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The changing geography of homelessness: a spatial analysis from 2001 to 2016

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AUTHORED BY

Sharon Parkinson
Swinburne University of Technology

Deb Batterham
Swinburne University of Technology

Margaret Reynolds
Swinburne University of Technology

Gavin Wood
RMIT University

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Authors	Sharon Parkinson	Swinburne University of Technology			
	Deb Batterham	Launch Housing			
	Margaret Reynolds	Swinburne University of Technology			
	Gavin Wood	RMIT University			
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Acronyms and abbreviations used in this report

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AHURI	Australian Housing and Urban Research Institute Limited
AIHW	Australian Institute of Health and Welfare
ARIA+	Accessibility and Remoteness Index of Australia
ASGS	Australian Statistical Geography Standard
CBD	Central business district
CC/RoS	Capital City or Rest of State
CNOS	Canadian National Occupancy Standard
CPI	Consumer Price Index
GCCSA	Greater Capital City Statistical Area
NAHA	National Affordable Housing Agreement
NHHA	National Housing and Homelessness Agreement
NPAH	National Partnership Agreement on Homelessness
NPARIH	National Partnership on Remote Indigenous Housing
NPRH	National Partnership on Remote Housing
NRAS	National Rental Affordability Scheme
NSW	New South Wales
NT	Northern Territory
OECD	Organisation for Economic Co-operation and Development
PRS	Private rental sector
QLD	Queensland
Q1	Quintile 1 of the national gross household income distribution (Q2 = quintile 2 etc.)
SA	South Australia
SA2	ABS Statistical Area Level 2
SA3	ABS Statistical Area Level 3
SAHF	Social and Affordable Housing Fund
SAR	Spatial Autoregressive (model)
SHS	Specialist Homelessness Service

SHSC	Specialist Homelessness Services Collection
TAS	Tasmania
TSP	Time Series Profile
VIC	Victoria
WA	Western Australia

Glossary

A list of definitions for terms commonly used by AHURI is available on the AHURI website www.ahuri.edu.au/research/glossary.

Executive summary

Key points

- Homelessness on a per capita basis remains highest in very remote areas but is becoming more dispersed nationally with concentrations in major cities growing over time, particularly in the most populous states (NSW and Victoria). By 2016 capital cities accounted for just under two-thirds of all homelessness nationally.
- Changes in homelessness rates between 2001 and 2016 are largely due to factors specific to regions, with little of the change accounted for by the mix of homelessness operational groups in a region, or overall national trends.
- Homelessness is rising in areas with a shortage of affordable private rental housing and higher median rents. This rise is most acute in capital city areas, specifically, Sydney, Hobart and Melbourne.
- The area supply of affordable private rental housing is statistically significantly associated with the variation in homelessness rates nationally, in capital cities and regional areas. Overcrowding accounts for a large part of this variation across areas after controlling for other area-based attributes.
- The impact of labour markets vary across capital cities, regional towns and remote areas. Overcrowding in capital cities is strongly associated with weak labour markets and poorer areas that have a higher than average concentration of males. However, these associations do not hold for overcrowding in remote areas.
- Nationally and in capital cities rates of overcrowding are highest where there is a concentration of children aged less than 14 years. For other forms homelessness, rates are elevated in areas with high concentrations of those aged between 25 and 40 years. In regional and remote areas, rates of all forms of homelessness are elevated in areas with high proportions of children aged below 14 years. Homelessness is lower in city, regional and remote areas where there is a higher than average concentration of married people.
- Area based overcrowding is most strongly associated with areas that are more culturally and linguistically diverse. The area based share of Indigenous persons remains the strongest determinant of homelessness in remote areas.
- There is substantial mismatch between the distribution of homelessness and specialist homelessness service capacity. Nationally, in 2016, 48 per cent of Specialist Homelessness Services (SHS) accommodation capacity and 44 per cent of support capacity would need to shift across SA3 boundaries to better

> align with the distribution of homelessness. Service mismatch is most obvious in the areas where Indigenous people are living in overcrowded dwellings[1]

The risk and experience of homelessness is shaped by the places in which people live and gravitate to, either by choice or necessity. Yet most research has focussed on understanding individually based causes, triggers or pathways into and out of homelessness and its consequences for individuals. This research offers policy makers evidence on the changing geography of homelessness. It outlines the extent to which homelessness is becoming more spatially concentrated over time, where it is rising and falling, and of the importance that housing affordability, poverty and labour market opportunities play in reshaping its distribution over time. It seeks to address the policy question:

What structural factors are important in driving changes in the geography of homelessness over the period 2001–2016, and is service delivery to those with experience of homelessness matching these spatial dynamics?

The following research questions address this policy theme:

- RQ1: How does the incidence of homelessness and its components vary within and between regions, states and territories, and is it becoming more or less geographically concentrated?
- RQ2: Is homelessness rising or falling in areas where there are shortages of affordable private rental housing, and are Specialist Homelessness Services (SHS) well located to intervene?
- RQ3: What role do structural factors such as housing and labour markets, demographics and other area-based indicators, play in shaping differences in rates of homelessness between Australian regions, states and territories over the study period 2001–2016?

Key findings

The key findings based on a descriptive, mapping and spatial modelling analysis of aggregate homelessness rates between 2001 and 2016 are summarised under the key headings below.

Where is homelessness rising and falling?

- Homelessness rates and shares are becoming more concentrated in major cities, particularly in the most populous states: NSW and Victoria. By 2016, capital cities accounted for just under two-thirds of all homelessness nationally.
- Geographical shifts in the location of rough sleepers and those who are homeless because of severe overcrowding are the most important components steering this urbanisation of homelessness towards metropolitan areas. While homelessness remains moderately spatially concentrated, it is slowly becoming more dispersed over time.
- Homelessness is rising in areas with a shortage of affordable private rental housing, as measured by the match between supply and demand for low-cost housing and median

[1] In 2016, there were 358 SA3s in Australia, with populations typically ranging from 30,000 to 130,000. Broadly, SA3s are designed to coincide with areas of economic, social and transport activity. In urban areas, SA3s closely align to an area serviced by a major transport and commercial hub. In regional areas they represent the areas serviced by regional cities with populations over 20,000 persons; in outer regional and remote areas SA3s are recognised as having a distinct identity, or similar social and economic characteristics (ABS 2018a).

rents. This rise is most acute in capital city areas, specifically, Sydney, Hobart and Melbourne.

Are services well located to respond to the changing geography?

- There is substantial mismatch between the distribution of homelessness and specialist homelessness service capacity. Nationally, in 2016, 48 per cent of SHS accommodation capacity and 44 of SHS support capacity would need to shift across SA3 boundaries to better align with the distribution of homelessness across the nation.
- Spatial mismatch of service capacity has been improving in regional and rural areas and worsening in major capital city areas between 2001 and 2016. Both outward migration and more targeted interventions to address overcrowding in remote areas are likely to be shaping this trend.
- In major capital cities, most SHS capacity is located in and around inner capital city areas but homelessness rates, particularly overcrowding, are increasing within urbanised locations.
- Homelessness counts, especially for those in severely crowded dwellings and who are sleeping rough, have been rising in line with population growth, yet only a small fraction are accessing supported accommodation on any given night.

In what types of areas are people most at risk of homelessness?

- A shift-share analysis reveals that changes in homelessness rates between 2001 and 2016 appear to be largely due to factors specific to regions (such as local housing market conditions, labour markets and local economies, or demographic profiles), with little of the change accounted for by the growth or mix of operational groups (i.e. sleeping rough, staying in supported accommodation, overcrowding) in a region, or overall national trends.
- The supply of affordable private rental is significantly associated with the variation in homelessness rates nationally, in capital cities and regional areas. Overcrowding accounts for a large part of the variance in the effect of housing affordability supply in capital cities after controlling for area-based attributes.
- In capital cities and regional towns—when omitting those in supported accommodation—rates of homelessness are significantly associated with poorer areas with weaker labour markets. However, this relationship does not hold in remote areas, which may potentially relate to the larger geographical expanse of these areas.
- Homelessness rates are significantly lower in areas where the concentration of married people is highest.
- In capital cities, as distinct from other areas, rates of homelessness are strongly associated with areas that have high concentrations of males, and this effect increases significantly when looking separately at overcrowding.
- Nationally and in capital cities, overcrowding is more typical in areas with young children aged less than 14 years, but for other forms homelessness rates are elevated in areas where those aged between 25 and 40 years are more prevalent. In regional and remote areas, rates of all forms of homelessness are elevated where there are higher concentrations of young children less than 14 years.
- Areas that are more culturally diverse—whether due to having an Indigenous or non-English-speaking background—have higher rates of homelessness, especially overcrowding. A large component of area-based overcrowding is linked to more culturally diverse areas.

- Indigenous background remains the strongest determinant of homelessness in remote areas and much of this effect is accounted for by overcrowding. Within capital cities, the areas where Indigenous people are accommodated informally are different from those here they are supported formally by homeless services.

Policy development options

National, state and territory government responses have made inroads into reducing and containing some of the growth of homelessness. This research raises new questions, and reinforces the challenges ahead in keeping apace of broader structural changes that are serving to deepen inequality across Australian cities and regions and how services can be best placed to respond.

- Continued efforts need to be devoted to ending homelessness in remote regions of Australia. Policy makers and providers also need to plan for and direct additional resources to address the increasing urbanisation of homelessness *between* capital cities, regional and remote areas, as well as the concurrent suburbanisation of homelessness *within* capital cities, particularly in our most populous states. This includes understanding how different types of living arrangements or components of homelessness are distributed across locations, particularly within the more suburban areas of capital cities that appear to be most vulnerable to severe crowding.
- Rising rental costs and a shortage in the supply of affordable rents coincide with areas where the growth of homelessness has been most marked over time. A continued and expanded affordable housing supply-side response is critical to making inroads into preventing and resolving homelessness. Current service agreements emphasising commitments to housing supply need to consider the location and key priority areas for new housing development as well as review the amounts of rents that are sustainable in the long term.
- There is a critical need for supply-side initiatives to increase the stock of and the accessibility of housing to lowest income individuals and households, including single persons, particularly males, living in overcrowded conditions. New stock developed needs to cater better to a range of household sizes, including options for multiple- and single-bedroom dwellings. Innovative solutions to include additional living space for families on existing properties could also alleviate crowding.
- The supply of affordable housing needs to match areas of population growth among lower income individuals and households in a way that also provides access to broader services, employment and amenities.
- Flexible models to rent and purchase transitional and permanent supportive housing in middle and outer suburbs and non-capital city areas should be further explored and scaled up to overcome difficulties gaining access to private rental that is affordable.
- Careful planning in the allocation and supply of affordable housing is required to ensure that new dwellings and housing assistance packages enable people to remain within their communities and close to support, including the exploration of more innovative responses to address issues of overcrowding—particularly among those with young children and extended kinship groups.
- Services are not currently well aligned with the changing geography of homelessness. Most service capacity for accommodation and support is located in and around inner capital city areas with less capacity in regional and remote areas.

