1.11 (0.17)	1.20 (0.34)	1.48 (0.37)
Depression/anxiety	0.58* (0.13)	0.74* (0.09)	0.52** (0.12)	0.54** (0.12)
Experienced violence as a child				
Yes	0.96 (0.20)	1.14 (0.13)	0.84 (0.19)	0.92 (0.19)
Opt out / Not defined	1.26 (0.52)	1.17 (0.33)	3.18** (1.33)	2.54* (0.99)
Ever in adult/juvenile detention	1.36 (0.31)	1.11 (0.14)	0.94 (0.23)	0.99 (0.22)
Age first homeless (base = never homeless)				
0-14	2.22 (1.11)	0.95 (0.23)	3.92* (2.61)	3.87* (2.60)
15-19 years	2.46† (1.14)	1.02 (0.22)	2.07 (1.34)	3.90* (2.53)
20+ years	1.59 (0.76)	0.83 (0.20)	3.21† (2.11)	2.46 (1.61)
Ever been in foster care	1.95** (0.42)	1.23 (0.16)	1.80* (0.43)	1.61* (0.35)
Individual-level random effect	1.22 (0.49)	1.70* (0.44)	5.3** (2.84)	1.45 (0.65)
Intercept	0.01** (0.01)	1.27 (0.37)	0.08** (0.06)	0.02** (0.02)
Observations	2,293			

Source: author's calculations from Wooden et al. 2012 and Scutella et al. (2017)

Renters in the private market face a high risk of moving due to housing and tenure problems. This is shown in Figure 5.3, where 17 per cent of private renters are predicted to move due to housing and tenure problems, compared with 6.9 per cent of social housing tenants. Approximately, 40 per cent of these find alternative housing in the private or social housing sectors, while another 42 per cent move in with family or friends. Irrespective of the origin housing or reason for moving, family and friends is an important destination. Of those leaving social or privately rented housing for reasons other than wanting to move, 43 per cent move in with family or friends, 37 per cent find alternative housing, 6 per cent enter the private sub-market and 8 per cent enter street or sheltered homelessness. The probabilities of entering street or sheltered homelessness are predicted to be highest for those who had been staying with family or friends (3.4 per cent), compared with those renting in the private market (2.9 per cent) and in social housing (2.2 per cent). This points to the potential importance of housing and tenure crises in pathways between housing and homelessness and the role of interpersonal support from family and friends.

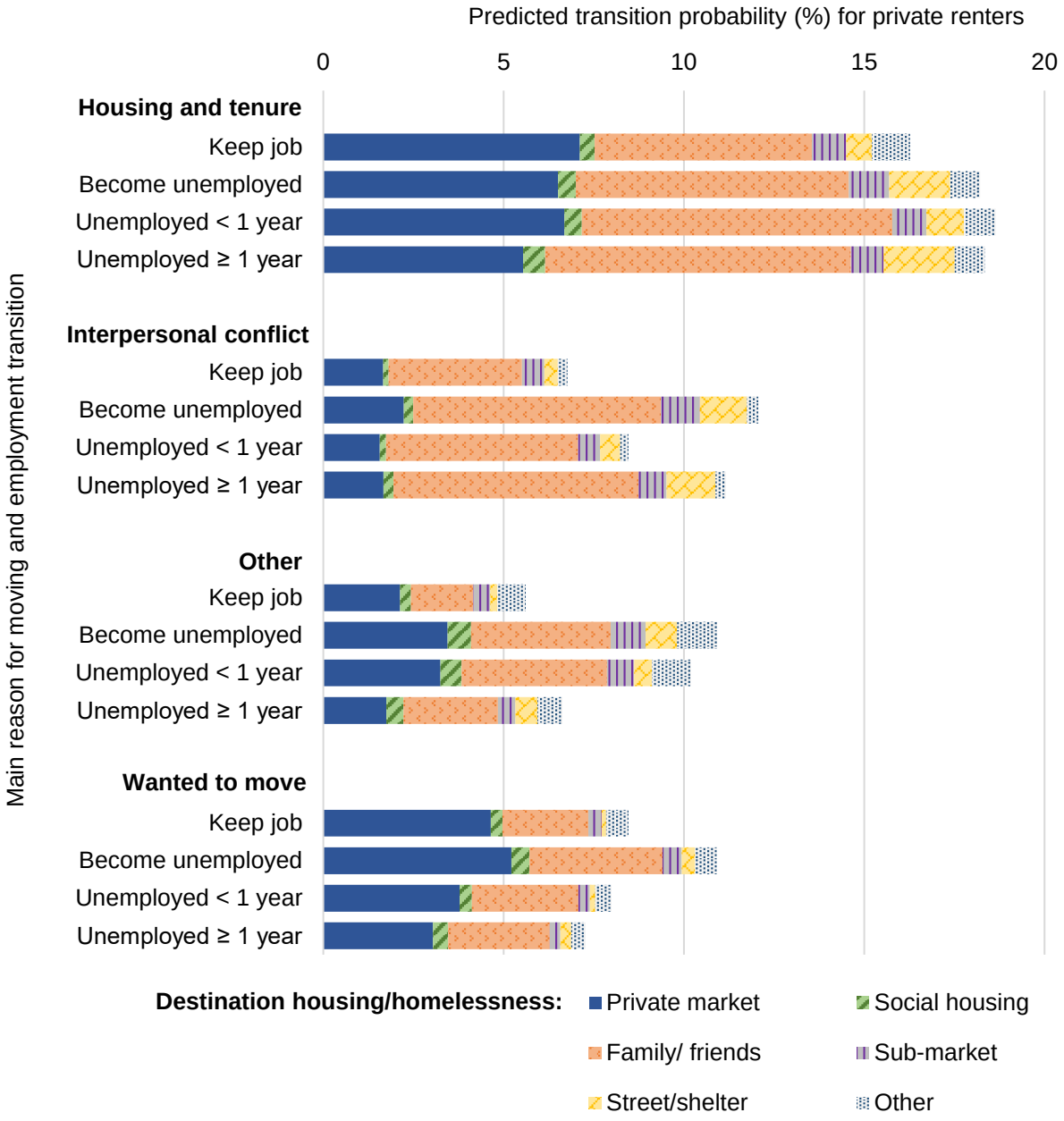
Those who lose their jobs have higher probabilities of becoming homeless. Private renters who transition from employment to unemployment have higher predicted probabilities of moving for any reason (52 per cent) than those who remain in the same job (37 per cent). More than one-in-five (22 per cent) people who lose their job are predicted to move in with family or friends, 4 per cent move into the sub-market and 4 per cent enter street or sheltered homelessness, compared with 14 per cent, 2 per cent and 1 per cent of those who keep their job respectively. The results suggest this is largely driven by positive associations between unemployment and moves due to interpersonal conflict and other reasons. As shown in Figure 5.4, the probability of private renters moving due to housing and tenure problems is high irrespective of employment transitions. Indeed, 16 per cent of those who keep their job are predicted to move due to a housing problem. However, people who transition into unemployment or are unemployed and have been out of work long-term have higher probabilities of entering street or sheltered homelessness and of moving in with family or

friends. This might indicate that housing crises affect this population irrespective of their labour market position. Employment though may be important in securing alternative housing and avoiding street or sheltered homelessness or having to double up with family or friends.



Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

Figure 5.3 Predicted housing and homelessness transition probabilities by reason for moving

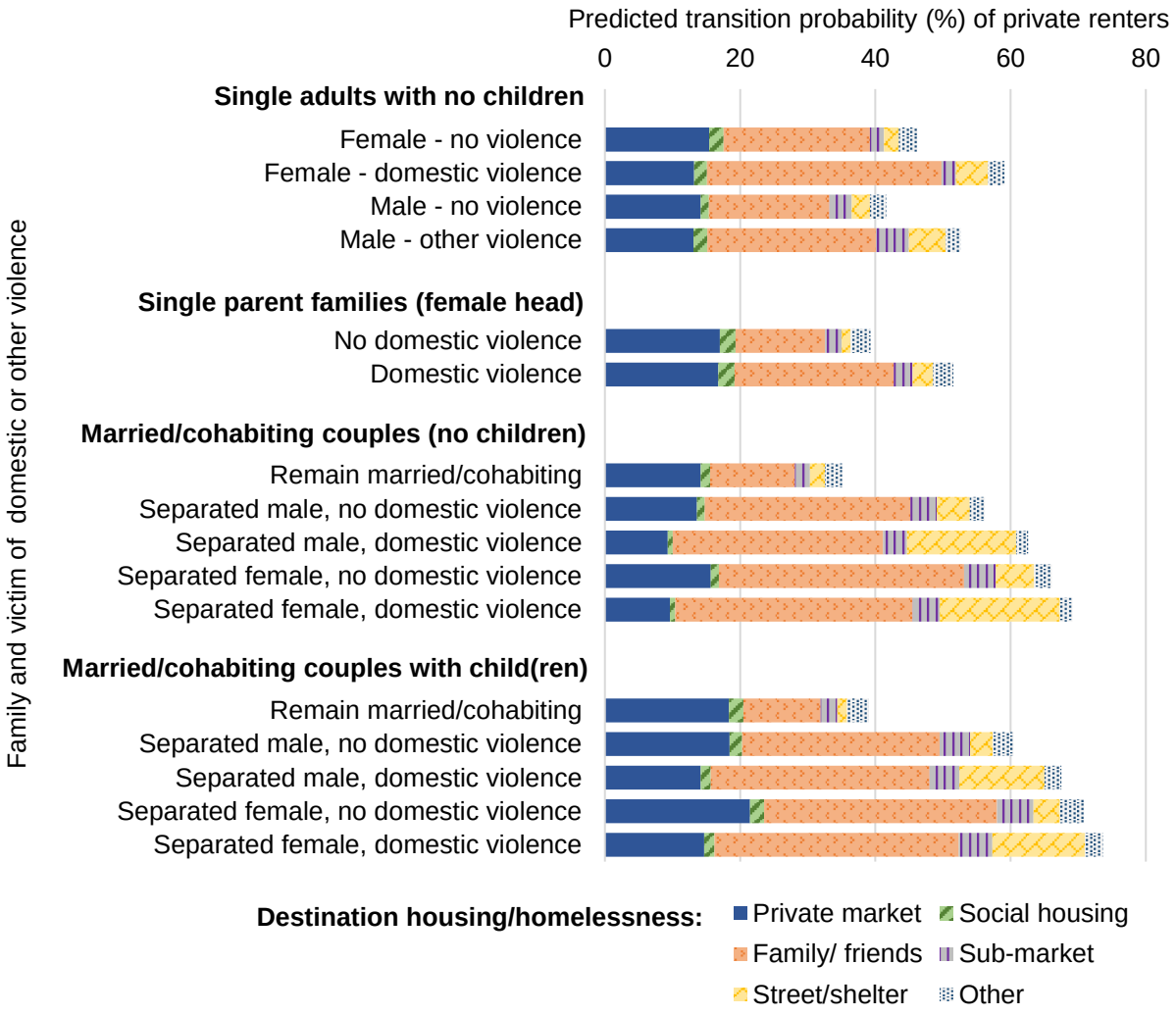


Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

Figure 5.4 Predicted effects of employment transitions in the private rental market

Finally, the predicted effects of relationship breakdown and violence among private renters are shown in Figure 5.5. Transition probabilities are shown for single females and female-headed single parent families who do and do not experience violence from a former partner and for single males who do and do not experience violence from someone other than a former partner. These suggest that victims of violence experience higher probabilities of moving, and in particular, higher probabilities of moving into street or sheltered homelessness

or in with family or friends. People who experience relationship breakdown, as measured by transitions from married/cohabiting to single, have similar probabilities of moving into new housing as those who remain married or cohabiting but substantially higher probabilities of moving elsewhere, particularly in with family or friends. Strikingly, people who experience domestic violence and a relationship break-up have substantially higher probabilities of street or sheltered homelessness. Separated women without children are predicted to have a 18 per cent probability of homelessness where domestic violence is involved, compared with 6 per cent where separation does not involve violence and 2 per cent where couples remain married/cohabiting and no violence is reported. Thus, domestic violence appears to be one of the most important factors associated with housing loss and homelessness.



Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

Figure 5.5 Predicted effects of family and violence in the private rental market

Discussion

This evidence provides support for the view that housing, family and economic events coincide with residential moves. Housing events and crises such as eviction and lease expiries appear to be a major contributor to housing loss among vulnerable populations, especially those living in the private rental market, complementing and building on the findings of Clark and Davies Withers (2007), Desmond et al. (2015) and Hartman and Robinson (2003). Interpersonal conflict including relationship breakdown and domestic violence is likely to be another major contributor, in support of several studies including Mikolai and Kulu (2018) and Moschion and van Ours (2019). Positive associations between job loss and housing transitions support the findings of Wiemer (2014), though the fact job loss is more heavily associated with moves due to interpersonal conflict and other reasons rather than housing and tenure problems adds to the body of literature that indicate complexity in the relationship between employment and housing (Clark 2013; Morris 2017; Rabe and Taylor 2010; Wang et al. 2018; Warner and Sharp 2016). In this case, it appears that even those with relatively stable employment within this vulnerable population face substantial risk of eviction and tenure instability. Nevertheless, strong evidence is found to suggest transitions into unemployment coincide with housing moves for adverse reasons.