- Service mismatch has implications for how homelessness episodes are resolved. As individuals may find it more difficult to gain support if they have to travel outside their local area services are better located in areas with higher demand. Similarly, if people remain in disadvantaged areas without formal assistance—including housing and support—reliance on informal housing solutions for extended periods could push individuals into even more precarious living arrangements.
- There is a need to gain more detailed insight into the service needs of those who are living in overcrowded dwellings. This includes the need for more targeted and culturally appropriate service responses to individuals and households from culturally diverse backgrounds—including Indigenous people, and people with English as a second language—within urban and suburban areas. This may include increased outreach and outposted services within areas that are more diverse that are not already well serviced by housing and support services.

The study

This research provides a comprehensive descriptive and spatial modelling analysis of the incidence of homelessness and the area-based attributes associated with elevated risk nationally and across cities and regions. It draws on a pooled panel dataset of the 2001–2016 Census Homelessness Estimates, the Australian Bureau of Statistics (ABS) Time Series Profile dataset and AIHW Specialist Homelessness Service Collection (SHSC) data, and special request data from the ABS on the supply and demand for affordable private rental housing. This analysis builds upon a unique panel data set (2001–2011) assembled by the research team for AHURI project 53027.

In undertaking a detailed spatial analysis of the geography of homelessness, we focus on how two key measures of homelessness (the rate per 10,000 persons and national share for each area) have been changing over the past 15 years. The share of national homelessness reveals where most homelessness is located, while the rate reveals the prevalence of homelessness in an area after accounting for population size. We apply novel spatial econometric models to determine the area-based attributes associated with elevated homelessness rates—using separate models across capital cities, regions and remote areas and disaggregated measures of homelessness components, including a separate set of models on overcrowding. A key advantage of spatial econometric techniques is that they allow the researcher to investigate interrelationships between homelessness in a region and homelessness in adjacent regions.

1 Introduction and background

- Homelessness persists, and in some cities and regions it has been rising at a faster pace than in other regions.
- This research examines how the changing geography of homelessness aligns with the changing geography of demographic groups, housing and employment opportunities that have become more spatially polarised in the past 15 years.
- It offers policy makers evidence on the extent to which homelessness is becoming more spatially concentrated over time, where it is rising and falling, and of the importance that housing affordability, poverty and labour market opportunities play in reshaping its distribution over time.
- National, state and territory government responses have helped curb growth in homelessness. This research raises new questions about the challenges that lie ahead as a result of broader structural changes that are serving to deepen inequality across Australian cities and regions. It also asks whether services could be better placed to respond.

1.1 Why this research is important

The risk and experience of homelessness is shaped by the places in which people live and gravitate to, either by choice or necessity. Yet most research has focussed on understanding individually based causes, triggers or pathways into and out of homelessness and consequences for individuals over time. We know that some groups have a heightened individual risk of homelessness over others, and that this will be more acute at different stages of their life course (Batterham 2017). We also know that the composition of the homeless population has been changing over time as different groups move through cycles of increased vulnerability as a consequence of economic restructuring and broader social changes that give rise to unequal access to secure incomes, work and housing. However, we know very little about how changing spatial inequality in incomes, work and housing opportunities might be also shaping the changing spatial composition of homelessness, and to what extent policy and services are well placed to respond to this change (Baum and Gleeson 2010; Pawson and Herath 2015; Reynolds and Wulff 2005).

There is a growing evidence base documenting changing demographic, housing and labour market structures in Australia (Campbell, Parkinson et al. 2014; Hulse, Reynolds et al. 2014; Whelan and Parkinson 2017; Wulff, Reynolds et al. 2011; Yates, Milligan et al. 2007) that seem likely to impact aggregate rates of homelessness and particular groups of individuals disproportionately. Sydney and Melbourne in particular have experienced rapid change in the past five years off the back of a housing investment boom that has lifted house prices and rents to unprecedented levels. In contrast, markets in other states and territories demonstrate different affordability dynamics with weaker labour markets (ABS 2017; CoreLogic 2017). The drivers of homelessness are thus likely to vary significantly across locations.

Despite significant knowledge of both the causes and consequences of homelessness and the inroads made into the provision of essential programs of crisis through to longer-term responses, homelessness persists, and more worrying recent figures—as examined in detail in

this report—reveal that rates across Australian cities and some regions are in fact rising. In view of this there are three key reasons why understanding the geography of homelessness matters.

Firstly, the changing spatial distribution of homelessness might offer clues about the importance of various factors such as housing affordability, poverty and lack of labour market opportunities in causing homelessness. Secondly, the geography of homelessness has implications for service delivery. Ideally, services should be targeted to those regions with concentrations of homelessness. And thirdly, changing patterns in the geography of homelessness can throw up interesting questions and issues that have not previously been addressed. With this aim in mind we address the following research questions:

- RQ1: How does the incidence of homelessness and its components vary within and between regions, states and territories, and is it becoming more or less spatially concentrated?
- RQ2: Is homelessness rising or falling in areas with a shortage of affordable private rental housing and are Specialist Homelessness Services (SHS) well located to intervene?
- RQ3: What role do structural factors such as housing and labour markets, demographics and other area-based indicators, play in shaping differences in rates of homelessness between Australian regions, states and territories between 2001 and 2016?

In the chapters to follow we present findings from a comprehensive cities and regional descriptive and spatial modelling analysis of the incidence of homelessness and its area-based determinants. We draw on a unique panel dataset constructed from the 2001–2016 Census of homelessness, AIHW SHSC and other relevant area-based data to extend the work of Batterham (2012), and Wood, Batterham et al. (2014; 2015), which examined the structural drivers of homelessness drawing on Census and service data from 2001–2011. It also complements the work of O'Donnell (2016) and Johnson, Scutella et al. (2015a; 2015b) by employing novel spatial econometric techniques to describe and model the incidence and spatial clustering of homelessness rates and its determinants.

1.2 Conceptualising the spatial opportunity structures of homelessness

The uneven geography of homelessness rates across locations has been conceptualised in various ways in the literature and is outlined in some detail in Wood, Batterham et al. (2014; 2015). In summarising, there are three core ideas that seek to explain concentrations of homelessness or risk in particular locations. The first set of ideas, often referred to as the *honey pot* or *magnet hypothesis* (Corbett 1991; Loveland 1991), focuses on place-based attributes, such as homelessness-specific services, which might prompt those at risk or with experience of homelessness to gravitate to a particular location. These may or may not be areas with a plentiful supply of permanent affordable housing. The second set of propositions relate to the *sorting hypotheses* associated with the tendency for those at risk of or experiencing homelessness to move to areas of affordable housing because they are 'forced' out of their existing housing and location due to low incomes and diminished capacity to compete in particular markets.

Others seek to explain the interrelationship between individual and area-based structures to account for uneven concentrations of homelessness across different locations. Most noted is O'Flaherty's (2004) *wrong person in the wrong place* proposition, which asserts that what matters most for the onset of a homelessness episode is the 'conjunction' between individual vulnerability with area-based vulnerability. In poverty studies, this connection between individual and area-based structural risk has been framed in terms of *poor people living in poor places* (Cotter 2009), and has been more widely examined in terms of the mutually reinforcing ways

that concentrations of poverty take form within a particular location to increase risk and adverse life chances.

While the above perspectives capture different dimensions of some of the underlying social structures that ultimately shape aggregate observations of homelessness across the country, a common element is the significance of the uneven spatial context in shaping variations in homelessness episodes. In expanding upon the initial work of Batterham (2012) and Wood, Batterham et al. (2015), a core focus of this research is to understand how geographical variation in homelessness rates between 2001 and 2016 align with increasing spatial inequality across Australian cities, regions and towns. There has long been an understanding that homelessness is strongly related to both absolute and relative trends in poverty, as well as inequality within a given society and its institutions. But there is limited evidence on how long-term growth in inequality across a number of indicators is materialising unevenly across geographies to impact upon the distribution of homelessness within Australian cities and regions. A key focus of our time series analysis is to understand how changing rates of homelessness across different locations might also correspond with broader structural changes occurring in Australian housing and labour markets that are also linked to spatial disadvantage and inequality.

The long-term growth of inequality in incomes and housing wealth in Australia, and across the OECD, signals that the opportunity structures among individuals and households, and between generations, is changing (Ballas, Dorling et al. 2017; Picketty 2014) and that this inequality has a distinct and cumulative spatial pattern. As a concept, *opportunity structures* reflect the broader set of social relations that enable or constrain individuals and households to gain access to valued resources, and to achieve their potential in a given society. Extending this concept, Galster and Sharkey (2017) propose that opportunity structures take their particular form within the spatial contexts that people belong to, live in and draw upon to meet their immediate and longer-term daily needs and aspirations.

Situating this current research within Galster and Sharkey's (2017) framework of *spatial opportunity structures* is useful, because it provides a way of thinking about areas as unequally distributed 'bundles of attributes' and resources within a context that enable or constrain actions in the immediate through to lifetimes and across generations. Within the framework it is recognised that 'various dimensions of inequality are organised in space. However, spatial inequality also is due to intentional efforts to organize physical space in ways that maintain or reinforce inequality' (Galster and Sharkey 2017: 6). This deliberate organising of space results in the construction of differing access to services, labour and housing markets, schools and networks, as well as exposure to different types of hazards including crime, pollution and weather. As such, it provides a way of expressing the changing geography of homelessness in line with broader changes associated with concentrations of disadvantage and widening spatial inequality that we are also witnessing across Australian cities and regions over time.

Within the framework, the spatial opportunity structures can act as a *mediator* in which the 'bundle of individual attributes' (Galster and Sharkey 2017) are translated through a particular geographical context to shape social, economic or personal outcomes. And it can also act as a *moderator* that is more cumulative and path-dependant over time, beginning early in life, or through caregivers, and which can continue to shape disadvantaged or advantaged experiences and successes after an individual or household has remained in or moved on from a particular location.

1.3 Policy context and responding to homelessness as a spatial problem

Understanding the causes and consequences of homelessness, including how rates vary across locations over time, is central to developing effective policies and programs to prevent and end homelessness. Next we briefly review some of the key initiatives that have shaped recent policy directions and service responses to the changing geography of homelessness and housing affordability.

1.3.1 Federal response

Since the *Supported Accommodation Assistance Act 1984*, various iterations of Commonwealth–state housing agreements—and its successors, the National Partnership Agreement on Homelessness (NPAH) and National Affordable Housing Agreement (NAHA)—have facilitated a national homelessness response comprising crisis and transitional accommodation with case-management support via a network of community agencies (now Specialist Homelessness Services). However, the capacity of states, territories and local governments to effectively respond to homelessness has been greatly shaped by the legacy of Federation and sovereignty of the federal government in determining and prioritising continued funding. In the recent 2017–2018 budget, after a period of uncertainty from a spate of interim agreements since 2013, the Liberal government advanced a new three-year Commonwealth–state funding agreement: the National Housing and Homelessness Agreement (NHHA) (Commonwealth of Australia 2017).

The evolution of Specialist Homelessness Services (SHSs) under Commonwealth–state-based agreements have typically aligned with a broader social policy direction of individualised or 'choice-based' packages of support, with a focus on early intervention and prevention through to the implementation of Housing First programs aiming to end long-term homelessness (Parkinson and Parsell 2018). Despite significant gains in preventing and resolving episodes of homelessness at the programmatic level, more sustained changes have invariably been stymied due to the lack of exits into long-term affordable housing options, or from the sector's inability to alter, in any substantial way, the market conditions contributing to homelessness (Johnson, Parkinson et al. 2012).

A reliance on demand-based subsidies—such as Commonwealth Rent Assistance—as the main policy lever for addressing rental access and preventing homelessness has been inadequate in overcoming affordability difficulties for individuals and households on the lowest incomes, including those in receipt of Newstart (Parkinson, James et al. 2018). *The Road Home* (Commonwealth of Australia 2008) initiated by the Rudd government in 2007 signalled renewed hope and commitment to supply-side initiatives via the introduction of the National Rental Affordability Scheme (NRAS). Changes to the *Income Tax Assessment Act 1997* enabled governments to incentivise public–private partnerships in development, construction and provision of affordable private rental dwellings. Although the scheme encountered difficulties attracting large scale investors and rental housing was not always offered to those on lowest incomes, its discontinuation by the Abbott Coalition government was thought to be premature and undermined supply-side policies for the promotion of affordable rental housing (Blessing and Gilmour 2011; Rowley, James et al. 2016).

In the recent 2017–2018 budget and under the new National Housing and Homelessness Agreement (NHHA), there is again a return to placing issues of housing affordability on the agenda with:

- endorsement of a new Housing Finance Corporation to establish a bond aggregator
- tax concessions for affordable housing investment through public managed investment trusts

- introduction of a Housing Infrastructure Facility to encourage infrastructure projects that support affordable housing (Australian Treasury 2018).

There is also funding allocated for a National Regulatory System for Community Housing to provide consistency across the sector and stimulate investor interest in the supply of affordable housing. These initiatives can perhaps be thought of as the current government's policy alternative to the former NRAS (Pawson, Parsell et al. 2018). Although the question remains as to whether such initiatives will generate sufficient supply for those whose incomes fall within the lowest 20 per cent of the income distribution—those who are most at risk of homelessness (Parkinson, James et al. 2018).

1.3.2 State and territory responses

As part of the new National Housing and Homelessness Agreement (NHHA), each jurisdiction has outlined its own key priorities for preventing and responding to homelessness, either through existing Homelessness Strategies, or strategies that are currently being developed. Part of the commitment to develop homelessness strategies is the requirement of each jurisdiction to outline how they will increase the supply of social housing, particularly in the context of high population growth in states such as NSW and Victoria. While the impact of homelessness, housing affordability and employment opportunities are distinct across each state and territory, recent agreements under NHHA continue to signal the ongoing transfer of existing public housing stock to the community housing sector or the formation of partnerships for hybrid models, as well as the continued support for centralised housing registers operating between public and community housing providers. However, some jurisdictions have a more developed community housing sector than others, which unequally impacts upon the capacity of different cities and regions to deliver sufficient dwellings that would make inroads in ending homelessness.

Although supplies of community housing have increased substantially since 2008—largely due to the transfer of public stock to community housing providers (AIHW 2018)—this does not necessarily increase supply for those on the lowest incomes. Indeed, there is a cost in providing social housing to households on the lowest incomes, regardless of whether it is managed by state housing authorities or community housing providers. Social housing providers must find a way to 'fund the gap' between sub-market rents and the costs of supplying housing in order to remain viable, and this can mean less of a focus on providing housing to those most in need (Randolph, Troy et al. 2018). Community housing providers may do this by cross-subsidising rents for those on the lowest incomes by also accommodating low- to moderate-income households. However, this will leave fewer affordable options for those on the lowest incomes.

Waiting lists for public housing remain long (AIHW 2018) and there has been a decrease in capital investment in social housing each year since the 2012–2013 financial year (Pawson, James et al. 2018: 16), with the supply of social housing failing to keep pace with household growth (AIHW 2018; Randolph, Troy et al. 2018). The priority allocation of public housing continues to be highly targeted to housing the most vulnerable. However, there is recognition of the need for continued investment in the supply of social housing with various states announcing new initiatives such as Communities Plus through the Social and Affordable Housing Fund (SAHF) in NSW, or Homes for Victorians in Victoria. Other states, such as South Australia, have a larger relative share of social and affordable housing and their strategy aims to sustain these levels through its 15 per cent affordable housing policy for residential developments on state government land, and other significant developments.

The focus on targeting high risk groups remains in place in service agreements, including women and children, young people, those leaving care, sleeping rough, repeat service users or those experiencing long-term homelessness, along with increasing recognition of the growing cohort of older people in the private rental system (PRS) at risk of homelessness. Some

jurisdictions have distinct plans for addressing the unique challenges associated with Indigenous homelessness and targeted housing access programs including home ownership. In addition, there is an increased emphasis on linking social and economic participation, particularly for young people, with some states including Victoria and Queensland continuing to pursue Foyer models that provide integrated accommodation, training and education support for young people exiting homelessness. There is also sustained emphasis on removing barriers to employment participation among social housing tenants. Understanding the implications of particular types of living arrangements, including the impact of overcrowding, have now become more central in states such as NSW. This is in addition to the ongoing and priority concern about tackling Indigenous homelessness within the remote regions of NT and central Australia.

Reliance on the private rental sector is still evident, with each state and territory delivering various packages of support to sustain existing tenancies. Support is also provided to assist people exiting homelessness with brokerage funding[2] and head-leasing[3] programs targeting specific population groups, including women escaping family violence. Continuing to build partnerships with the private sector, including real estate agents, remains a priority. Exploration of new funding mechanisms including Social Impact investing is also a priority focus among some states, including a current NSW proposal to prevent people from exiting government institutions into homelessness. The Social Housing Growth Fund in Victoria aims to stimulate new supply by making loan guarantees available to the community housing sector.

1.3.3 Regional and remote initiatives

Programs targeted to those most at risk have, for many years, included resource support for services to address Indigenous homelessness. The National Partnership on Remote Indigenous Housing (NPARIH)—replaced in 2016–2018 by the current federal government with the National Partnership on Remote Housing (NPRH)—was a 10-year agreement (2008–2018) that aimed to increase the supply of housing in remote communities, and undertake much needed maintenance work on existing stock, in order to address overcrowding, homelessness and poor housing conditions in remote communities. Funding was initially provided to all states and territories except the ACT. However, most funds were spent in the states and territories with larger remote populations: the Northern Territory, Western Australia and Queensland. This agreement has had a significant impact on the supply of housing in remote Indigenous communities, which have had acutely high homelessness rates, and made more of the existing stock available for habitation again. The federal government will provide $550 million over five years from 2018–2019 as part of a bilateral agreement with the Northern Territory Government for remote Indigenous housing. This funding will provide property and tenancy management, and address severe overcrowding in remote communities. However, previous funding to Queensland, Western Australia and South Australia ($392.2 million in 2017–2018) for remote Indigenous housing will no longer be ongoing.

Changes in the geography of homelessness over time need to be viewed within the changing policy and programmatic responses. There is a clear recognition and commitment from all levels of government for the need to effectively target and resource homelessness interventions. There is also widespread recognition of the importance of expanding affordable rental housing for those on the lowest incomes. However, the challenge ahead in preventing and ending homelessness, as we explore further in this report, is significant in the context of market volatility and persistent disadvantage that shapes unequal opportunities across cities and

[2] Brokerage funds are made available to select clients to purchase goods and services to achieve positive housing outcomes.

[3] Head leasing is when an organisation leases properties from the private rental market and sub-lets them to their clients.

regions. Understanding the relationship between spatial opportunity structures and homelessness is key to successfully responding to and reducing homelessness. Similarly, a better understanding of the relationship between homelessness and SHS capacity can be used to guide the allocation of additional resources, and create a more efficient specialist homelessness service system.

1.4 Research approach

The project research questions have been addressed through the analysis of a panel dataset consisting of data items drawn from several secondary sources (see below), across four Census years (2001, 2006, 2011 and 2016), and all at a consistent spatial scale.

1.4.1 Defining homelessness

Homelessness is defined in this study using the statistical definition developed by the ABS. This definition emphasises the 'home' in homelessness; home encompasses a sense of security, stability, privacy, safety and the ability to control one's living space. Homelessness is conceptualised as a loss of one or more of these elements and not just about 'rooflessness'. The ABS (2012c) defines someone as homeless if they do not have suitable alternative accommodation and their current living arrangement:

- is in a dwelling that is inadequate, or;
- has no tenure or their initial tenure is short and not extendable,[4] or;
- does not allow them to have control of, and access to, space for social relations.

In order to estimate those persons experiencing homelessness on Census night, the ABS has operationalised this definition by flagging six key operational groups based on living situation:[5]

- Operational group 1: People in improvised dwellings, tents or sleeping out (rough sleeping)
- Operational group 2: People in supported accommodation (includes shelters) for the homeless, or in transitional housing
- Operational group 3: People staying temporarily with other households (including with friends and family)
- Operational group 4: People staying in boarding houses
- Operational group 5: People in other temporary lodging (those with low income reporting 'no usual address' in lodgings such as hotels or motels).
- Operational group 6: People living in severely overcrowded conditions (according to the Canadian National Occupancy Standard [CNOS]).[6]

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[4] Here tenure means legal right to occupy a dwelling—such as holding the title or having a lease. It also includes familial security of tenure such as children living with their parents.

[5] People who live with the constant threat of violence (i.e. family violence) or in dwellings with major structural problems are also considered homeless but cannot be enumerated with Census data. People who are living long-term in caravan parks and those who are in crowded but not severely overcrowded dwellings are considered to be marginally housed and 'at risk' of homelessness but are not considered homeless under the statistical definition.

[6] The Canadian National Occupancy Standard specifies that no more than two persons should share a room with specific clauses about the age and gender of the occupants and couples. Under the CNOS, a dwelling is considered severely overcrowded if four or more bedrooms are needed to accommodate the residents. (For more information, see ABS 2012b: 92.)

The inclusion of overcrowding in aggregate rates of homelessness has generated some controversy in the context of changes to the long-term standing cultural definition of homelessness developed by Chamberlain and MacKenzie (1992). However, overcrowding or 'crowding' as a living arrangement has many determinants, some of which may be culturally mediated, but others may also be due to the difficulties that individuals and households have in gaining access to more suitable and affordable accommodation and dwellings. In this report, the above operational groups are combined and analysed as one measure of homelessness and analysed separately to determine distinct geographical patterns of each group over time.

1.4.2 Spatial unit

The spatial unit of analysis is the ABS-defined, 2016 Statistical Area Level 3 (SA3). The SA3 was selected primarily because it is the smallest spatial unit at which homelessness estimates are consistently available and, importantly, can be disaggregated into the above operational groups.[7] In 2016, there were 358 SA3s in Australia,[8] with populations typically ranging from 30,000 to 130,000. Broadly, SA3s are designed to coincide with areas of economic, social and transport activity. In urban areas, SA3s closely align to an area serviced by a major transport and commercial hub. In regional areas, they represent the areas serviced by regional cities with populations over 20,000 persons; in outer regional and remote areas SA3s are recognised as having a distinct identity, or similar social and economic characteristics (ABS 2018a).