Housing transitions and loss are common among this population, though entries to street and sheltered homelessness are relatively rare. The majority of people moving out of the private rental market find alternative rental accommodation or draw on support from family and friends. Employment is a strong predictor of transitioning into alternative housing, pointing towards the importance of economic resources after housing loss. As other studies suggest (Johnson et al. 2019; O'Donnell 2019; Shinn et al. 1998; Shinn and Gillespie 1994; Wong and Piliavin 1997), institutional resources, in this case in the form of social housing, appear important in reducing the risk of housing loss. However, interpersonal support appears much more important in accommodating those who lose housing in the private market. Transition probabilities for people living with family and friends are high though, and while some enter or

re-enter the housing market, they also carry an elevated risk of transitioning to a new episode with family or friends or into street or sheltered homelessness. This latter risk appears greatest for the most vulnerable including those who lose jobs, the long-term unemployed, victims of violence, older adults and those with histories of homelessness. This finding lends support to the hypothesis that those with the least economic, institutional, interpersonal and personal resources have the weakest capacity to manage housing and accommodation loss and consequently, the highest risk of street and sheltered homelessness. The importance of doubling up as a destination after housing loss and as an intermediary stage underscores the value of the housing pathways approach, including in providing a potential mechanism through which structural weaknesses in housing and labour markets intersect with personal and interpersonal histories and characteristics to shape the risk of homelessness through time.

The main limitations of the study presented in this chapter relate to the strength and generalisability of the findings. Uncertainties around the timing of events with respect to housing moves, the effects of respondent attrition and the potential for other unobserved events and factors prevent the estimation of causal effects. The causes of housing loss and homelessness are likely to be diverse and complex, in any case, making it difficult to identify any one factor. Housing, economic and family crises are thus argued to be among the proximal events that mediate a potentially large array of distal personal, interpersonal and macrostructural factors. Another limitation is the relatively coarse categorisation of the reasons for moving and the destination housing and homelessness states. Rental lease expiries, for example, were a major reason given for housing moves. While these were grouped with evictions in this study, that leases were not renewed may be the prerogative of tenants as much as it is forced upon them. Without information to clarify this, operationalising a precise measure of housing crisis has not been possible. Finally, the study population is a very disadvantaged population of income support recipients in Australia. This is a strength in that it focuses on a population most at-risk of homelessness, however the results are not generalisable to a wider population. On a related point, and to the extent that the results are

a product of factors such as the structure and regulation of housing and labour markets and social support systems, certain findings are likely to be unique to Australia. The effect of rental subsidies is one example, as the rent subsidy scheme in Australia operates very differently from other schemes, such as Housing Choice Vouchers in the US (O'Donnell 2019). Research also suggests that tenant protections for private renters are relatively weak in Australian legislation, particularly compared with Europe (Martin et al. 2017). Nevertheless, the conceptual and methodological approach and the intersections between life events and interpersonal support networks are likely to have a wider application.

Conclusion

This chapter has examined the processes that underlie transitions between housing and homelessness. The main conceptual and methodological contribution has been to connect analyses of housing transitions to a spectrum of possible housing and homelessness destinations. The results provide evidence for the hypothesis that life events and shocks contribute to housing loss. Whether or not this leads to street or sheltered homelessness depends on the resources and support available to people to secure alternative accommodation. The support of family and friends is found to be critical in this respect, often moderating the effects of housing, family and economic shocks on homelessness entries. This support is often temporary though, in many cases just delaying their effects. This warrants greater policy and research consideration of the factors that contribute to housing loss within multidimensional and intertemporal housing and homelessness dynamics.

6

Does social housing reduce homelessness?

A multistate analysis of housing and homelessness pathways[4]

Abstract

This chapter presents a multistate demographic approach for analysing the longitudinal dynamics of housing and homelessness. The approach is applied to a sample of highly disadvantaged individuals in Australia to assess whether private housing markets and interpersonal support networks provide stable housing trajectories vis-à-vis public and community (social) housing. Discrete-time competing risk survival models are specified to estimate the probabilities of exiting housing to six housing and homeless states. Model outputs are applied to a microsimulation model to estimate the duration of episodes and the cumulative incidence of subsequent episodes of housing and homelessness. The results suggest that private housing markets carry an increased risk of housing exit relative to social housing. The homes of family and friends are the most common destination, though this type of support is usually time limited and often precipitates episodes of homelessness. These findings warrant policy consideration as to how housing markets can provide better affordability and security for low income households.

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Introduction

Public housing has traditionally played an important role in preventing and addressing homelessness. However, across a number of countries, governments' role in housing has been changing, shifting from the direct provision of public housing to the funding of subsidies for people renting in the private market and in housing run by community, not-for-profit organisations (community housing). Rental subsidies combined with personalised support services has been shown to provide security of tenure for previously homeless populations in certain contexts, and can be argued to provide greater housing choice and better opportunities for integration of residents into the mainstream community. It is not clear though the extent to which rental subsidies protect vulnerable populations from future homelessness relative to public and community (social) housing at a general population level. Nor is it clear what happens to those who choose not to or are unable to access public or subsidised housing. Many are likely to rely on interpersonal networks of family and friends to provide informal housing support, particularly in the context of rationalised public services. A key question for this group is to what extent informal support systems provide stable pathways out of homelessness.

In view of this, this chapter sets out to address the following research questions:

1. Are different housing tenure types – for example social and privately rented housing - associated with the risk of homelessness and housing deprivation?
2. Are tenure types associated with the extent and duration of future homelessness?

A multistate approach is proposed to address these questions. A competing risk survival model is specified to estimate the probabilities of exiting a housing episode to one of six housing and homelessness states. The model is applied to the *Journeys Home* dataset, a longitudinal survey of highly disadvantaged individuals in Australia. Model outputs are used to simulate trajectories for a synthetic population and estimate the incidence and durations spent in different states. The results indicate that homeless exit pathways are more volatile for

people outside social housing, faced with higher probabilities and durations of repeat homelessness episodes. These findings and the approach taken deliver a novel contribution to the literature, particularly in quantifying housing pathways and the durations of homelessness and housing disadvantage.

Background

Housing markets are important structural determinants of housing and homelessness dynamics among low income populations. A lack of housing stock, in particular low-cost rental housing, in relation to low income households has long been considered to be one of the prominent drivers of homelessness (Burt 1992; Shinn and Gillespie 1994; O'Flaherty 2004). This is reflected in quantitative empirical studies, many of which analyse the effects of housing at the neighbourhood, city or region level on the prevalence, incidence or duration of homelessness. These generally suggest that areas with higher rent prices and less housing affordability – as measured by rent to income ratios and the size of the affordable housing stock – are associated with higher rates of homelessness (Byrne et al. 2013; Cobb-Clark et al. 2016; Culhane et al. 1996; Elliot and Krivo 1991; Fargo et al. 2013; Honig and Filer 1993; Lee et al. 2003; Johnson et al. 2015). With respect to tenure types, a greater proportion of housing being rented and lower rates of home ownership are often found to be associated with higher homelessness rates (Byrne et al. 2013; Fargo et al. 2013; Lee et al. 2003), at least in low income areas (Culhane et al. 1996).

These associations are in part explained by the reliance of low income households on at times volatile and expensive private rental markets. While the size and characteristics of private rental markets vary within and across countries (Hulse 2002; Hulse et al. 2011; Hulse et al. 2014; Martin et al. 2017), low income renters often experience high rates of residential instability and financial stress (Breunig and Cobb-Clark 2006; Clark 2016; Hassan et al. 1996; Hulse et al. 2014; Kemp 2011; Phinney 2013; Stone et al. 2013, 2015), potentially resulting in housing loss and homelessness. This has been attributed to a lack of affordability in private markets with high and increasing rents, light regulation, short-term tenures and a lack of

controls on eviction (Hartman and Robinson 2003; Hulse et al. 2011). The structure and composition of housing markets, particularly the size, affordability and regulatory environment of the private rental sector, therefore is an important influence on the extent of homelessness and housing deprivation.

A substantial body of evidence demonstrates the protective effect of government funded housing support in preventing homelessness. Studies in the United States have found that rent subsidies – usually in the form of Housing Choice Vouchers – are associated with fewer unwanted residential moves (Phinney 2013), shorter durations of homelessness and increased exits into stable housing (Wong and Piliavin 1997; Wood et al. 2008; Zlotnick et al. 1999), fewer returns to homelessness (Metraux and Culhane 1999; Shinn et al. 1998; Wong and Piliavin 1997) and more stable housing pathways (Skobba et al. 2013; Skobba 2016). Shinn et al. (1998) and Metraux and Culhane (1999) find that subsidised housing is more important than factors related to personal characteristics and histories in creating stable housing trajectories, a finding the authors assert confirms the primacy of housing in addressing homelessness. Indeed, supportive housing in which rental subsidies are combined with wrap-around support services have been shown reasonably conclusively to stably house homeless populations with complex needs such as moderate and severe psychiatric disabilities (Bruce et al. 2012; Busch-Geertsema 2013; Goering et al. 2014; Pearson et al. 2009; Piat et al. 2015; Stefancic and Tsemberis 2007; Tsemberis et al. 2004).

The extent to which this protection extends to other countries and housing support systems is a question for research. Housing Choice Vouchers provide the majority of housing support in the United States. In other countries, such as the United Kingdom, a large stock of public and social housing might be expected to perform this protective function to a greater degree, particularly where new allocations are targeted to individuals and families deemed most in need (Fitzpatrick and Pawson 2014; Hulse and Burke 2005) and provide a degree of security of tenure and income contingent rent setting (Lewis 2006; McNelis 2006). Indeed, the use of Housing First and other supportive housing models in public and social housing has

also been shown to provide housing security to participants in Canada (Goering et al. 2014), Scotland, Denmark (Busch-Geertsema 2013) and Australia (Bruce et al. 2012).

However, this is impacted by the shift away from direct provision of public and social housing across many countries in recent decades and the growing reliance on demand-side rent subsidies (Groenhart and Burke 2014; Holmqvist and Turner 2014; Kofner 2014; Murphy 2004; Popkin et al. 2004). The relatively generous Housing Benefit in the UK and Housing Choice Vouchers are likely to provide important protection against homelessness and housing deprivation, though in the context of restrictions on eligibility and/or long waiting lists, an otherwise relatively weak social safety net and a lightly regulated private rental sector (Griggs and Kemp 2012; Hickman et al. 2017; Martin et al. 2017). In a similar environment, the main rent subsidy program in Australia, Commonwealth Rent Assistance, is less generous, with an estimated 41 per cent of the 1.3 million family units receiving assistance paying more than 30 per cent of their income in rent (SCRGSP 2017). Expenditure on the program is nevertheless high and growing, driven in part by a declining public housing stock, a growing stock of housing run by not-for-profit community sector organisations and growing dependence on the private rental sector among low income households (Stone et al. 2013; SCRGSP 2017). Though as yet unexplored, this change in the nature of housing support is likely to impact the incidence and duration of homelessness.

Theoretical framework

An increasing amount of research recognises the importance of both individual and institutional-structural factors in explaining homelessness. Many scholars agree that while individual characteristics shape who becomes homeless and for how long, structural weaknesses particularly in the housing and labour markets bear the larger responsibility for the quantum of people entering and exiting homelessness (O'Flaherty 2004; Wong and Piliavin 1997). Various empirical studies have sought to prove or disprove this proposition, though critics argue they invariably leave the mechanisms through which these factors contribute to homelessness unspecified and under-theorised (Fitzpatrick 2005; Neale 1997;

Somerville 2013). This arguably reinforces a false dichotomy between individual and structural factors that ignores important and dynamic interactions between the two, interpersonal connections and resources and the heterogeneity of individual housing and homeless pathways.

Several theoretical frameworks have been proposed to articulate these mechanisms. These include those described as realist (Fitzpatrick 2005), cultural (Somerville 2013), economic (O'Flaherty 2004) and ecological (Nooe and Patterson 2010; Toro et al. 1991). To draw out the intertwined effects of different factors over individual life courses, Fitzpatrick (2005) and others (for example, Neale 1997) put forward Giddens' (1984) theory of structuration and its emphasis on how individuals interact with social structures over space and time, along with Clapham's (2003) concept of housing pathways. This approach has been adopted by qualitative studies utilising biographic life histories of individuals experiencing homelessness (May 2000; Piat et al. 2015; Sharam and Hulse 2014). Arguably though, in reflecting the personal perceptions and experiences of their informants, biographic studies struggle to identify how broader macro-social factors indirectly influence housing pathways.

This study seeks to address part of this gap, placing housing tenure types with and without support at the centre of housing and homeless transitions. Transitions are hypothesised to be embedded within broader residential mobility. At the prospect of a residential move, whether for positive or negative reasons, individuals and families face a set of choices constrained by personal, interpersonal, economic and institutional resources as to their next set of accommodation. Homelessness and housing disadvantage result where these resources are individually or collectively impaired. Housing tenure and support and the duration of time spent living in a housing episode prior to any move are theorised to play an important role in moderating the risk of housing loss for individuals and households. Social housing may protect tenants through greater security of tenure, rent affordability and access to support services, while rent subsidies are likely to improve affordability in the private market depending on their level, coverage and responsiveness to negative income shocks.

'Couch/sofa surfing' or 'doubling up' with friends or family is anticipated to be a common use of interpersonal support in the event of housing loss to avoid or end homelessness on the streets on in shelters (Chamberlain 1999; Koebel and Murray 1999; Pilkauskas et al. 2014; Vacha and Marin 1993).

Data

I use the *Journeys Home* survey (Wooden et al. 2012; Scutella et al. 2017) again in this chapter, in this case to analyse housing and homeless trajectories. As in Chapter 5, I use information on the timing and duration of housing and homeless episodes provided in the accommodation calendar and match these to individual and household data given at overlapping survey waves. Unlike in the previous chapter, I use information on the duration of all episodes in the following analysis including those that commence and conclude between survey waves. As described in the previous chapter, episodes without a start data (310 episodes) were imputed or dropped if they were reported at wave 1.

Multistate model

This study proposes a multistate approach to the analyses of the risks of individuals transitioning between housing and homelessness. The approach used here is based on survival or event history analyses (Putter et al. 2007; Steele et al. 2004; Willekens 2014) recognising the longitudinal aspect of housing and the importance of duration in shaping the risk of exiting a particular accommodation type (Cobb-Clark et al. 2016). While this is common to a number of studies in this field, the key innovation is in the consideration of multiple housing and accommodation states. Rather than focusing on dichotomous transitions between housed and homelessness and vice versa, the multistate approach allows one to simultaneously consider transitions between, for example, public housing and street homelessness or private rental housing and boarding/lodging houses. This offers several advantages over the housed-homeless dichotomy, including that it illustrates different pathways on losing or acquiring housing (Skobba et al. 2013), it reflects the qualitatively different experience of

various accommodation types (Koebel and Murray 1999), is relatively transparent and internationally comparable in the context of widely differing definitions of homelessness and recognises that demographic and socioeconomic groups have varying risks of exiting and entering different types of homelessness.

The multistate space is depicted in Figure 6.1. This is similar to that used in Chapter 5 (though reasons for moving are not considered here), except for an important extension in that I attempt to account for not only transitions out of an initial housing state but also subsequent transitions once people have entered a destination state. There are six destination housing and homelessness states as shown on the right hand side. These are *Street/shelter* which combines rough sleeping on the streets and in improvised dwellings and publicly-funded homeless accommodation such as shelters and refuges; the *Private sub-market* which combines boarding or lodging houses with caravans/mobile homes, hostels and motels; *Staying with family/friends*; *Private market housing* which combines private rental with home purchase; and *Social housing* which combines public and community housing. As in Chapter 5, exits to institutional settings (for example, prison and health facilities) have been combined into an *Other* category and are not separately reported because the estimates are considered unreliable. Note that this classification of housing and homelessness states does not fit within all definitions of homelessness. Rather, the focus in this chapter is on transitions between accommodation types that lie along a housing and homelessness spectrum rather than homelessness per se.

In this chapter, I am interested in the subsequent transitions and pathways of people who commence an accommodation episode in one of the housing states. Initial housing states are shown on the left hand side of Figure 6.1. Different types of tenure and support are experienced within each of the states. Social housing is divided between 1) public and 2) community housing. The private market is divided between rented housing where residents receive 3) no rent assistance, 4) assistance and pay no more than 30 per cent of their household income in rent and 5) assistance and pay more than 30 per cent of income. Staying

with family or friends is both an individual state and type of tenure/support. Individuals in the private market can also own or be buying their own place, however this rare within the *Journeys Home* sample (34 episodes) and not central to the analysis. An individual who moves to new accommodation completes a housing episode in this initial tenure/support type and transitions to a destination state. This may be in a different state or they may have a repeat episode in the same state. For example, an individual may have two or more consecutive episodes staying with different sets of family or friends or in different private rental properties. Once a transition is made, subsequent transitions between episodes are also measured in an attempt to recreate housing pathways. This is indicated by the arrows between destination states on the far right hand side of Figure 6.1.

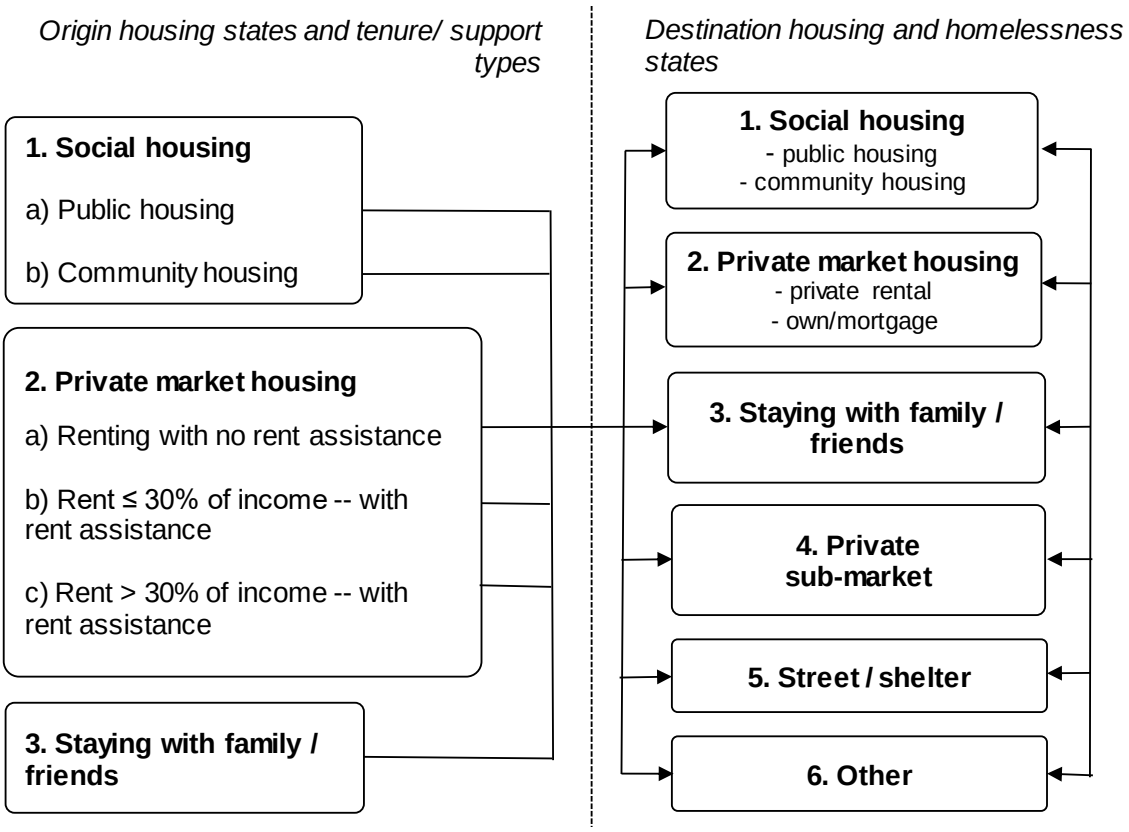


Figure 6.1 Multistate housing and accommodation space

Housing and homelessness states were constructed from a combination of the accommodation calendar and the main questionnaire at each survey wave. The timing of episode commencement and completion and the accommodation type were determined from

the calendar, while the tenure and support levels including whether housing is being purchased or rented in the public, community or private sector was determined from the main questionnaire where the start and end dates of the episode overlap the date of the survey wave. The main questionnaire only collected information on the accommodation spell in which the respondent was living at the time of each survey wave, so episodes that began and ended between survey waves contained no information on tenure and support levels. This was the case for 181 episodes. These episodes are included in the empirical model described below as a separate category. Tenure types also have the potential to change within an accommodation episode, for example an individual could transition from staying with family or friends to private rental housing by being added to a lease agreement. State and tenure type were therefore determined from information provided at the closest survey wave and the results assume tenure types are constant within each housing/homeless episode.

A description of the housing and homelessness states is provided in Table 6.1. There are 6,922 episodes experienced by 1,643 respondents in one of the six states. Of these episodes, 1,643 (24 per cent) were censored, or still open at either the end of the survey period (1,406 episodes) or when the respondent dropped out of the survey (237 episodes). The most common origin type and destination state is *Staying with family/friends*, comprising 2,917 episodes. This includes episodes with parents, but only where the episode commenced on or after the respondent's fifteenth birthday – thereby removing 34 episodes in which the respondent was living in their childhood home. Exits to *Street/Shelter*, *Private sub-market* or *Other* are not individually identified by origin type in Table 6.1 due to some small cell counts.

Table 6.1 Description of housing tenure and support types

Housing states and tenure/support types	Housing[1]	Exits to: Family / friends	Other[2]	Censored	Total episodes
1. Social housing					
(a) Public housing: Respondents renting from government	82	61	36	246	425
(b) Community housing: renting from not-for-profit providers	64	31	33	93	221
2. Private market housing					
(a) Private rent – no rent assistance: renting from a private landlord and receive no rent assistance	177	174	53	193	597
(b) Private rent ≤ 30% income with rent assistance: privately renting, receive rent assistance and pay ≤ 30% of household income in rent	142	119	56	176	493
(c) Private rent > 30% income with rent assistance privately renting, receive rent assistance and pay > 30% of household income in rent	111	94	46	133	384
(d) Own or buying with a mortgage	n.p.	n.p.	n.p.	n.p.	34
3. Staying with family/friends					
Respondents stay with/live in the home of:	554	1,371	479	523	2,917
(a) parents (commencing after age 15)					
(b) other relatives					
(c) friends					
4. Private sub-market					
Respondents stay in a/an:	118	181	237	104	640
(a) boarding/lodging house / Single Room Occupancy					
(b) hotel/ motel room or hostel					
(c) caravan/mobile home					
(d) other temporary private market accommodation					
5. Street/shelter					
Respondents:	168	191	297	134	790
(a) stay in emergency or crisis accommodation					
(b) stay in temporary accommodation provided by government or community service provider					
(c) sleep rough (e.g. street, a park, a car, tent, train station)					
(d) squat in an abandoned building					
6. Other (including Institutional settings)					
Respondents stay in a:	n.p.	n.p.	n.p.	n.p.	239
a) Hospital, nursing home, health or treatment facility					
b) Juvenile detention centre, adult prison or remand centre					
c) Other (unspecified)					
Total	1,526	2,388	1,365	1,643	6,922

n.p. not published to preserve confidentiality

[1] Buying or renting in private market or social housing
[2] Combines Street/shelter, Private sub-market and Other
Source: Author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

Empirical strategy

Transitions between housing episodes are estimated and analysed through a multistate discrete time survival model. The dataset is firstly transformed to create an observation for each person at each 10 day interval between the date they commenced their housing episode at wave one and the date of their last interview. A stylised example is shown in Table 6.2 for a hypothetical respondent. For illustrative purposes, survey waves are placed one month apart (as opposed to approximately six months). The first observation or row coincides with the first 10 day interval following wave one of the survey. Each subsequent observation corresponds to an interval up until the respondent's final interview. The date, episode and accommodation variables are drawn from the accommodation calendar. *Duration* measures the elapsed time from the start of each accommodation episode until the current date. The housing state, tenure/support variables and time varying covariates, such as family type, are measured at each survey wave. The *hstate* variable is the origin housing state or the state the respondent was living in at the start of the interval. This is imputed for each observation by matching an episode in the accommodation calendar to a survey wave based on their timing. The destination state variable is the housing state the respondent was living in at the end of the interval. The numbers listed in the *hstate* and destination state columns refer to the states described in Table 6.1. Zeros in the destination state column indicate that the individual remains in the same episode. Covariate values such as family type are taken from the most recent survey wave. If the housing type changes between waves without a change recorded in the accommodation calendar – for example, episode six in Table 6.2 overlaps waves five and six which record different housing types – the origin state is derived from the closest wave chronologically.

A multilevel multinomial logistic regression model is specified to predict the probabilities of transitioning to one of the six destination states or remaining in the current episode within each ten day interval. The model analyses all residential and accommodation moves, including those within the same state (a within-state transition), on the hypothesis that

time spent in the current housing episode is a key influence on its continuation. On the commencement of a new episode, time resets to zero (as in a clock reset model, see Putter et al. 2007) and the probability of a subsequent transition depends on the duration of time spent in the new episode. See Steele et al. (2004) for an example of a similar approach applied to a different context.