Several low-population and non-spatial SA3s were excluded from the analysis, specifically offshore, shipping and migratory areas; and areas with populations below 100, leaving a total of 334 SA3s in the database.[9] Data from the four consecutive Census years were assembled for each of the 334 SA3s. Where there were spatial unit boundary changes over this time, ABS population weighted correspondence files were used to apportion affected data to the 2016 SA3 areas.

To compare how the relationship between structural factors and homelessness differs between diverse Australian regions, our results are summarised and presented for three broad area types:

- all capital cities (combined)
- major regional cities and areas
- other regional, remote and very remote areas.

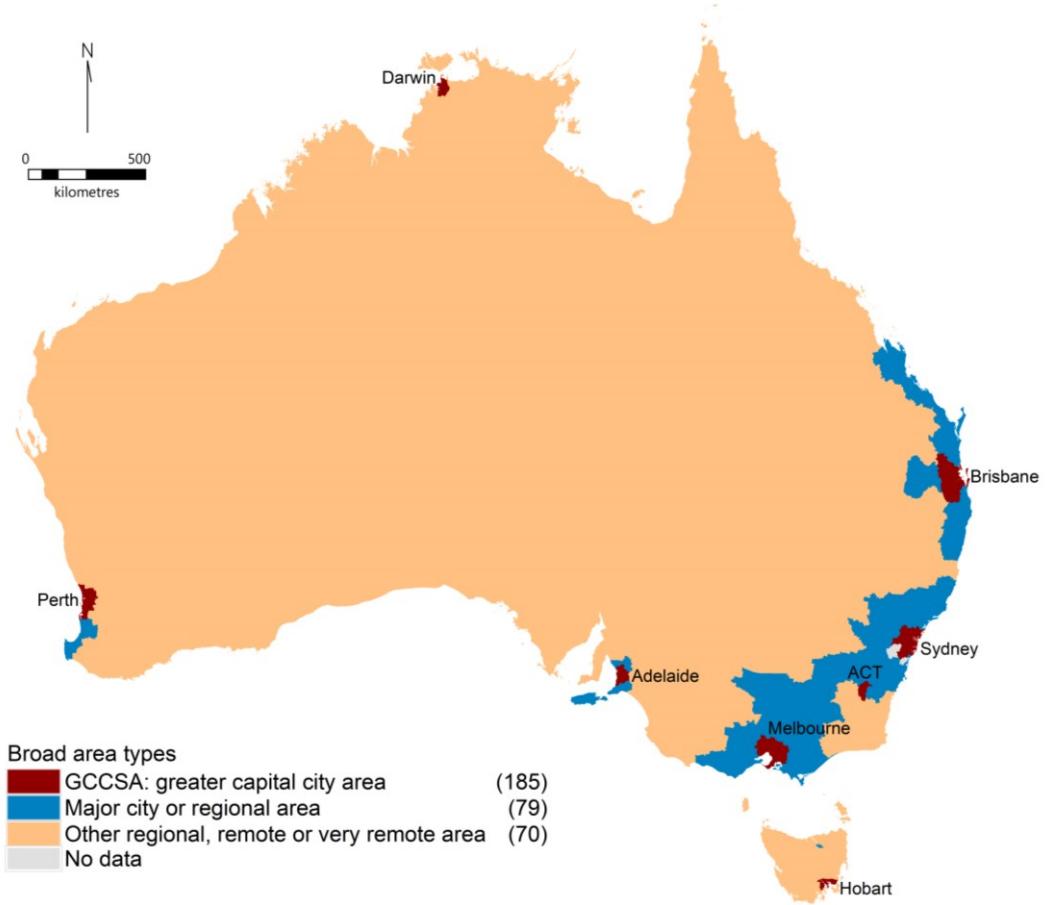
[7] Total homelessness estimates were available at the SA2 level, but a breakdown by operational groups could not be released for most SA2s. This was due to small numbers in some SA2s, giving the potential for individuals or services to be identified. ABS advised that the SA3 geography is the finest level of geography that sufficiently supports estimates of homelessness disaggregated by operational group for all of Australia.

[8] This total includes special purpose, non-spatial SA3s such as migratory, off-shore and shipping codes; no usual address codes for each state/territory; and a number of 'zero' SA3s covering large national park areas with an effective population of zero (ABS 2018).

[9] Including: 90 SA3s in New South Wales, 66 in Victoria, 82 in Queensland, 28 in South Australia, 34 in Western Australia, 15 in Tasmania, 9 in the Northern Territory, and 10 in the Australian Capital Territory.

'Capital cities' are the combination of all state/territory 'Greater Capital City Statistical Areas' (GCCSAs). The SA3s outside the capital cities (those in the 'Balance of State'), were divided in two, based on the ABS Remoteness Area classification—a system that divides 'Australia into five classes of remoteness' based on 'a measure of relative access to services' (ABS 2018b).[10] Figure 1 illustrates how Australia is divided up into these area types for this project.

Figure 1: Three broad area types used in modelling and descriptive analysis



Source: ABS digital Statistical Geography Boundaries 2016 (GCCSA and Remoteness Area boundaries)

1.4.3 Data sources

Detailed variable lists and descriptive statistics are included in Appendix 1 for the data obtained from the following sources.

ABS Census: homelessness estimates

Homelessness estimates were obtained via the ABS website. These estimates are based on a complex enumeration strategy applied to the five yearly Census of Population and Housing, and

[10] Relative remoteness is measured in an objective way using the Accessibility and Remoteness Index of Australia (ARIA+), which is developed by the Hugo Centre for Migration and Population Research at the University of Adelaide. ARIA+ is derived by measuring the road distance from a point to the nearest Urban Centres and Localities in five separate population ranges' (ABS 2018).

provide a 'point in time' count.[11] Further detail of the estimation process is included in Appendix 2. The homeless figures for each year were obtained at the SA3 level as raw number estimates for the total estimated homeless population, and for each operational group.

Using the homelessness estimates from the ABS, we created two key measures of homelessness:

- The rate of homelessness per 10,000 persons in each local region (SA3)
- The national share of the homeless count in each SA3.

The rate of homelessness in an SA3 is calculated by dividing the homeless count by the SA3 population and multiplying by 10,000. This variable is a rate measure and measures the incidence of homelessness at a point in time—the Census date.

Each SA3's share of the national total is calculated by dividing each local region's homeless count by the national homeless count and multiplying by 100 to translate into a percentage. It is a useful variable to help guide the allocation of support services. But it might be argued that neither the rate nor national share measures should be used on their own as a signal for the allocation of resource support to the homeless. The rate indicates where the risk of homelessness is high or low, and the share measure indicates where resources should be placed if they are to target where most of the homeless are located. The two measures are correlated, but not perfectly.

Changes in regions' rates of homelessness are an important aspect of the dynamics of homelessness, as they shape the shifting geography of homelessness. The study uses the percentage change in the rate of homeless (per 10,000) between Census dates in order to explore spatial dynamics. Definitions of these variables and descriptive statistics by year can be found in Appendix 1, Section 1.

ABS Census: Time Series Profile data

Housing, labour market and demographic variables were largely drawn from the publicly available ABS Time Series Profile (TSP) dataset. The TSP provides three consecutive Census years of data for consistent spatial boundaries and variable definitions. The 2011 TSP was utilised, along with 2016 data sourced from 'TableBuilder'—the online ABS tool for accessing Census data. As mentioned, ABS correspondence files were used to apportion data from the 2011 TSP (and hence data from 2001, 2006 and 2011) to 2016 SA3 boundaries. The SA3 is a relatively 'stable' spatial unit and, as such, there were only 11 SA3s from 2011 that required modifying so that their associated data was equivalent to the corresponding 2016 boundaries. Definitions of the TSP variables and descriptive statistics by year can be found in Appendix 1, Section 2.

ABS Census: customised data

Three customised, special-request Census datasets were obtained from the ABS, namely: the number of households in each national household income quintile; SA3 median weekly private rent ($); and count of private rental households by household income quintile and affordable rent category. From these datasets, the following measures were calculated at the SA3 level for each of the four Census years:

- the supply of affordable private rental housing

[11] The prevalence estimates of homelessness cover usual residents in Australia and Other Territories on Census night and do not include: overseas visitors; people who were enumerated in offshore, shipping or migratory regions; and people on an overnight journey by train or bus. http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2049.0Explanatory%20Notes12016?OpenDocument

- the median weekly rent of privately rented properties including a comparison to the broader area rent
- the quintile distribution of household incomes within each SA3.

Further description of these measures is included in the relevant upcoming chapters, and in Appendix 1, Section 3.

AIHW: Specialist Homelessness Services Collection

Specialist Homelessness Services (SHS) are non-government organisations that provide support and accommodation services to people who are homeless or who are at imminent risk of homelessness. All SHS organisations receive government funding under the NHHA and are required to provide service usage data to the Australian Institute of Health and Welfare (AIHW; a national agency) as part of the SHSC. A special request was made to AIHW for four data items from the SHSC:

- Number of persons (including children) within each SA3 who received some form of support (other than accommodation) from an SHS during the 2011–2012 and 2016–2017 financial years
- Number of persons who were accommodated by an SHS in 2011–2012 and 2016–2017.

Key descriptive statistics measure descriptions are included in Appendix 1, Section 4.

1.4.4 Construction and analysis of the panel database

To carry out both the descriptive analysis (Chapter 2 and Chapter 3) and modelling analysis (Chapter 4), we created a wide file combining all four data sources: the homelessness data from the ABS with demographic information obtained from the Census, as well as homelessness services data obtained from AIHW. Variables were merged on the SA3 (local region) region code—a unique identifier across the data sources—and this was done contemporaneously for all years. Therefore, the final dataset for each of the 334 SA3s included its corresponding demographic profile, homelessness count and homelessness service availability for each of the Census years (2001, 2006, 2011 and 2016)—resulting in 1336 observations. Both wide and long file versions of the dataset were created. Spatial information for SA3s was taken from a shapefile provided by the ABS and merged with the long file version of the dataset to enable the spatial modelling to be undertaken.

In answering the first two research questions, we undertake a descriptive and mapping analysis of the changing rates of homelessness over a 15-year period between 2001 and 2016 across capital city, regional and remote areas of Australia. This analysis is supplemented with statistical techniques including shift-share analysis, concentration ratios, measures of sigma convergence and mismatch. Further detail of each approach is discussed in Chapter 2 and Chapter 3, alongside relevant findings.

In responding to the third research question, spatial econometric modelling methods were employed. We estimate Spatial Autoregressive (SAR) models with random effects to account for the spatial clustering of the dataset across geographical areas and from repeated observations over time. A more detailed account of the modelling method appears in Chapter 4.