Table 6.2 Stylised example of the data structure

ID	Obs.	Date	Spell	Accom.	Duration (days)	Wave	Hous. state	*hstate*	Dest. state	Family	Impute family
1	1	1 Mar	1	Own place	150	1	2	2	0	Couple	Couple
1	2	11 Mar	1	Own place	160			2	3		Couple
1	3	21 Mar	2	Family/ friends	0			3	0		Couple
1	4	1 Apr	2	Family/ friends	10	2	3	3	0	Single	Single
1	5	11 Apr	2	Family/ friends	20			3	5		Single
1	6	21 Apr	3	Street/ shelter	0			5	0		Single
1	7	1 May	3	Street/ shelter	10	3	5	5	3	Single	Single
1	8	11 May	4	Family/ friends	20			3	0		Single
1	9	21 May	4	Family /friends	0			3	3		Single
1	10	1 Jun	5	Family/ friends	10	4	3	3	0	Single	Single
1	11	11 Jun	5	Family/ friends	20			3	3		Single
1	12	21 Jun	6	Own place	30			3	0		Single
1	13	1 Jul	6	Own place	40	5	3	3	0	Couple	Couple
1	14	11 Jul	6	Own place	50			3	0		Couple
1	15	21 Jul	6	Own place	60			2	0		Couple
1	16	1 Aug	6	Own place	70	6	2	2		Couple	Couple

The independent variables are the housing state at the beginning of each interval and a set of state-specific dummy variables that describe the tenure and support type. Different specifications of time or episode duration were tested, including splines, piecewise constant and polynomial functions. A linear spline with knots at 30, 90, 180 and 360 days (approximately 1, 3, 6 and 12 months respectively) was found to provide a good fit to the raw

data while providing flexibility to model transitions between different states. Transition rates are assumed to remain constant after two continuous years in the same accommodation episode. The analyses for this study was carried out using Stata version 14.The model takes the form,

$$log\left(\frac{p_j^t}{p_0^t}\right) = \beta_0 + \beta_{0k} + \beta_1.t + (\beta_2 + \beta_3.nohouse).max(0, t-90) \quad 6.1$$

$$+ (\beta_4 + \beta_5.nohouse).max(0, t-180) + (\beta_6 + \beta_7.nohouse).\max(0, t-360)$$

$$+ \beta_8.hstate_i + \beta_9.community + \beta_{10}.subsidy + \beta_{11}.hstate_i.t + \beta_{12}.episode1$$

$$+ \beta_{13}.hnfd + \beta_{14}.hnfd.t + \beta_{15}.covariates$$

where p_j^t are the probabilities of transitioning to a new housing episode in state j between time *t* and *t + 10* days; p_0^t is the probability of remaining in the current episode; t is the length of the episode; $hstate$ is a vector of dummy variables representing one of the six housing or accommodation states at the beginning of the interval; $community$ is a dummy variable specific to the social housing state that identifies whether housing is public or community managed; $subsidy$ is a categorical variable specific to private market housing that identifies the level of rent assistance received; $episode1$ is a dummy variable that attempts to control for differences in how respondents' first episodes were recorded in the calendar; and $covariates$ is a matrix of control variables. The $hstate_i.t$ term is a vector of interactions between the origin housing state and the episode length. $nohouse$ is a variable that indicates whether the origin state is outside of social or private market housing (states 1 and 2 in Figure 6.1). This provides for an interaction effect between the duration knot and the respondent housing state. $hstate_i.t$ and $nohouse$ thereby relax the proportional odds assumption of the regression model, allowing the transition probabilities to take different shapes over time between origin states. Housing episodes with undefined tenure and support types were included in the private market state with a dummy variable, $hnfd$, and interaction term, $hnfd.t$, to identify and separate their effects from private rental housing episodes. The β values are the parameters to be estimated.

The model is specified with random effects with β_0 representing a population intercept term and β_{0k} an individual respondent-level intercept.

The covariates used are similar to those used in Chapter 5. Four sets of covariates were drawn from theoretical and empirical literature on the factors associated with entries, exits and prevalence of homelessness. The first set is demographic which includes age of the respondent in ten year intervals (15-24 years to 55 years and over) and the sex and family type of the respondent at the previous interview (single males, single females, couples, single parent families and couple parent families) (Chamberlain and Johnson 2015; Metraux and Culhane 1999; van Laere et al. 2009; Wong and Piliavin 1997). The second set is economic which includes the main source of income and highest education of the respondent at the previous interview (Bramley and Fitzpatrick 2018; Culhane et al. 1996; Fitzpatrick 2005; Pilkauskas et al. 2014; Tyler and Schmitz 2013). The third set is health and conflict which includes whether the respondent has ever been diagnosed with a mental health condition, whether they have a problem with alcohol or other drugs and whether they were to subject to violence in the six months prior to the last interview (Chamberlain and Johnson 2013; Culhane and Kuhn 1998; Martijn and Sharpe 2006; McQuistion et al. 2014; Piat et al. 2015; Scutella et al. 2013). The fourth set is personal histories which includes age first homeless, whether ever incarcerated in adult or juvenile detention, whether even been in foster care and whether experienced physical violence as a child (Hinton and Cassel 2013; Lutze et al. 2014; Martijn and Sharpe 2006; Piat et al. 2015; Piliavin et al. 1993; Scutella et al. 2013; Tyler and Schmitz 2013). Descriptive statistics of the *Journeys* Home sample, including covariate values are provided in the appendix.

The housing tenure and support variables are by their nature time-varying, increasing the risk of unobserved heterogeneity. The inclusion of well specified covariates is critical to reducing this risk and providing some confidence in the estimates. Note however that the model is not attempting to measure a precise causal effect, but rather operates under the hypothesis that tenure and support act as moderating factors or as factors that protect

individuals to different degrees from the risk of housing loss. This is also an important point in the context of two caveats in the specification of the covariates. Firstly, covariates are only measured at the time of survey waves, so transition intervals that occur between waves draw on covariates at the previous wave. This potentially ignores the effects of events such as family breakdown that may immediately precede a housing loss. Secondly, covariates are destination but not origin specific. This assumes that interactions between covariates and the origin housing state and tenure and support types do not affect the results. This was tested by sequentially introducing interactions terms between each covariate and the origin state. These interactions were occasionally significant but even in these cases had no meaningful effect on the parameters of the independent variables.

Microsimulation

The concept of housing pathways suggests that there are direct and indirect means by which individuals experience homelessness. On losing housing, for example, ‘couch surfing’ or ‘doubling up’ with family or friends may be a common destination, which in turn may act as a springboard back into the housing market or into deeper deprivation. Therefore, it is also important to consider durations in and transitions out of subsequent states of the housing and homelessness spectrum. Quantitative exploration of these pathways, however, is difficult due to the lack of panel or cohort data over suitably long time periods. As a result, estimation of longer run pathways are hampered by different starting and exposure times and the effects of censoring where accommodation episodes remain open at the end of survey periods.

The alternative proposed in this chapter is a microsimulation model, in which empirically measured transition probabilities are used to generate trajectories for a synthetic population (Willekens 2014). In this application, the model is used to estimate possible pathways between housing and homelessness. A population is constructed to mirror the characteristics of the Journeys Home sample frame. The size of the population is approximately 107,500 people, calculated by summing the population weights for wave one.

The population is 62 per cent male with an average age of 31 years. Approximately 15 per cent are married or cohabiting and 16 per cent have co-resident children. As stated, all have recently received a Government support payment and the large majority have a history of homelessness.

The model simulates the effects of different policy responses on subsequent housing pathways. In successive simulations, the population commence an episode in the six housing tenure and support types. At the beginning of each 10 day interval, individuals face a probability of transitioning out of that episode and into one of the six destination states. On transitioning to a destination state, individuals commence a new episode and face a new set of probabilities of exiting that episode and commencing another. Pathways are projected over a four year period and the number of transitions and length of time spent in each state measured.

Housing transition probabilities are calculated by transforming equation 6.1 into predicted probabilities, $\vec{p}_{ij}^{t}$, of transitioning from housing support i at time t to housing state j at $t + 10$ days. For example, the probabilities of exiting an episode where an individual is receiving a subsidy in the private rental market and pays less than 30 per cent of income in rent are calculated as:

$$log\left(\frac{p_{rent<30\% \rightarrow j}^{t}}{p_{rent<30\% \rightarrow 0}^{t}}\right) = \beta_0 + \beta_1.t + \beta_2.max(0, t-90) + \beta_4.max(0, t-180) \quad 6.2$$
$$+ \beta_6.max(0, t-360) + \beta_8.hstate_2 + \beta_{10}.subsidy_1 + \beta_{11}.hstate_2.t +$$
$$\beta_{15}.covariates.average$$

$hstate_2$ is a dummy variable indicating the private rental market and $subsidy_1$ indicates that the individual receives a rent subsidy and pays less than 30 per cent of their income in rent. $covariates.average$ are the population weighted average values of the covariates across each person-wave. Thus, each individual in the synthetic population carries the same covariate profile, assumed to be the estimated average profile of the entire population. These

values are held constant through time. Individual-level random effects are not included in these predictions under the assumption that these will average close to zero across each transition. These probabilities are estimated for each of the possible transitions between the six tenure and support types and the six destination states. Onward transition probabilities are estimated in a similar manner. For example, an individual who transitions to an episode in the *street/shelter* state faces a set of probabilities of an onward transition to a new episode in each of the six states. These probabilities adopt semi-Markovian properties in that they depend on the length of time in the current housing episode but not on the type or duration of previous episodes.

Sets of $\bar{p}_{ij}^{t}$ values for each transition typed are calculated in approximately 10 day intervals from the start of each episode (t = 0) until four years. These are used to construct 'survivorship' functions for each tenure and support type, as shown in column 6 of Table 6.3. The function commences with 100 per cent of individuals in support type i at time 0 ($l_i^0 = 100$). Of these, $\bar{p}_{ij}^{0}$ exit the housing episode to each destination state j before the tenth day. Thus, the probability of remaining in the same housing episode at day 10, l_i^{10}, is the probability of remaining in housing at the previous interval l_i^0 minus the sum of the probabilities of exiting to all destination states between day zero and day 10. This calculation is repeated across all time intervals to produce the life table 'survivorship' function, representing the predicted number of people who remain in the original housing episode at each time t.

A Monte Carlo draw is used to simulate housing episode durations and transitions. A random number is drawn between zero and one for each individual. If the random number is less than or equal to l_i^t and greater than l_i^{t+10} then the individual exits the housing episode after $t + 5$ days. If the same random number is less than or equal to

$l_i^{t+10} + \sum_{j=1}^{n} \bar{p}_{ij}^{t} \times l_i^t$

and greater than

$l_i^{t+10} + \sum_{j=1}^{n-1} \bar{p}_{ij}^{t} \times l_i^t$

then the individual commences a new episode in the housing state n. The draw is repeated for the new episode and for all subsequent episodes until each individual in the model has completed a four year housing trajectory. The number of people and the average time spent in each housing state is measured across each run.

Table 6.3 Constructing the 'survivorship' function

Days	**Hazards**				**'Survivorship'**
t	p_{i1}^t	p_{i2}^t	…	p_{i7}^t	l_i^0
0	$\bar{p}_{i1}^0$	$\bar{p}_{i2}^0$		$\bar{p}_{i7}^0$	$l_i^0 = 1$
10	$\bar{p}_{i1}^{10}$	$\bar{p}_{i2}^{10}$		$\bar{p}_{i7}^{10}$	$l_i^{10} = l_i^0 . (1 - \sum_{j=1}^{7} \bar{p}_{ij}^0)$
20	$\bar{p}_{i1}^{20}$	$\bar{p}_{i2}^{20}$		$\bar{p}_{i7}^{20}$	$l_i^{20} = l_i^{10} . (1 - \sum_{j=1}^{7} \bar{p}_{ij}^{10})$
30	$\bar{p}_{i1}^{30}$	$\bar{p}_{i2}^{30}$		$\bar{p}_{i7}^{30}$	$l_i^{30} = l_i^{20} . (1 - \sum_{j=1}^{7} \bar{p}_{ij}^{20})$
…					
t	$\bar{p}_{i1}^t$	$\bar{p}_{i2}^t$		$\bar{p}_{i7}^t$	$l_i^t = l_i^{t-10} . (1 - \sum_{j=1}^{7} \bar{p}_{ij}^{t-10})$

Sensitivity analysis is conducted to assess the effects of the model assumptions on the results. The survival and microsimulation models are rerun four times under different sets of assumptions. The first tested the effect of the linear spline, replacing the spline with piecewise constant durations where the risk of exiting housing was assumed to be constant within every three month period of a housing episode up until 24 months and constant thereafter. The second model rerun tested the potential impact of episodes with undefined tenure and support types. These were imputed with a multinomial logistic regression model on the full dataset. The five tenure and support types were regressed on the total length of the episode, the previous and subsequent accommodation states and the covariates used in the main model. Model results were used to predict the tenure and support type of undefined episodes. The empirical model was then run on this partly imputed dataset. Only one

imputation was performed. While multiple imputation would be preferable, it is computationally difficult to perform in this modelling framework. The third model rerun tested the assumption that housing tenure remains constant within episodes. This was achieved by separating each episode where a different tenure type is reported from one wave to the next into two separate episodes. Fourthly, rather than use the value of all covariates recorded at the previous wave, transitions between waves in labour market status (keep/gain employment, remain/become unemployed, remain/ drop out of the labour force) were used along with indicators for whether the respondent transitioned from marriage/co-habitation to single between waves and whether the respondent was the victim of violence by a current or former partner or another person.