1.4.5 Summary and structure of the report

Although homelessness persists, its growth—as we outline in Chapter 2 and Chapter 3—has been uneven across Australian cities and regions over the past 15 years. In this chapter we outline the conceptual framework of ‘spatial opportunity structures’ as a way of investigating how the changing geography of homelessness aligns with the geographical changes in areas more broadly, with a particular focus on the growing spatial polarisation of housing and labour markets. We also outlined some of the current key policy directions in attempting to curb rising

rates of homelessness, including the growing recognition of the significance of the provision of affordable housing supply in conjunction with individualised packages of support targeted to those most vulnerable to homelessness. In Chapter 4 we draw on spatial economic methods to identify the strength and significance of area-based attributes in predicting elevated rates of homelessness within the spatial opportunity structures of capital cities, and regional and remote areas of Australia. We conclude in Chapter 5 with a discussion of the policy implications of our findings.

2 Exploring the geography of homelessness in Australia: 2001–2016

- In this chapter we examine changing rates and shares that capture different aspects of homelessness. A region's share of the national homelessness count reveals where most of the homeless are located. The rate of homelessness reveals the prevalence of homelessness in an area after accounting for population size.
- The national per capita rate of homelessness has been more or less stable 2001–2016, but the count measure of homelessness has increased by more than 20 per cent over this timeframe.
- Homelessness on a per capita basis remains highest in very remote areas but is becoming more dispersed nationally, with concentrations in major cities growing over time—particularly in the most populous states of NSW and Victoria. By 2016, capital cities accounted for just under two-thirds of all homelessness nationally.
- Geographical shifts in the location of rough sleepers and those homeless because of severe overcrowding are the most important components steering the urbanisation result. Homelessness remains moderately spatially concentrated, but it is slowly becoming more dispersed over time.
- The increase in rough sleepers and severe overcrowding in major cities, which is accompanying changes in homelessness rates between 2001 and 2016, appear to be largely due to factors specific to areas—such as local housing and labour market conditions, structural change in local economies, and demographic profiles—with little of the change accounted for by the mix of operational groups in an area, or overall national trends.
- Together, these findings suggest that the importance of drivers of homelessness may differ between types of areas—capital city, regional cities and other regional and remote areas—and that insights gained from an analysis of spatial variation in rates of homelessness are important to understanding the changing geography of homelessness over time.

Uneven access to employment, housing and service opportunities assume spatial forms that intensify social disadvantage and advantage (Baum and Mitchell 2008; Baum and Gleeson 2010). Previously, Wood, Batterham et al. (2014; 2015) demonstrated that homelessness is also spatially concentrated and hence unevenly distributed across geographical locations. Labour market conditions vary across regions due to the uneven distribution of industry across locations, as well as segmentation in housing markets that concentrate low-income, unskilled workers in areas where housing is typically more affordable (Nygaard, Wood et al. 2005; Yates, Randolph et al. 2006). In the past two decades, rental and purchased housing have been spatially restructuring across urban, regional and rural towns, altering how housing is supplied and occupied in a way that is likely to continue to impact upon the changing geography of homelessness, including how individuals are able to exit homelessness. The question of whether low-income individuals and households are forced to relocate in search of, or become

contained in, areas with affordable housing away from central business district (CBD) locations as areas become more spatially polarised over time has been a central theme in mobility and area-based disadvantage research (Baker, Bentley et al. 2016; Bill and Mitchell 2005; Cheshire, Pawson et al. 2014; Hulse and Pinnegar 2015; Parkinson, James et al. 2018; Parkinson, Ong et al. 2014; Randolph and Tice 2017; Vinson, Rawsthorne et al. 2015; Whelan and Parkinson 2017; Wulff and Reynolds 2010).

In examining long-term area-based disadvantage, Vinson, Rawsthorne et al. (2015) use a nested mean method to show that there is a high degree of consistency in the areas that are the most disadvantaged over time from 1999 to 2014. Regional, rural areas and fringe areas on the edges of cities continue to rank among the most cumulatively disadvantaged over time. Despite being relatively more affordable than inner urban areas, more disadvantaged areas may precipitate increased risks of homelessness, including overcrowding. Regional, rural and outer areas of capital cities are plagued by the difficulties associated with comparatively high rates of unemployment, especially long-term unemployment that can further compound individual vulnerability (Baum and Mitchell 2008). Specifically examining individuals with experience of homelessness using 'Journeys Home' data, Bevitt et al. (2015) found that, conditional on moving, individuals who moved to areas with higher unemployment or lower rents tend to have higher rates of homelessness than those moving in the opposite direction. Although more mobile than other groups, unemployed individuals can become spatially contained as their moves are more likely be prompted by financial stress or arrears rather than the search for employment in different regions (Whelan and Parkinson 2017).

These spatial differences offer an opportunity to explore the relationship between aggregate rates of homelessness and broader structural spatial change. In this chapter, we begin to answer the first research question of how the incidence of homelessness and its components vary within and between regions, states and territories, and whether homelessness is becoming more or less spatially concentrated. We begin by documenting and mapping the changing geography of homelessness in Australia across four Census periods spanning 15 years. After this, we examine changes over time between states and territories followed by remoteness areas. We draw on two measures to examine change in area-based homelessness within this period:

- The first measure is the *share* of homelessness, which reveals where most homelessness is located—and is of particular assistance in planning resource allocation.
- The second measure is the *rate* of homelessness, which reveals the prevalence of homelessness in an area after accounting for population size.

We then delve further into the figures with statistical tests of spatial convergence versus divergence and a shift-share analysis to reveal whether the changing geography of homelessness is driven by national changes, compositional changes of different operational groups or due to regional factors such as labour and housing markets and services.

2.1 Area-based shares of national homelessness 2001–2016

Table 1 examines the change in shares of homelessness between 2001 and 2016 for each state and territory. Homelessness and population counts are presented as a share of national homelessness, and as a share of the national population, respectively; these shares are listed in each Census year. Such comparisons enable the identification of regions where homelessness is over-represented (or under-represented) compared with overall population levels. As shown, the largest share of homelessness in 2016 was in New South Wales, followed by Victoria and Queensland—a pattern in line with overall population distribution. While New South Wales has consistently had the largest homeless share over the 15-year period, Victoria's homeless share surpassed that of Queensland in 2011 and 2016 to have the second

highest share. What is also striking about NSW is the increase in its share of national homelessness—from roughly one-quarter to one-third over 15 years. Most of this share is located in Greater Sydney. Most of the smaller states and territories have a falling *share* of the national count. In both the Northern Territory and Western Australia there is a sharp decline.

But the most conspicuous pattern is evident when comparing each state capital's share of national homelessness with corresponding balance of state shares. Every state capital, and especially Sydney and Melbourne, has lifted its *share* of national homelessness. Every balance of state area accounts for a falling *share* of national homelessness. In Sydney and Melbourne, the surge in the homeless count is at a rate exceeding population growth. These patterns are responsible for an increasingly urbanised Australian homelessness profile.

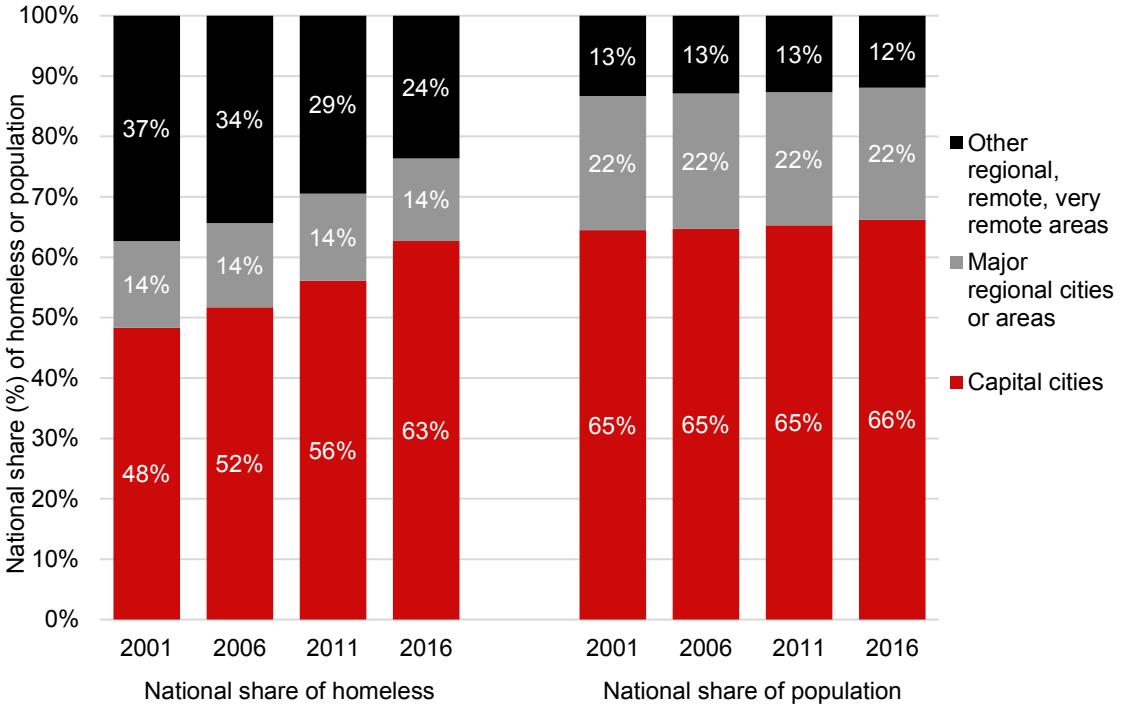
Table 1: Share of national homelessness and national population by state/territory region: 2001, 2006, 2011 and 2016

Region	2001		2006		2011		2016	
	Share of homeless	Share of pop.	Share of homeless	Share of pop.	Share of homeless	Share of pop.	Share of homeless	Share of pop.
Sydney	16.1	21.0	17.1	20.7	19.3	20.4	24.9	20.6
Rest of NSW	8.1	12.6	7.6	12.2	7.6	11.7	7.5	11.3
NSW total	**24.2**	**33.6**	**24.7**	**32.9**	**26.8**	**32.1**	**32.4**	**31.9**
Melbourne	14.5	18.0	15.2	18.2	17.7	18.5	17.6	19.1
Rest of VIC	4.5	6.5	4.1	6.4	4.0	6.2	3.7	6.0
VIC total	**19.0**	**24.6**	**19.4**	**24.6**	**21.7**	**24.7**	**21.3**	**25.1**
Brisbane	6.7	8.9	7.3	9.3	6.9	9.6	8.0	9.6
Rest of QLD	13.6	10.2	13.7	10.7	11.7	10.8	10.6	10.7
QLD total	**20.3**	**19.1**	**21.0**	**20.0**	**18.6**	**20.4**	**18.7**	**20.3**
Adelaide	3.4	5.9	4.2	5.8	4.0	5.7	4.0	5.5
Rest of SA	2.7	1.9	2.0	1.8	1.7	1.7	1.3	1.6
SA total	**6.1**	**7.8**	**6.2**	**7.6**	**5.7**	**7.4**	**5.3**	**7.1**
Perth	4.2	7.4	4.4	7.5	4.6	7.9	4.6	8.2
Rest of WA	6.1	2.4	4.8	2.4	4.4	2.5	3.2	2.4
WA total	**10.3**	**9.8**	**9.2**	**9.9**	**9.0**	**10.5**	**7.7**	**10.6**
Hobart	0.5	1.0	0.5	1.0	0.7	1.0	0.7	0.9
Rest of TAS	0.8	1.4	0.8	1.4	0.8	1.3	0.7	1.2
TAS total	**1.3**	**2.4**	**1.3**	**2.4**	**1.5**	**2.3**	**1.4**	**2.1**
Darwin	1.9	0.6	1.8	0.6	1.2	0.6	1.5	0.6
Rest of NT	15.9	0.5	15.2	0.5	13.7	0.5	10.3	0.4
NT total	**17.8**	**1.1**	**17.0**	**1.1**	**15.0**	**1.1**	**11.8**	**1.1**
ACT	**1.0**	**1.6**	**1.1**	**1.6**	**1.7**	**1.7**	**1.4**	**1.7**
Australia	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Authors' panel dataset (ABS Census homelessness estimates and TSP).

Figure 2 compares changes in the national shares of homelessness with changes in the national share of the population for capital cities, regional and remote areas between 2001 and 2016. This figure provides a visually striking illustration of the changing geography of homelessness. In 2001, capital cities accounted for 48 per cent of national homelessness, well below their share of the national population (at 65%). However, by 2016, the national share for capital cities had increased to 63 per cent, or nearly two-thirds of all homelessness. Yet their share of the national population edged up by only one percentage point to 66 per cent. It is remote and very remote Australian regions that have an offsetting decline in their share of national homelessness—from 37 per cent in 2001, to 24 per cent in 2016—despite their total population being a more or less static share of the national population.

Figure 2: National shares (%) of homeless persons and population by area type: 2001, 2006, 2011 and 2016



Source: Authors' panel dataset (ABS Census homelessness estimates and TSP).

2.2 Area-based rates of homelessness per 10,000 persons: 2001–2016

We now compare the distribution and changing dynamics of area-based rates of homelessness across states and territories over the 15-year period. Table 2 and the map in Figure 3 show the enormous differences in rates of homelessness across Australian states, territories, capital cities and balance of state areas. In the most recent Census of 2016, rates within the Northern Territory, for example, remain the highest across the country at 549 per 10,000 persons—around 17 times the low of 32 per 10,000 in Tasmania, or 11 times higher than NSW with a rate of 50 per 10,000 persons. Although we can see in Table 2 that national rates of homelessness exhibited a modest fall from a high of 50.8 in 2001 to a low of 45.2 in 2006, by 2016 they had edged back up to a rate of 50 per 10,000 persons. Importantly, this more or less unchanged rate over the study timeframe translates into a 21,000 (22.1%) increase in the total count of individuals experiencing homelessness.

When comparing rates of homelessness across states and territories over time, the pattern is far from uniform. Since 2006, the most populous states of New South Wales and Victoria—which accommodate Australia's two largest cities—have witnessed strong growth in rates of homelessness. However, we have also witnessed consistent growth in the smaller state of Tasmania since 2006. In states such as South Australia, or in the more dispersed and remote populations of Western Australian and Northern Territory, rates of homelessness have typically declined in all intercensal periods. This decline over the 15-year period has been most marked in the Northern Territory, but on a per capita basis it still retains the highest rates across the country. In Queensland, rates declined until 2011 but then started increasing in the intercensal period 2011–2016.

Comparisons across capital cities relative to non-capital city or 'balance of state' areas also reveal interesting temporal trends. Homelessness rates for capital cities have increased between 2001 and 2016 such that rates now exceed 2001 levels in all capital cities except Perth and Darwin, although rates have begun to increase once more in Darwin in the latest Census. Rates show a clear decline in most balance of state areas, including those in Victoria, South Australia, Queensland, Western Australia and the Northern Territory. Rates fluctuated in balance of state regions of New South Wales and Tasmania. The large differences in rates across areas in Australia suggest that area-based factors, such as housing markets and demographic change, might be important in shaping the changing geography of homelessness.

Table 2: Number and rate of homeless persons by state/territory region: 2001, 2006, 2011 and 2016

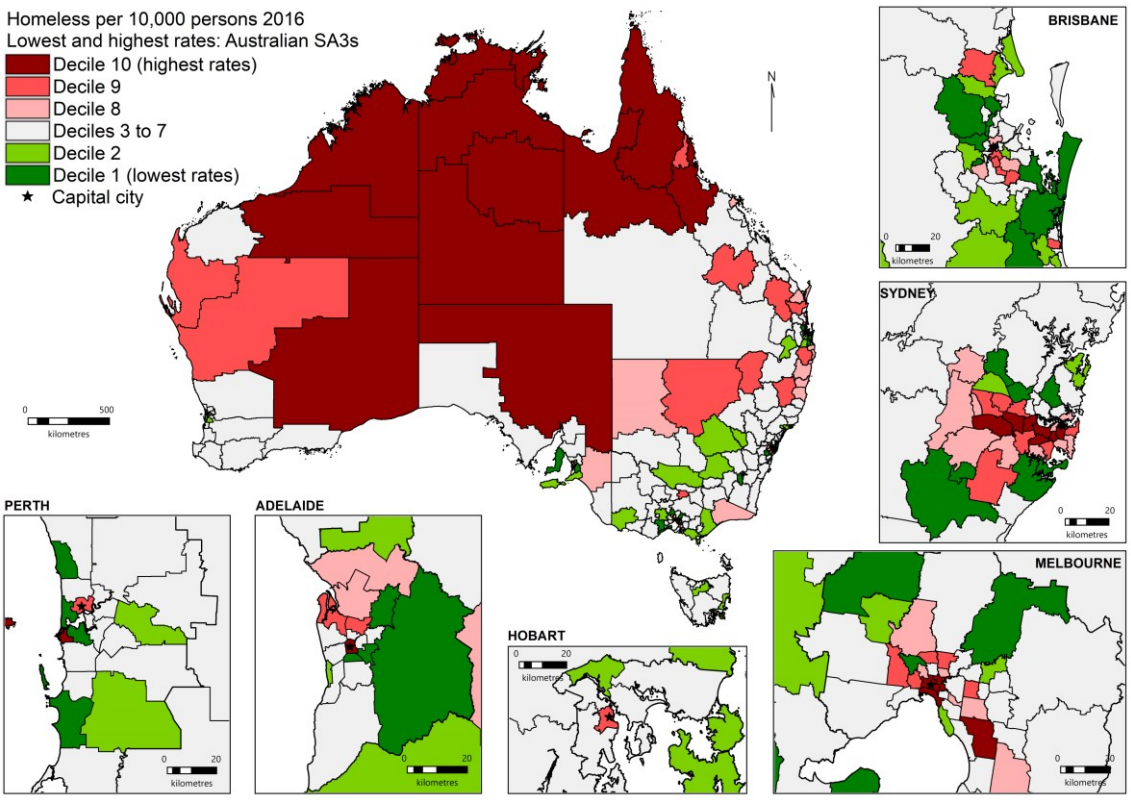
Region	2001		2006		2011		2016	
	Rate per 10,000	N	Rate per 10,000	N	Rate per 10,000	N	Rate per 10,000	N
Sydney	38.9	15,364	37.5	15,378	45.1	19,735	60.2	28,978
Rest of NSW	32.5	7,677	28.1	6,829	30.7	7,737	32.9	8,711
NSW total	**36.5**	**23,041**	**34.0**	**22,207**	**39.8**	**27,472**	**50.5**	**37,689**
Melbourne	40.9	13,857	37.8	13,681	45.5	18,108	46.0	20,518
Rest of VIC	35.0	4,297	29.4	3,721	31.2	4,144	30.5	4,308
VIC total	**39.4**	**18,154**	**35.7**	**17,402**	**41.9**	**22,252**	**42.3**	**24,826**
Brisbane	38.1	6,357	35.5	6,570	34.3	7,065	41.5	9,337
Rest of QLD	67.7	12,959	58.0	12,309	51.6	12,013	49.4	12,373
QLD total	**53.9**	**19,316**	**47.5**	**18,879**	**43.5**	**19,078**	**45.6**	**21,710**
Adelaide	29.4	3,259	32.9	3,771	33.7	4,099	36.1	4,634
Rest of SA	74.3	2,585	51.6	1,829	47.4	1,745	41.4	1,563
SA total	**40.1**	**5,844**	**37.3**	**5,600**	**36.9**	**5,844**	**37.3**	**6,197**
Perth	29.1	4,008	26.6	3,975	27.7	4,716	27.7	5,300
Rest of WA	128.5	5,791	91.3	4,283	82.1	4,479	65.0	3,714
WA total	**53.5**	**9,799**	**42.1**	**8,258**	**40.9**	**9,195**	**36.3**	**9,014**
Hobart	26.1	498	22.4	446	34.9	729	38.6	848
Rest of TAS	29.1	766	26.0	702	28.6	793	27.3	768
TAS total	**27.8**	**1,264**	**24.5**	**1,148**	**31.3**	**1,522**	**32.3**	**1,616**
Darwin	166.6	1,774	140.6	1,613	99.5	1,267	119.3	1,757
Rest of NT	1,611.6	15,174	1,437.5	13,668	1,402.5	14,071	1,165.6	11,955
NT total	**844.7**	**16,948**	**728.4**	**15,281**	**673.6**	**15,338**	**548.8**	**13,712**
ACT	**30.5**	**943**	**29.5**	**958**	**48.7**	**1,738**	**40.1**	**1,586**
Australia	**50.8**	**95,309**	**45.2**	**89,733**	**47.7**	**102,439**	**49.8**	**116,350**

Source: Authors' panel dataset (ABS Census homelessness estimates and TSP).

In Figure 3, SA3 regions are classified into ten equal groups (or deciles) based on their rate of homelessness in 2016. Clearly, the remote areas in Western Australia, Queensland, South Australia and (all of) the Northern Territory were dominated by the very highest rates of homelessness. The capital city maps show more diversity in rates, and all cities (apart from Hobart) had at least one SA3 in the top decile of national homeless rates. A consistent pattern across the capital cities is the high rate of homelessness in CBD and adjacent areas. However,

moderate to high rates of homelessness are also dispersed across the metropolitan areas, particularly in Sydney and Melbourne. In Sydney, a corridor of SA3s stretches from the Inner City westward, through suburbs such as Marrickville, Canterbury, Strathfield, Auburn and Fairfield (more than 30 km from the CBD), with homeless rates in all these areas in the highest national decile. In Melbourne, the SA3 of Dandenong is around 25 km south-east of the CBD and also had a homeless rate in the top national decile. Areas such as Maribyrnong and Brimbank to the west of the city centre, Moreland and Darebin to the north and Whitehorse, about 15 km to the east of the CBD, also had high rates of homelessness in 2016.