Results

The regression results indicate that public and community housing are associated with a lower relative risk of housing loss and homelessness. These are shown in Table 6.4. Relative risk is the probability of transitioning to each of the destination states divided by the probability of remaining in the current episode. The relative risk of exiting to stay with family and friends is 2.70 higher ($p<0.01$) for renters in the private market with no subsidy than for those in public housing. The relative risks of exiting to the street/shelter (2.30, $p<0.1$) and the private sub-market (3.07; $p<0.1$) are also higher for private renters though these are only approaching statistical significance. Relative risks are also higher in community housing compared with public housing though only exits to new housing episodes are statistically significant. Rent subsidies have some effect in reducing the relative risk of exit to family friends – the risk ratio is 0.75 ($p<0.05$) for private renters that receive assistance and pay less than 30 per cent of their household income in rent, relative to unsubsidised renters. Episodes with family or friends, in the private sub-market and on the street or in a shelter have high ratios of transition within and across housing and homelessness states. Note that these are substantially affected by the interaction effects with episode duration, making them difficult to interpret on their own. Undefined housing episodes also have high ratios, not surprising as these begin and end between survey waves, so by their nature are relatively short.

Table 6.4 Discrete time survival analysis with random effects, relative risk ratios

	Risk of entering destination housing states					
	Street / shelter	Sub-market	Family / friends	Social housing	Private market	Other
	Relative risk ratios *(base = remain in current housing episode)*					
Episode duration	1.024**	1.01	1.012**	1.014†	1.013**	1.023†
Episode duration knots						
Three months	0.972*	0.995	0.993	0.99	0.996	0.979
Six months	1.005	0.987*	0.995†	0.995	0.991**	0.996
12 months	1.000	1.006	0.998	1.000	0.998	1.001
Origin housing state and type/level of support *(base = social housing)*						
Social housing	1.00	1.00	1.00	1.00	1.00	1.00
Public housing	1.00	1.00	1.00	1.00	1.00	1.00
Community housing	1.44	2.16	1.12	1.71**	2.07*	2.11†
Private housing market	2.3†	3.07†	2.7**	0.43*	5.58**	0.75
Private rent, 0 subsidy	1.00	1.00	1.00	1.00	1.00	1.00
Private Rent ≤ 30% income (w subsidy)	0.81	1.2	0.75*	0.58	0.95	1.28
Private Rent > 30% income (w subsidy)	1.12	1.1	0.9	0.42†	1.09	2.29†
Own or buying home	0.00	0.63	0.54	0.58	0.48	0.00
Housing not defined	20.3**	22.3**	6.96**	42.68**	15.9**	165**
Family / friends	72.0**	48.6**	38.7**	4.02*	53.3**	31.0**
Sub-market	119**	103**	28.7**	4.05*	56.0**	39.3**
Street / shelter	157**	73.8**	27.5**	9.34**	61.0**	57.8**
Other	73.6**	67.3**	37.5**	18.3**	28.5**	120**
Interactions with episode duration *(base = social housing)*						
Private market	1.000	1.002	1.000	1.001	1.001	1.000
Family / friends	0.966**	0.985†	0.982**	0.988	0.988**	0.964**
Sub-market	0.965**	0.985†	0.982**	0.988	0.988**	0.963**
Street / shelter	0.965**	0.984*	0.981**	0.988	0.987**	0.96**
Other	0.966**	0.987†	0.983**	0.987	0.99*	0.963**
Housing not defined	0.990	0.994	1.000	0.988†	0.996†	0.956*
Interactions between duration knots and living outside social/private market housing						
Three months × not in housing	1.042**	1.006	1.015**	1.007	0.999	1.045*
Six months × not in housing	0.994	1.015*	1.000	1.004	1.013**	0.987
12 months × not in housing	0.998	0.992†	1.004*	1.002	1.001	1.009

*** significant at 99% level; * significant at 95% level; † p<0.1*

Source: author's categorisations and calculations using Journeys Home (Wooden et al. 2012; Scutella et al. 2017)

The relative risk ratios for the covariates are shown in Table 6.5. Older people have significantly higher risks of exiting to the street or shelter and to the private sub-market and significantly lower risks of exiting to stay with family or friends. Compared with those who have never been homeless, people who first experienced homelessness before the age of 15, between age 15 and 19 years and from age 20 onwards have significantly higher risks of transitioning to the street or shelter and to the private sub-market. Sex, family, drug/alcohol problems, violence, main income source, mental health and incarceration histories have some significance across one or many destination states. In interpreting these, it is important to note that the large majority of this sample have experienced homelessness over their lifetimes and disadvantage across these domains.

Predicted transition probabilities from each tenure and support type are shown in Figure 6.2. Transition functions for the different destination states have been stacked on top of each other to depict the combined risk of exit to *Street/sheltered homelessness*, the *Private sub-market* or *Family/friends*. Transition probabilities are expressed as the predicted number of people exiting a housing episode to a destination state at the beginning of each ten day period per 10,000 people. As can be seen, probabilities in the social and private rental sectors are predicted to increase to a peak at approximately six months and then decline at various rates thereafter. The initial combined probability for people staying with family or friends is substantially larger than for other tenure and support types (note the different Y axis scale in Figures 6.2f.) and declines sharply, though remains substantially higher after 2.5 years. Regardless of housing origin type, the largest risk is of exit to commence (new) episodes staying with family or friends. In the case of people already staying with family or friends, this reveals a high degree of churn between different accommodation episodes and volatility in interpersonal support.

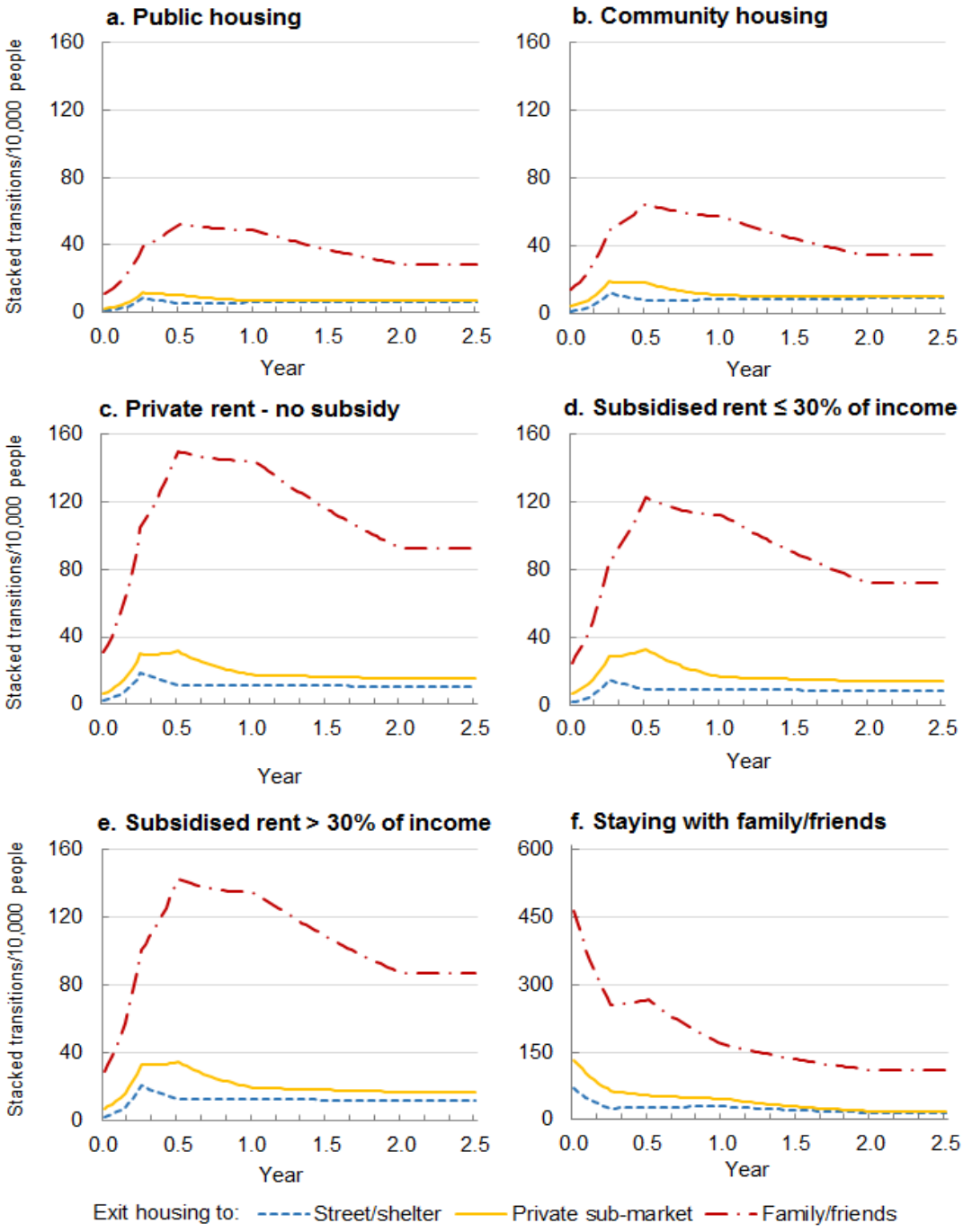
Table 6.5 Discrete time survival analysis, effects of covariates, relative risk ratios

	Risk of entering destination housing states					
	Street / shelter	Sub-market	Family / friends	Social housing	Private market	Other
	Relative risk ratios *(base = remain in current housing episode)*					
Age group *(base = 15-24 years)*						
25-34 years	1.75**	1.49*	0.8**	1.21	0.91	1.07
35-44 years	1.86**	1.56*	0.72**	1.45†	0.85	1.05
45-54 years	2.53**	1.74**	0.56**	1.36	0.6**	0.7
55+ years	2.78**	1.64†	0.44**	1.54	0.45**	1.14
Sex and family type at previous interview *(base = single males)*						
Single females, no co-resident children	0.85	0.74*	1.15*	1.59**	1.38**	0.83
Married/cohabiting, no children	0.65**	0.95	0.89	1.89**	1.22*	0.77
Single with co-resident children	0.64*	0.53**	0.83†	2.32**	1.62**	0.62
Married/cohabiting with children	0.79	1.06	0.86	2.72**	1.79**	0.87
Highest education at previous interview *(base = completed high school)*						
Completed a post-school qualification	0.9	1.19	0.88*	0.93	1.13†	1.3
Did not complete high school	1.09	1.03	0.83*	0.76	1.24*	0.72
Drug/alcohol problem in 6 months prior to last interview *(base = no)*						
Yes, self-described or received treatment	1.33**	1.02	1.12†	1.07	0.88	2.27**
Victim of violence in 6 months prior to last interview *(base = no)*						
Yes, current or former partner	1.03	1.08	1.2*	1.24	0.97	0.51
Yes, other person	1.27*	1.04	1.13†	1.16	1.04	0.95
Opt out of answering question	1.2	1.02	0.94	1.14	0.82	1.05
Main income source at previous interview *(base = unemployment benefit)*						
Private income (e.g. wage)	0.79	0.91	0.82*	0.33**	1.22*	0.69
Youth Allowance	1.2	1.03	1.28**	0.76	1.04	0.9
Disability Support Pension	0.94	0.94	0.72**	1.22	0.89	1.12
Other Government benefit	1.2	1.01	1.01	1.12	0.9	0.58
Ever diagnosed with mental illness						
Bipolar / schizophrenia	1.17	1.25†	0.91	1.4*	0.95	1.04
Depression / anxiety	0.99	0.79*	1.03	0.86	1.14†	1.36†
Experienced physical violence as a child *(base = no)*						
Yes	1	1.07	1.16*	1.01	0.99	0.97
Opt out of answering question	1.11	1.12	0.91	0.95	0.89	0.76
Ever in juvenile/adult incarceration	1.15	0.89	1.19**	1.03	0.99	1.5*
Age first homeless *(base = never homeless)*						
0-14 years	3.4**	3.73**	1.34*	1	1.2	0.8
15-19 years	3.07**	2.52*	1.34*	0.94	1.13	0.51*
20+ years	2.31*	3.15**	1.2	0.89	1.13	0.57†
Unknown	3.78**	2.1	0.92	0.37†	0.79	0.49
Ever been in foster care	1.32*	1.1	0.92	1.26†	0.97	1.05
Episode one	1.02	1.69**	1.16*	1.57**	1.25**	1.42

Source: author's calculations from Journeys Home (Wooden et al. 2012; Scutella et al. 2017)