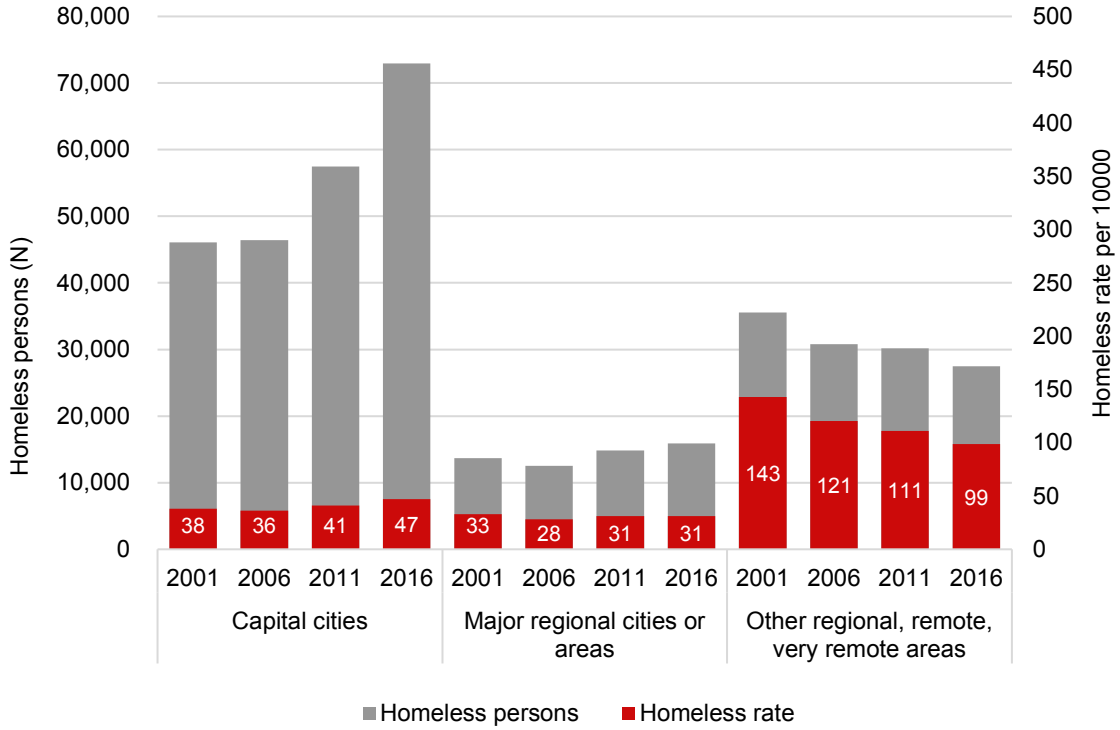
Figure 3: Rates of homeless in Australian SA3s, 2016



Source: Authors' panel dataset (ABS Census homelessness estimates and TSP); ABS digital Statistical Geography Boundaries, SA3, 2016.

Figure 4 depicts the shift in rates relative to total counts of homelessness. We see that although rates are higher in remote areas, albeit steadily declining over time, the largest counts of homelessness are in our capital cities. The most rapid jump in numbers of homelessness in capital cities occurred in the most recent intercensal period between 2011 and 2016.

Figure 4: Number and rate of homeless by area type: 2001, 2006, 2011 and 2016

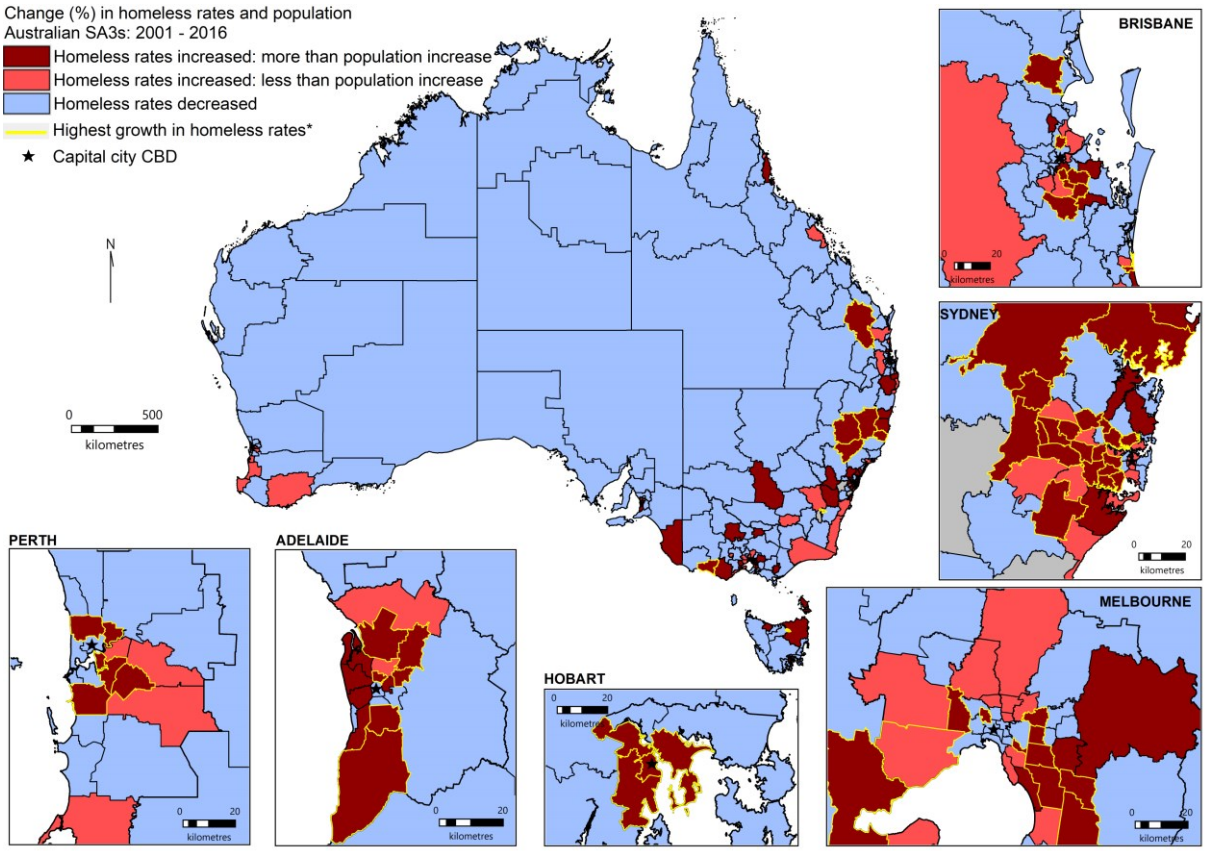


Source: Authors' panel dataset (ABS Census homelessness estimates and TSP).

Figure 5 maps change in homelessness rates and how these compare to the change in population growth across SA3s between 2001 and 2016. The areas are classified into three categories: those where rates of homelessness increased faster than the rate of population growth; those where homeless rates increased but more slowly than the population increase; and those where homeless rates decreased (2001–2016). The areas with the highest growth rates of homelessness are further highlighted. Most obvious in Figure 5 is that rates of homelessness declined in all remote areas and much of regional Australia between 2001 and 2016. Nonetheless, as the previous graph in Figure 4 showed, despite this decline, many of these areas still had the highest rates of homelessness in 2016. The capital city maps in Figure 5 reveal an interesting pattern for Perth, Adelaide and Melbourne (and, to some extent, Brisbane). There was a decline in homeless rates in the CBD and adjacent inner areas—the core suburbs—of these cities over the 15 years, and a corresponding increase in homeless rates in those areas further from the CBD. In many areas, this increase was more rapid than overall population growth.

This rapid increase in homelessness in middle to outer suburbs is evident in all capital cities, regardless of the change that occurred in the core SA3s. Homelessness in the smaller cities of Adelaide and Hobart grew disproportionately throughout most of their metropolitan areas, and numerous middle to outer SA3s in Perth and Brisbane also saw such growth. In Melbourne, growth in homeless rates above that of population occurred in areas between 25 km and 40 km southeast of the CBD (Dandenong, Casey North and Casey South) ,and also in the well-established middle to outer eastern regions of Manningham, Whitehorse and Monash. But it was in the largest Australian city of Sydney that the most concentrated increase in homelessness rates occurred during 2001–2016. In only 13 of Sydney's 46 SA3s did homeless rates decrease, and in the majority of the remaining SA3s, homeless rates increased at a greater pace than overall population. Such change occurred in areas close to the city centre (e.g. Strathfield, Canterbury and Kogarah) and through contiguous SA3s extending west to the fringe (e.g. in Penrith and Richmond, around 45–50 km from the CBD).

Figure 5: Change in homeless rate compared with population growth: Australian SA3s, 2001–2016



**The 'highest growth in homeless rates' is in those SA3s where homeless rates increased by 40 per cent or more 2001–2016 (the top two deciles for homeless rate growth).*

Source: Authors' panel dataset (ABS Census homelessness estimates and TSP); ABS digital Statistical Geography Boundaries, SA3, 2016.

2.3 Homelessness operational groups

Homelessness, as defined by the ABS and outlined earlier in Chapter 1, is comprised of six operational groups. While we note that individuals can and do move through different types of homelessness, point-in-time estimates of changes in one particular dimension of homelessness over another offer important insights into how homelessness can be resolved in a particular location. As such, changes in the rates of these operational groups are examined next. The detailed tables for each operational group by area type are provided in Appendix 3. Table 3 examines changes in the share and rate of homelessness per 10,000 persons for each operational group over the timeframe 2001–2016.

Table 3: Count, national share and rate (per 10,000 persons) of each ABS Homelessness Operational Group by year

	2001			2006			2011			2016		
	No.	%	Rate	No.	%	Rate	No.	%	Rate	No.	%	Rate
Persons living in improvised dwellings, tents, or sleeping out	8,946	9	4.8	7,247	8	3.7	6,810	7	3.2	8,200	7	3.5
Persons in supported accomm. for the homeless	13,420	14	7.2	17,329	19	8.7	21,258	21	9.9	21,235	18	9.1
Persons staying temporarily with other households	17,880	19	9.5	17,663	20	8.9	17,374	17	8.1	17,725	15	7.6
Persons living in boarding houses	21,300	22	11.4	15,460	17	7.8	14,944	15	6.9	17,503	15	7.5
Persons in other temporary lodgings	338	0	0.2	500	1	0.3	682	1	0.3	678	1	0.3
Persons living in severely crowded dwellings	33,430	35	17.8	31,531	35	15.9	41,370	40	19.2	51,088	44	21.8
All homeless persons	95,314	100	50.8	89,728	100	45.2	102,439	100	47.6	116,427	100	49.8

Source: ABS (2018c), Table 1.1 HOMELESS PERSONS, Selected characteristics, 2001, 2006, 2011 and 2016.