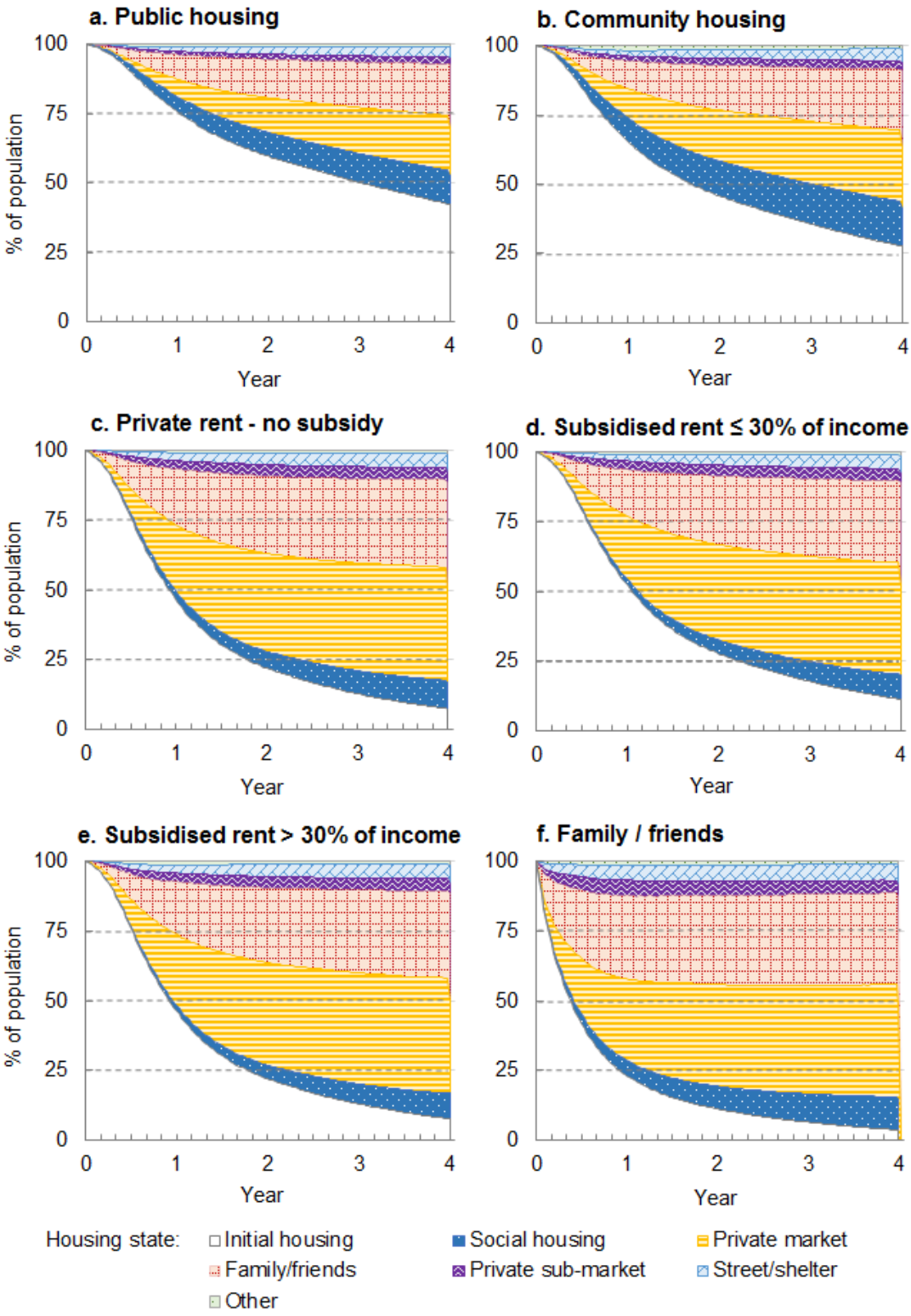
The results of the microsimulation suggest that public housing episodes last longer and result in fewer instances of housing loss and homelessness than the other tenure and

support types. Figure 6.3 shows the predicted survivorship functions for each origin housing support type. The white spaces are the predicted proportion of people remaining in the original episode at each time period. The coloured spaces indicate the housing/homelessness state individuals are predicted to be in at each time point. As shown in Figure 6.3a, 50 per cent of public housing episodes are predicted to end after three years (36.7 months). This compares with 20.7 months in community housing (Figure 6.3b.), 11.3-12.7 months in private rental housing (Figure 6.3c-e.) and 4.7 months with family or friends (Figure 6.3f.). Many of those who exit, nevertheless, remain housed. After four years, for example, 70 per cent of people initially placed in public housing and 63 per cent in community housing are predicted to be living in the social or private market housing, compared with 50-52 per cent of those placed in private rental housing. Somewhat promisingly, 44 per cent of those who stayed with family or friends are predicted to have their own housing after four years, while 43 per cent live in the same or a different episode with family or friends. However, those staying with family or friends are also the most likely to be in street or sheltered homelessness, particularly after 12 months. Overall, public housing residents are predicted to have the greatest housing stability.



Source: author's calculations from Journeys Home (Wooden et al. 2012; Scutella et al. 2017)

Figure 6.2 Predicted probabilities of exiting housing tenure and support types, by duration and destination



Source: author's calculations from Journeys Home (Wooden et al. 2012; Scutella et al. 2017)

Figure 6.3 Multistate housing 'survival' by tenure and support type

Nevertheless, the incidence of housing loss and the duration of time spent without housing are predicted to be high across all tenure and support types. As shown in Table 6.6,

12 per cent of people placed in public housing are predicted to experience homelessness on the street or in a shelter within four years, while 10 per cent spend time in the private sub-market and 39 per cent stay with family or friends. Over the four years, people placed in public housing are predicted to spend, on average, 38 days on the street or in a shelter, 21 days in the private sub-market and 212 days with family or friends. These estimates are somewhat higher for community housing, while people placed in the private rental market spend substantially longer with family or friends (390-422 days), in the private sub-market (38-41 days) and on the streets or in a shelter (62-68 days). The time spent in the latter two categories is the consequence of both a direct and an indirect effect in which the high risk of private renters exiting to stay with family or friends is followed by a relatively high risk of these episodes resulting in an exit to the street, a shelter or the private sub-market. Rental subsidies that provide for affordable rent may reduce these durations, though the predicted reductions are modest and unlikely to be statistically significant. In this way, the microsimulation reveals the importance of different pathways between housing and homelessness.

Table 6.6 Predicted incidence and duration of housing loss and homelessness over four years

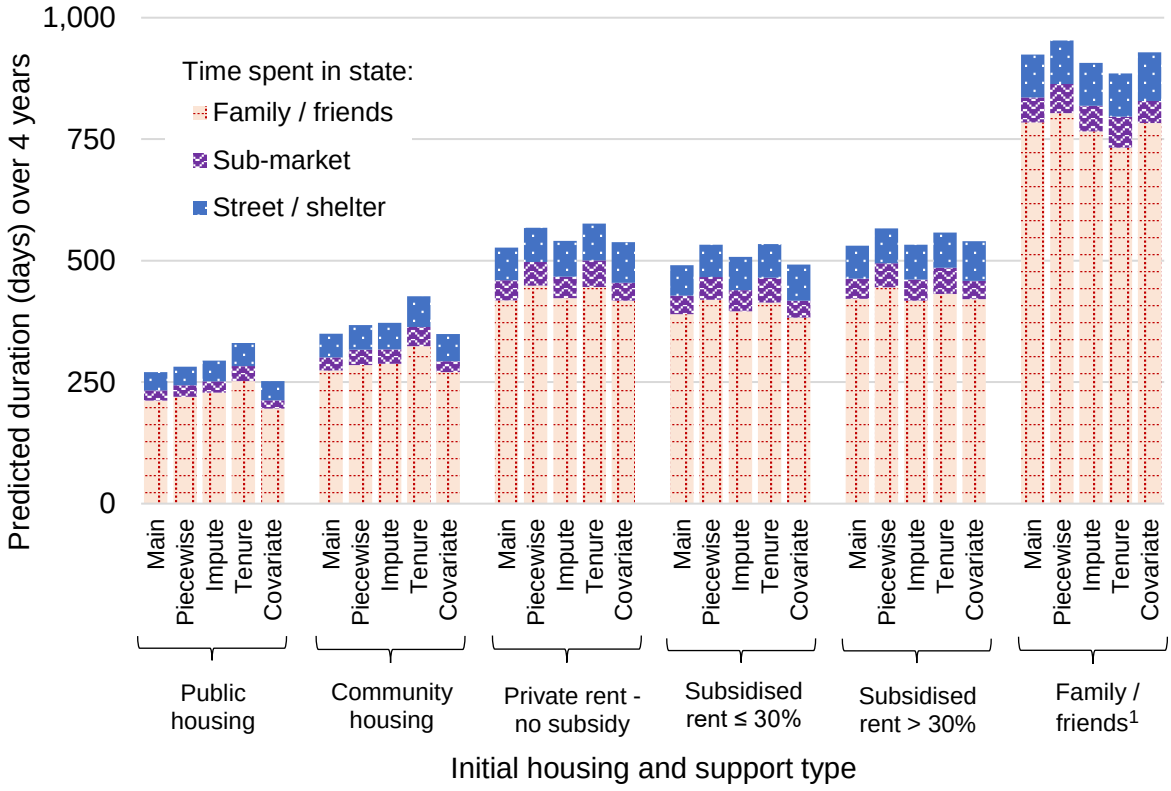
	Housing/homelessness state					
Housing tenure/support	Private market	Social housing	Family / friends	Sub-market	Street / shelter	Other
	Predicted days spent in each state over four years[1]					
Public housing	146	1,013	212	21	38	11
Community housing	198	878	274	27	49	14
Private rent - no subsidy	814	83	418	41	67	16
Subsidised rent ≤ 30% income	863	72	390	38	62	15
Subsidised rent > 30% income	819	74	422	41	68	16
Staying with family/friends	386	109	785	51	88	20
	% of population who enter state over four years[1]					
Public housing	32	100	39	10	12	5
Community housing	40	100	48	13	15	6
Private rent - no subsidy	100	15	69	19	21	7
Subsidised rent ≤ 30% income	100	14	66	18	20	7
Subsidised rent > 30% income	100	15	69	19	21	7
Staying with family/friends	66	18	100	23	25	9

[1] *Includes state of initial housing episode*

Source: author's calculations from Journeys Home (Wooden et al. 2012; Scutella et al. 2017)

The sensitivity analysis suggests the results are robust to the specifications tested. Figure 6.4 shows the predicted number of days spent with family or friends, staying in the private sub-market and in street or sheltered homelessness under the four models tested. Compared with the results so far presented (Main), the models which measure housing episode durations with piecewise constant probabilities (Piecewise), impute housing tenure for episodes where it is undefined (Impute), treat all observed changes in tenure as separate episodes (Tenure) and test the effects of changes in relationship and employment status and the incidence of violence between waves (Covariate) produce similar estimates. A number of other potential sources of error may affect the results, particularly the nature of the sample and of private and social housing allocation systems, as well as the assumptions underpinning the regression and microsimulation models (for example, the semi-Markov properties). Thus,

while the sensitivity analysis gives some confidence in the results, a degree of uncertainty remains.



Main: Based on the model described in this chapter
Piecewise: Episode duration is modelled with constant rates within each 3 month period
Impute: Housing episodes where tenure is not defined is imputed
Tenure: Observed differences in tenure within housing episodes are modelled as separate episodes
Covariate: Between wave changes in labour market status, divorce/separation and violence are included as

[1] *Includes state of initial housing episode*

Source: author's calculations from Journeys Home (Wooden et al. 2012; Scutella et al. 2017)

Figure 6.4 Results of sensitivity analysis – duration of time by state, model and initial tenure and support

Discussion

These findings provide support for the proposition that housing tenure and support are important proximal contributors to housing loss and homelessness. As such, this study builds on and provides some explanation for geographic studies that find associations between sub-national housing markets and the prevalence of homelessness (Byrne et al. 2013; Honig and Filer 1993; Lee et al. 2003), panel studies that demonstrate the protective effects of

housing markets and public support (Johnson et al. 2015; Metraux and Culhane 1999; Wong and Piliavin 1997) and economic and ecological frameworks for understanding the extent and causes of homelessness (Fitzpatrick 2005; O'Flaherty 2004; Toro et al. 1991). In view of this literature, these results point to the composition and affordability of housing available to low income and disadvantaged populations as an important influence on the incidence and subsequent duration of homelessness. A key finding and contribution of this study in this respect is that social housing is associated with greater stability in housing trajectories for disadvantaged populations. People who enter social housing are more likely to maintain their tenancy and less likely to experience homelessness or other forms of disadvantage than people living in privately rented housing. This has important implications for housing policy, particularly in view of declining investment in public housing and the flow on effect this is likely to have in terms of increased incidence and duration of homelessness in the absence of affordable and secure alternatives. The relative importance of tenure and support over personal characteristics, in line with the findings of Goering et al. (2014), Metraux and Culhane (1999), Shinn et al. (1998) and Tsemberis et al. (2004) and reaffirm the centrality of housing policy in preventing and addressing this effect.

The relatively modest associations between private rental subsidies and housing exit are somewhat surprising. The results in this study run counter to the findings of US studies on the importance of Housing Choice Vouchers (Metraux and Culhane 1999; Shinn et al. 1998; Wong and Piliavin 1997) and supported housing models where subsidies are prominent (Busch-Geertsema 2013; Pearson et al. 2009; Tsemberis et al. 2004). This may be attributed to several factors. Firstly, wrap around services provided in supported housing models that may enhance tenancy security are not universally available to disadvantaged populations, meaning the results in this chapter are not comparable to evaluations of these programs. Secondly, Commonwealth Rent Assistance in Australia does not guarantee either affordability or security of tenure and may not be responsive to income shocks or housing affordability pressures. Thirdly, assistance is available to all renters in receipt of income support and

therefore individuals and households that may prefer and choose private rental housing over other tenure types for the flexibility and mobility it offers. Meanwhile, those who receive no rent assistance may have become ineligible as a result of improving their economic circumstances including through employment. Thus, estimates of the effects of rent subsidies contain an element of selection bias. Fourthly, tenant protections from eviction and rent increase are relatively weak in Australian legislation (Hulse et al. 2011; Martin et al. 2017) potentially exposing greater numbers to the risk of housing loss and homelessness. The peculiarities of Australia's private rental system may mean these conclusions are less applicable to other nations. However, the general finding that social housing and strong tenant protections are important in preventing homelessness and housing disadvantage is likely to be universal.

Housing trajectories are found to be highly episodic for disadvantaged populations. This provides quantitative evidence in support of biographic life history studies that reveal the often complex and highly volatile pathways of individuals and families into and out of homelessness (May 2000; Piat et al. 2015; Sharam and Hulse 2014; Skobba 2016). Of particular relevance in this respect is the prominent role of the private support of family and friends. Within the *Journeys Home* sample, such support constitutes the largest proportion of accommodation episodes that occur outside of individuals' own home, is the largest entry and exit point for people staying on the street, in shelters or in the private sub-market, is the most common destination for people who lose or leave their homes in the social and private housing markets and as revealed through the microsimulation, a potentially important indirect pathway between housing and more severe forms of homelessness – and vice versa. Accommodation periods with family and friends tend to be short in duration and often recurring as people move from one set of family or friends to another. It is also more common among young and single adults than older people and families and self-evidently only available to those who retain connections to family and friends. Other studies also suggest that reliance on family and friends can create interpersonal conflict, lead to crowding and other undesirable living

circumstances and erode social capital (Ahrentzen 2003; Skobba and Goetz 2015; Vacha and Marin 1993). From a policy perspective, interpersonal housing support may be attractive to government in privatising the costs of homelessness, however this argument is undermined where street and sheltered homelessness results and many of the costs transfer back to government. Policy development is therefore warranted in strengthening this form of support and pathways to stable housing.

There are shortcomings with this study that ought to be acknowledged. Firstly, the data and quantitative analysis alone do not support causal inferences as to the effect of housing types of future trajectories. The multilevel approach, inclusion of covariates and the sensitivity analysis offer some confidence in the strength of the associations. However, unobserved heterogeneity will arise given the time varying nature of housing and homelessness dynamics and how the choices, allocations and eligibility rules of individuals, social housing authorities, rent subsidy program managers and private landlords influence housing outcomes (Hulse and Burke 2005). Secondly, as described throughout the chapter, several assumptions were made in the construction and modelling of the data, particularly those relating to the type and timing of tenure and support periods and the semi-Markovian principles underlying the microsimulation. Thirdly, while survey attrition was relatively low, some *Journeys Home* respondents left the study due to factors such as refusal, loss of contact, death, imprisonment and emigration. Finally, the Journeys Home sample is representative of a highly disadvantaged population across multiple dimensions, particularly homeless histories. The findings therefore are not representative of the general population or mainstream housing markets. In view of the research and policy value of the findings and their theoretical justification, the benefits of this study were considered to outweigh these issues.

Conclusion

This chapter provides evidence for the relative effect of various housing supports in preventing homelessness and housing loss. Observed associations suggest that rent subsidies may have a modest protective effect for those living in the private housing market, though perhaps not

to the same degree as social housing without providing similar levels of affordability and security of tenure. The informal support of family and friends, while common particularly among young adults, is associated with less housing security. Indeed, its temporary nature may create volatile housing pathways including into more severe forms of homelessness. A full appreciation of these dynamics is achieved through the multistate demographic approach, which is argued to be a key methodological contribution to this field. The approach has allowed for analysis of multiple housing and homelessness states and the dynamic interactions between them. Microsimulation allows for the construction of synthetic housing pathways, facilitating the calculation of housing and homelessness incidence and duration, thus providing valuable measures of the burden and timing of homelessness.

7

Conclusion

The key contribution of this study that underpins and draws together each piece of analysis is the operationalisation of a housing and homelessness spectrum. Deprivation and disadvantage exist on multiple levels, including tenure, safety, affordability, adequacy, location and amenity of housing and accommodation. The spectrum I have adopted is based on different types of accommodation and tenure. These are readily available from several datasets and as have shown have an important bearing on housing security. The housing categories I have used distinguish between home ownership, private rental and public and community (social) housing. I also identify the accommodation forms of people staying with family and friends, people staying in homeless shelters and refuges and people living on the streets, in abandoned buildings and improvised dwellings. Finally, I identify a range of sub-market accommodation such as hotels, motels, hostels, boarding houses and caravans. Although rather amorphous, these forms are marked by usually insecure or short-term tenure and/or sit below societal expectations for housing (Chamberlain and Mackenzie 1992). I consider these categories of housing and homelessness as both distinct forms of accommodation (Chapters 3 and 4) and interconnected states through which individuals and families move over time (Chapters 5 and 6).

As I discuss in this concluding chapter, there are several important insights and implications that flow from this perspective. Indeed, the housing and homelessness spectrum is viewed as a framework – or perhaps one plank of a broader housing pathways framework

(Clapham 2003) – through which to analyse the social, demographic, economic and policy drivers and outcomes of housing and homelessness.

Data and methods

Although the concept of a housing and homelessness spectrum is not new (Watson 1984), data limitations mean that it has been rarely operationalised in quantitative research. As discussed in Chapters 2, 3 and 4, homelessness is most commonly estimated through point-in-time counts. These usually focus on homelessness on the streets and in shelters and refuges. Counts based on the Australian Census are a notable exception in attempting to estimate the extent of 'couch surfing' or 'doubling up' with family or friends, however these struggle with substantial measurement issues (see Chapters 2 and 3) and are unable to capture underlying dynamic processes.

Analyses of other data sources vary. Retrospective household survey data are sometimes used to separately identify those with a past experience staying 'doubled up' from those who have only experienced street or sheltered homelessness (Link et al. 1994, 1995). Studies that use administrative data invariably focus on presentations to and use of homeless shelter and other accommodation services (Chamberlain and Johnson 2013; Culhane et al. 1994, 1996, 2007, 2013; Shinn et al. 1991). The growing body of research that utilises targeted surveys of homeless and at-risk populations has, to date, largely concentrated on dichotomous transitions between housing and homelessness however defined (Curtis et al. 2013; Johnson et al. 2019; McVicar et al. 2019; Moschion and van Ours 2019; Shinn et al. 1998; Wong and Piliavin 1997). There are also separate bodies of work that focus on different aspects of housing and accommodation such as household crowding and doubling up (Booth and Edwards 1976; Entner Wright et al. 1998; Myers et al. 1996; Wiemer 2014; Skobba and Goetz 2015). A small number of studies have pointed to the importance and prevalence of doubling up in pathways between housing and street/sheltered homelessness (Chamberlain and Johnson 2013; Kuhn and Culhane 1998; Shinn et al. 1991). No studies that have been viewed

over the course of this research have sought, or been able, to systematically analyse the patterns and processes across a spectrum of housing and homelessness.

In this thesis, I use a combination of datasets and methods, drawing on the strengths of each, to implement such an approach. In Chapter 3, I develop a novel approach to derive annual estimates of different forms of homelessness. This relies on retrospective information collected in the *General Social Survey*. Regression modelling is used to predict the timing and length of past episodes. These predictions are then used as parameters to simulate homeless episodes for a synthetic population, from which the probabilities of being homeless at the time of the *General Social Survey* can be estimated. Results are validated against administrative data, providing the first known prevalence estimates that combine retrospective survey and administrative data to overcome the population coverage issues in each.

This approach has limited capacity, however, to assess how homelessness is distributed among sub-national geographies. Thus, I use the Australian Census in Chapter 4 to quantify and analyse the spatial patterns of different types of homelessness. Spatial regression modelling is used to analyse how these have changed over time and the contribution of different forms of homelessness to these changes. Spatial analyses of homelessness rates is common in the literature, particularly in identifying the potential structural drivers of homelessness such as poverty, housing affordability and unemployment. The methods I use in Chapter 4 advance this literature by controlling for spatial autocorrelation that might arise from stochastic variation, homelessness policy and service changes and data quality and concordance issues and by analysing changes in patterns of different forms of homelessness over time.

I analyse the dynamic, episodic and interconnected aspects of housing and homelessness in Chapters 5 and 6 using the *Journeys Home* longitudinal study. I develop and implement a discrete-time multistate approach to quantify and analyse probabilities of transitioning between different forms of housing and homelessness. In Chapter 5, I use structural equation modelling to estimate associations between employment and family

changes, housing transitions and subsequent entries to different forms of housing and homelessness. In Chapter 6, I use microsimulation to generate synthetic housing pathways from which estimates of the incidence of and duration of time spent in housing and homelessness states can be calculated. State duration times are argued to be particularly useful measures of the personal and societal burden of homelessness.

Themes

There are four key themes emerging from this research. I regard these as contributing to existing theory and understanding of the nature and extent of housing and homelessness. I summarise each of these in turn.

Theme 1: The extent and duration of homelessness

Point-in-time counts underestimate the number of people who experience homelessness over a lifetime, a year or even a month or week. As I show in Chapters 3 and 6, individuals and families move in and out of homelessness. Indeed, my estimates suggest 11 per cent of episodes last for less than one week, 21 per cent for less than two weeks and 33 per cent for less than one month (Chapter 3). Thus, the population who are homeless on any given night will always be smaller than those homeless over multiple nights. Further, because those experiencing longer term and chronic homelessness are more likely to be homeless on any given night, they are proportionately more likely to be captured in point-in-time counts, creating a bias in these counts towards the long-term homeless. Note that these general findings are irrespective of how homelessness is defined, derived as they are from the largely episodic nature of all forms of homelessness.

These points are reasonably well acknowledged in the literature. Since the 1990s, these have been revealed through analyses of administrative and household survey data (Chamberlain and Johnson 2015; Link et al. 1994, 1995; Metraux et al. 2001). However, these studies also suffer from limitations in that administrative data only capture those receiving support while survey data excludes those who are homeless at the time of the survey.

Although these problems have been recognised elsewhere (Shinn 2010), Chapter 3 of this thesis is the first study that I am aware of that has attempted to quantify both the size of the error in household survey data and the true population who experience homelessness over a year. The results indicate that both point-in-time counts and household surveys substantially underestimate the extent of homelessness. In my study, total annual homelessness in Australia in 2013-14 was 1.4 times higher than estimated by the *General Social Survey* and 3.7 times higher than an average nightly rate.

Also of importance, but rarely acknowledged in the literature, is that while point-in-time counts overestimate homeless durations, they are underestimated in household surveys. For example, I estimate that 22 per cent of all homeless episodes in 2013-14 lasted one year or longer, compared with 11 per cent if taken directly from the survey and 53 per cent if taken from the number who are homeless on an average night. These over- and under-estimates are essentially for the same reason. Those experiencing longer term homelessness are most likely to be homeless on any given night and therefore included in point-in-time counts and excluded from household surveys. As a consequence, this is the first study that I am aware of that has estimated the true annual prevalence and duration of homelessness.

Theme 2: The private and suburban nature of homelessness and housing deprivation

Measurement of the prevalence, distribution and dynamics of interpersonal housing support is a key contribution to the literature. One of the findings that emerges from all four analytical chapters is that the extent of homelessness on the streets and in improvised dwellings is relatively rare compared with forms of homelessness and housing deprivation that occur within private households. In Chapter 3, I estimate that the large majority of people who experience homelessness stay with family and friends, by far the most common form of homelessness in Australian definitions outside of household crowding. In Chapter 4, I show that severe household crowding has become the largest category of homelessness in Census based point-in-time counts in Australia since its inclusion in the ABS (2012a) statistical definition – barring substantial measurement issues in measuring ‘couch surfing’. The size and growth of

household crowding has created poly-nucleated concentrations of homelessness in disadvantaged and migrant communities. In Chapter 5, I find that disadvantaged and previously homeless populations rely on housing support from family and friends to a large extent, particularly in the event of housing and family crises. Finally, in Chapter 6, I show that staying with family and friends is the most common entry and exit point between housing and homelessness, acting as an important though usually temporary stepping stone in pathways into and out of homelessness. Whether or not they constitute 'homelessness', these forms are a critical aspect of the housing and homelessness spectrum, particularly for populations vulnerable to homelessness.

The importance of interpersonal housing support has implications for homelessness theory and policy. Firstly, definitions of homelessness have a substantial impact on its size, nature, demography and geographic distribution. Definitions that concentrate on street and sheltered homelessness reveal relatively small populations that are more likely to be older, male, long-term unemployed, living in inner city areas and have severe mental health and substance use problems and histories of homelessness and violence. Including those staying with family and friends in definitions of homelessness expands and shifts the composition of the population to one that is younger and experiences housing, family and labour market volatility, while maintaining interpersonal connections. Secondly, street homelessness and seeking out public support appear to be among the last resorts for people unable to attain or maintain their own housing. The majority draw on the support of family and friends in the first instance and perhaps exhaust these supports before presenting to homelessness services. Thirdly, the factors that draw people to different geographic locations are likely to be different between those with and without interpersonal support. In particular, the location of homelessness services is likely to have a substantially weaker attractive force than the location of family and friends. Thus, the provision of services within a city or jurisdiction is unlikely to induce in-migration among the majority who experience homelessness and housing deprivation.

Theme 3: Housing transitions and pathways

As discussed in Chapter 2, most empirical research utilising a housing pathways framework is based on qualitative data. At least one study has sought to quantify the number of people presenting to homelessness services through different pathways using administrative records (Chamberlain and Johnson 2013), while another has quantified housing pathways among young people using qualitative and quantitative data (Clapham et al. 2017). However, biographic life history studies are the most common (Martijn and Sharpe 2006; van Laere et al. 2009; Sharam and Hulse 2014; Piat et al. 2015; Skobba 2016). There are specific reasons for this, namely that these studies are best placed to capture the lived experiences and meanings that individuals attach to their housing, as well as the long run processes and dynamics that produce homelessness – something usually not feasible in targeted longitudinal surveys conducted over relatively short time horizons (Somerville 2013). Quantitative research is nevertheless useful, including, as I argue in Chapter 6, for identifying the factors that indirectly impact upon housing pathways. Most quantitative research to date though, has focused on dichotomous transitions between housing and homelessness. While several of these studies are better able to identify causal effects, they tend to disguise the underlying processes leading to homelessness. Their measured effect sizes are also likely to be confounded by the personal, interpersonal and institutional resources and supports that protect people from, and create indirect pathways into, homelessness.

The principal way in which I operationalise a housing pathways framework in this study is by analysing transitions along the housing and homelessness spectrum through time. In Chapter 5, I hypothesise and find evidence that transitions are the product of residential moves driven by reasons such as housing and family crises. On exiting housing, individuals and families face choices as to the form of accommodation they move into constrained by the resources and supports available to them. Street homelessness is hypothesised to occur where these have been depleted such that persons involved have or believe they have no better options. The findings of Chapter 5 suggest these result from transitions from social and

private market housing and accommodation episodes staying with family and friends. This provides circumstantial evidence that doubling up is an important intermediary stage in pathways between housing and homelessness.

I examine this in more detail in Chapter 6 by creating housing trajectories for a synthetic population. These reveal a high incidence of doubling up and a high degree of volatility and churn in these episodes, exposing these populations to the risk of street and sheltered homelessness. In this chapter, I also hypothesise that the true burden of homelessness and housing deprivation is a product not only of entries but also durations, exits and re-entries, particularly in view of the episodic nature of these accommodation forms. I estimate accommodation specific duration times as a quantitative proxy for this burden.

Theme 4: Adverse events, housing loss and homelessness

Housing, family and economic shocks are hypothesised to act as proximal events leading to housing loss and homelessness. In Chapter 5, I find evidence for this hypothesis through observed associations between job loss, relationship breakdown, violence and housing moves. The most common reasons respondents give for moving include temporary and expired leases, relationship breakdown, eviction and violence. Thus, loss of tenure whether through eviction or lease expiries may be another, and perhaps the most, important shock. Personal factors such as mental health and substance use issues are less common reasons for moving, and perhaps have a more indirect role. Importantly, shocks are argued to act as tipping points for already vulnerable populations, potentially mediating the effects of more distal factors related to personal characteristics and histories, as well as those related to housing and labour markets.

Shocks are increasingly recognised for their role in homelessness entries. One of the important contributions of this study is to analyse shocks within the context of the housing and homelessness spectrum. This highlights the potentially important interactions between life events and personal, interpersonal and institutional resources and supports in producing homelessness. The results of Chapters 5 and 6 provide evidence for the view that forms of

tenure and support have important protective roles. Housing crises appear to be particularly common in the private rental market irrespective of employment transitions. Social and particularly public housing, by contrast, are associated with more stable housing pathways and fewer transitions for either housing, family or personal reasons. Whether a loss of housing leads to street or sheltered homelessness is argued to be influenced by personal and interpersonal factors including employment, family and friends, relationship stability and violence. Thus, the operationalisation of the housing and homelessness spectrum within a multistate approach reveals some of the potentially important interactions that shape housing pathways and the risk of homelessness.

Limitations

The analytical chapters of this thesis include discussion of the limitations inherent in each. From the perspective of the thesis as a whole, one of the key limitations relates to sampling and measurement issues and inconsistencies in the data. The availability of a broad collection of data instruments on homelessness is relatively rare internationally. While point-in-time counts and household surveys are or have been conducted and administrative data collected in several countries, having all of these conducted at a national level over a similar period, in addition to a targeted longitudinal sample survey like *Journeys Home* is very unusual and offers enormous research potential for analysing multiple aspects of homelessness. Indeed, one of the ambitions at the start of this research was to integrate all of these data sources in the construction of a demographic account of housing and homelessness to provide a (near) complete quantitative profile of homeless stocks and flows.

However, it became clear through the course of the research that the estimates produced through each are somewhat incongruous. A notable example arose in the comparison of *General Social Survey* and Census nightly prevalence estimates in Chapter 3, in which the *General Social Survey* produced substantially higher estimates of staying with family and friends. Another example arose in Chapter 3 where episodes of homelessness

among *Journeys Home* respondents were longer and more likely to have involved street homelessness than among *General Social Survey* respondents.

I hypothesise that there are three main explanations for these differences. Firstly, while they use the same or similar definitions, they operationalise and measure homelessness differently by directly asking respondents about past experiences without a permanent place to live (*General Social Survey)* or indirectly inferring it from the type and tenure of current accommodation (Census). Secondly, there are likely to be measurement issues affecting the Census count, particularly for those staying with family or friends, and sample size issues affecting *Journeys Home* and *General Social Survey*. Thirdly, the *General Social Survey* and *Journeys Home* appear to represent different populations. The *Journeys Home* population experiences deeper disadvantage and vulnerability, likely excluding the large population in the *General Social Survey* whose homelessness is one-off and temporary. These factors have made it difficult to create a single, coherent picture of housing and homelessness.

Other limitations relate to the demography, life course and multidimensional aspects of housing and homelessness. In terms of demography, family and child homelessness is notably absent from much of these analyses, largely a consequence of the individual-level focus of much of the data, particularly the Census and the *General Social Survey*. *Journeys Home* has a reasonable amount of information on family composition at each survey wave, though the sample was drawn from a predominately young and single population and little information was collected on other household members. Administrative data in the *Specialist Homelessness Services Collection* identifies individuals presenting in family units to homelessness services, however these data are not readily available in unit record form.

In terms of the life course, this study was restricted by the relatively short time horizons of the data. The *General Social Survey* asks respondents about lifetime homelessness experiences, however, this is collected retrospectively and, given the high proportion who report only one experience (see Chapter 3), this appears to be affected by recall bias. *Journeys Home* asks respondents about childhood experiences of violence and

homelessness and histories of incarceration and State care. These were used as explanatory variables in Chapters 5 and 6. However, their effect sizes are conditional on later disadvantage in adulthood – to make them eligible for sample selection. Thus, the population level effects of these variables are unknown. Finally, there are several dimensions of housing and homelessness that although important were largely neglected in this study. These include affordability, adequacy, safety, amenity and location. Household crowding is another example, which although analysed in Chapter 4 and found to be the most common form of homelessness, was not measured in the sample surveys and was therefore excluded from the other analytical chapters.

Future directions

Future research ought to consider how to better coordinate and integrate different measures of housing and homelessness. Harmonising the timing and measures of homelessness between the Census and the *General Social Survey*, for instance, would provide a more direct estimate of those missed from the latter. Benchmarking and aligning targeted studies such as *Journeys Home* with general household studies would provide opportunities to analyse housing and homelessness transitions within the total population. One possibility to capture long term life course dynamics is to investigate the potential for using cohort studies. Where transitions into street and sheltered homelessness are rare, a coordinated and targeted longitudinal study with common measures and representing a population that can be benchmarked to the general population could enhance statistical power. Another possibility is to incorporate homelessness data into the growing array of linked administrative datasets. Integration of homelessness services data with income support data, for example, coupled with a targeted survey of income support recipients could provide powerful evidence on the economic and labour market drivers of homelessness and demand for services.

The housing and homelessness spectrum coupled with the multistate approach to estimating transitions through time provides a valuable conceptual and methodological framework for this work. The spectrum is able to capture the processes and mechanisms

through which people experience homelessness and housing deprivation and better reflects the diversity of lived experiences. Demographic multistate analysis provides a toolkit through which to operationalise this spectrum as well as formal and tailored approaches to combine data and estimate patterns from missing and censored data. Outputs such as incidence, prevalence and exit rates and duration times have important utility for measuring the impacts of housing markets and policy and broader social, demographic and economic trends. Most importantly, in providing greater understanding of housing and homelessness process, they contribute to the actions of families, communities and governments in transforming people's lives and elevating them to new and fulfilling housing and life course trajectories.

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Appendix

Table A.1 Demographic and housing characteristics of *Journeys Home* respondents

	% person-waves		% person-waves
Sex		**Housing/accommodation type**	
Male	54	Street/improvised dwelling	3
Female	46	Homeless shelter/refuge	5
Age group at wave 1		Private sub-market	7
15-24	36	Staying with family/friends	32
25-34	21	Public housing	14
35-44	21	Community not-for-profit housing	6
45-54	15	Private rental housing	31
55+	7	**Rent and subsidy level**	
Family type		Pay no rent	14
Single male	41	Rent < 30% income without subsidy	38
Single female	21	Rent < 30% income after subsidy	16
Married/cohabiting (no children)	14	Rent ≥ 30% income after subsidy	16
Single parent family	15	Rent ≥ 30% no subsidy	16
Couple parent family	10	**Main reason for moving between waves**	
Transition between waves		Eviction	5
Married/co-habiting -> single	3	End of lease/temporary accommodation	6
Single -> married/co-habiting	5	Relation breakdown	8
Highest education completed		Domestic or other violence	3
Post-school qualification	33	Health and substance use	3
High school	11	Wanted to relocate	8
Less than high school	56	Wanted to be with family/friends	3

Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)

Table A.2 Economic, health and personal histories of *Journeys Home* respondents

	% person-waves		% person-waves
Income support type		**Victim of physical violence in last 6 months**	
None	14	Yes, by current or former partner	5
Unemployment benefit	30	Yes, by other person	10
Youth Allowance	14	Opt out	11
Disability Support Pension	25	**Ever diagnosed mental health conditions**	
Other Government benefit	16	Bipolar affective disorder	13
Employment transitions between waves		Schizophrenia	11
Keep job	12	Depression	61
Change job	4	Anxiety	49
Employed -> unemployed	11	**Alcohol and drugs**	
Employed -> not in labour force	7	Self-described problem	17
Not employed -> employed	9	Received treatment in last 6 months	4
Not employed -> not in labour force	29	**Age first homeless**	
Not employed <1 year -> unemployed	10	Never	7
Not employed ≥ 1 year -> unemployed	18	0-14 years	17
Ever in adult/juvenile detention	35	15-19 years	39
Experienced violence as a child	46	20+ years	35
Ever placed in foster/residential care	26	Unknown	2

Table A.3 Average episode durations in the *Journeys Home* accommodation calendar

	Days		Days
Average observed episode durations			
Completed episodes prior to wave 1		*Episodes ongoing at end of survey period*	
Private market housing	501	Private market housing	443
Social housing	711	Social housing	752
Family/friends	525	Family/friends	371
Private sub-market	493	Private sub-market	373
Primary/shelter	829		
Completed episodes commencing after wave 1			
Private market housing	243		
Social housing	250		
Family/friends	104		
Private sub-market	103		
Primary/shelter	88		

Source: author's calculations from Wooden et al. (2012) and Scutella et al. (2017)