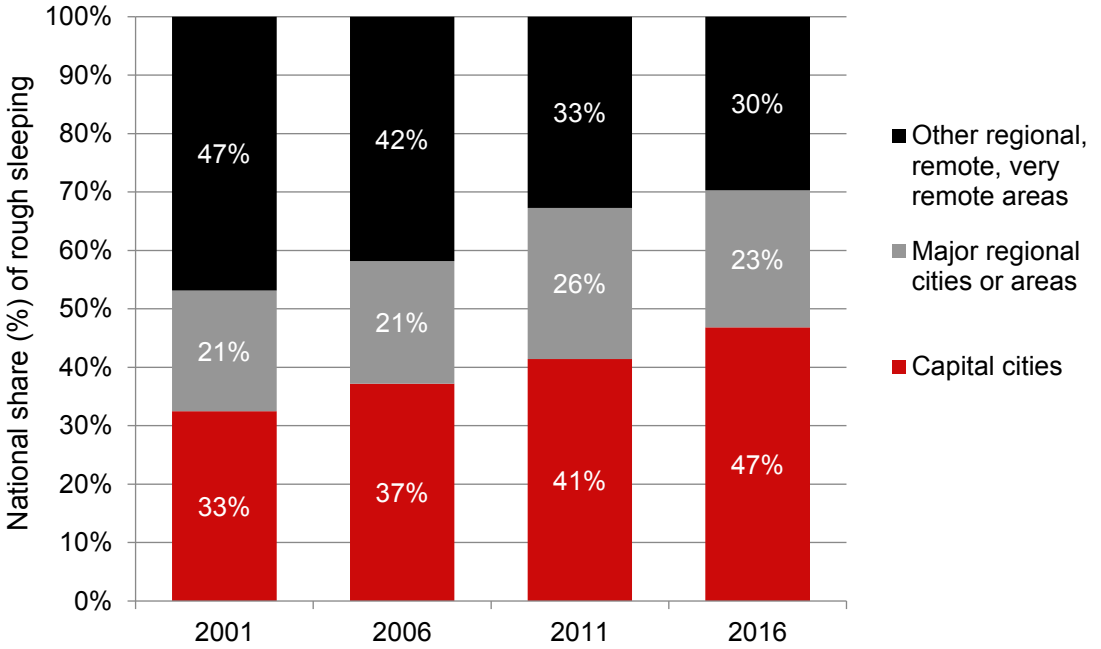
The most striking change, particularly in the last two census periods, is the increase in the share of people in severely crowded dwellings, as a percentage of total homelessness and as a rate per 10,000 persons. By 2016 severe crowding accounted for 44 per cent of all homelessness. Severe overcrowding has increased so rapidly that the Australia-wide count is now a little over 50 per cent higher than in 2001. People living in boarding houses was the second most prominent operational group in 2001, followed by people staying temporarily with other households. However by 2016, persons staying in supported accommodation for the homeless had overtaken both of these other homeless types.

While rough sleeping—persons living in improvised dwellings, tents or those sleeping out—are the most visible form of homelessness to the public, they represent only a small fraction of national homelessness (7% in 2016), and this share has declined slightly since 2001. At the national level, rough sleeping has also declined using the per capita measure. These national trends vary substantially by state and territory and remoteness area. Indeed, below the national level there have been substantial shifts in the distribution of both severe crowding and rough sleeping—as described below.

Comparing changing patterns among operational groups across capital cities, regional and remote areas reveal important changes over time. Here we focus on the two groups where area-based changes have been most profound. First, commencing with the share of rough

sleeping, Figure 6 shows that the share of rough sleeping, while decreasing nationally, has become increasingly concentrated in capital cities. In 2001, roughly one-third of rough sleepers were located in capital cities, but in 2016 the share of rough sleepers in capital cities had reached nearly one-half of all rough sleepers. Rough sleeping has been transformed from a remote phenomenon to an urban phenomenon in the 15 years to 2016.

Figure 6: Share of rough sleeping by area type, 2001–2016

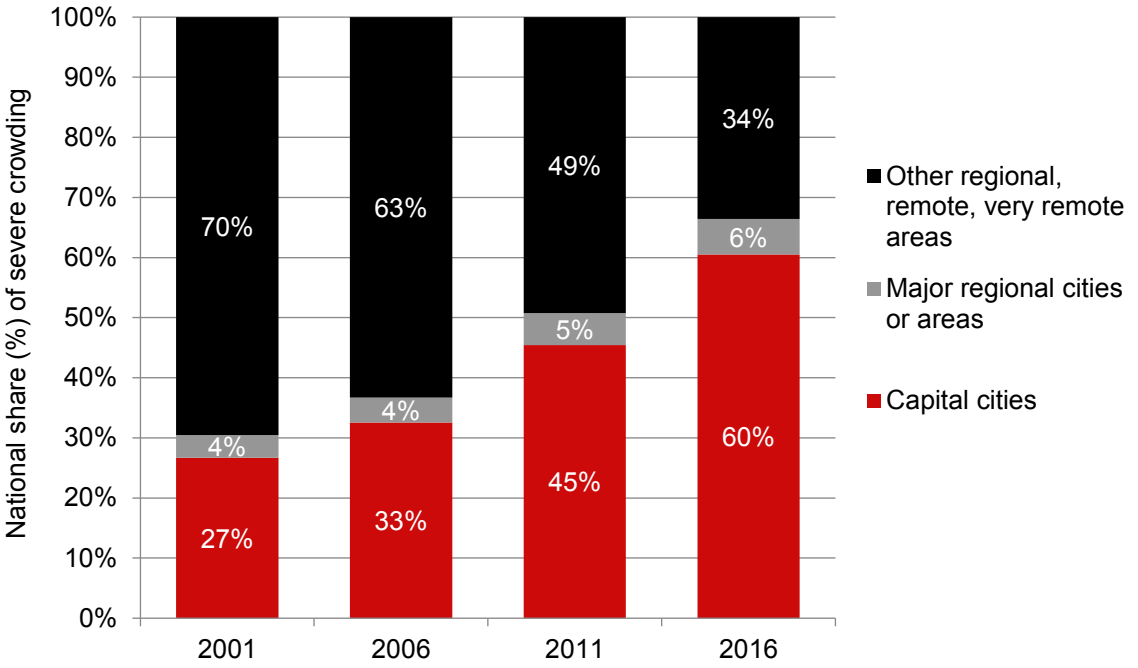


Source: Authors' panel dataset (ABS Census homelessness estimates).

Yet despite rough sleepers' growing urban profile and plummeting rates in remote areas over time, examination of the 2016 rate of rough sleeping shows that it remains most prevalent in remote areas of Australia on a per capita basis. Moreover, the sharp decline in very remote regions between 2001 and 2011 was abruptly reversed in 2016 (see Table A.13 in Appendix 3).

The share of overcrowding, like sleeping rough, has also become more urbanised over time but the change is much more dramatic. Figure 7 shows that 'other regional and remote' areas held 70 per cent of those experiencing severe crowding in 2001. Yet in the 15 years to 2016, that share was halved (to 34%) and the capital city areas became the location with the largest share of overcrowding, rising from 27 per cent in 2001 to 60 per cent in 2016. In a short 15-year period, the spatial character of overcrowding has been transformed from one largely confined to regional and remote areas, to one dominated by urban regions.

Figure 7: Share of severe crowding by area type, 2001–2016



Source: Authors' panel dataset (ABS Census homelessness estimates).

Despite the rapid increase in the share of severe crowding in capital cities, when expressed as a per capita rate, severe crowding still remains far more prevalent in 'other regional, remote and very remote areas' (see Table A.13 in Appendix 3).

Nonetheless, given the rapid population growth in our major cities over the study timeframe, the more than two-fold increase in the per capita rate for major cities is striking. Severe crowding, in particular, is symptomatic of housing market pressures and we explore this theme further in Chapter 3 and Chapter 4. It is likely that some reductions in remote areas could be due, in part, to the increase in remote Indigenous housing driven by the NPARIH. However, the decline in rates of 'overcrowding' homelessness preceded the introduction of NPARIH in 2008, suggesting that other factors were also driving this change prior to its implementation.

Shift-share analysis

Examination of changes in the geography of different forms of homelessness over time suggests that the changes in severe crowding and rough sleeping may be important in understanding the changing geography of homelessness in Australia. Indeed, O'Donnell's (2016) work implies that the geography of homelessness in Sydney is driven by the location of different operational groups. In order to explore this further, we follow Wood, Batterham et al. (2014) and employ shift-share analysis. This analysis breaks down the change in homelessness counts or rates between 2001 and 2016 into three components: the share that is due to national trends (which might be caused by national factors such as recessions); the share that is due to the mix of different operational groups (dubbed 'homeless mix'); and the share that is due to other area-specific or region-specific factors. These other area-based factors could include, for example: housing and labour market conditions, local service capacity or demographic factors.

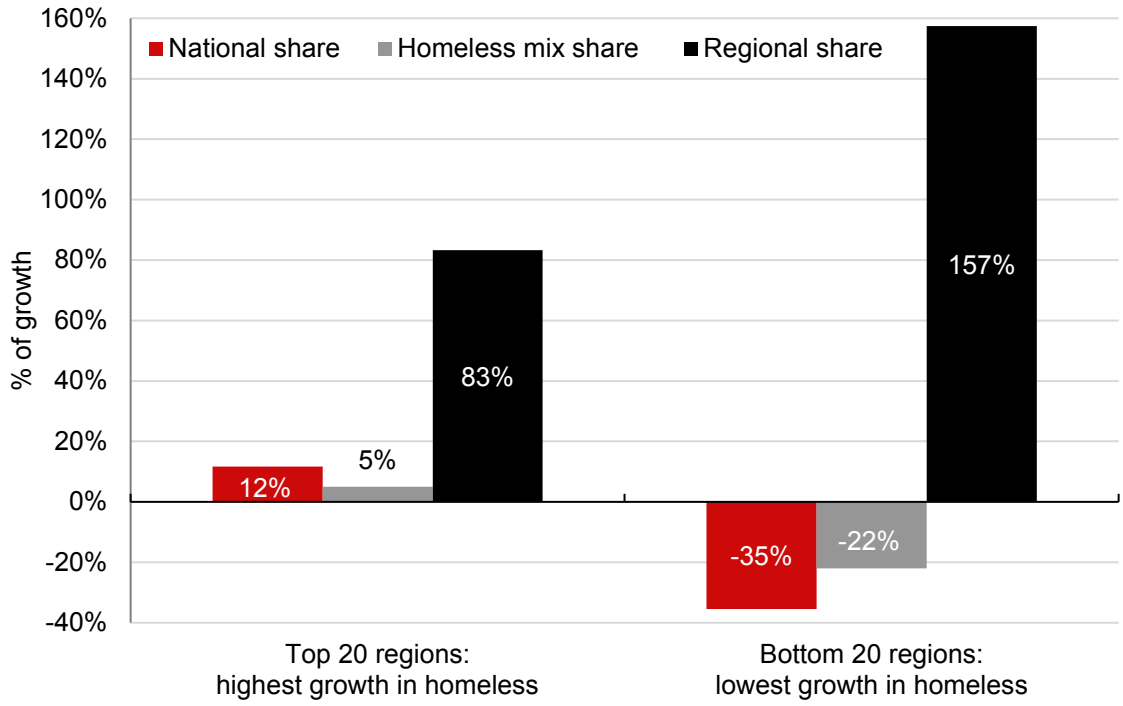
We run the shift-share analysis using the raw count of people experiencing homelessness. Formulas for this analysis are shown in Appendix 4.[12]

It is not feasible to report results for each of the 334 SA3s in the database. As such, SA3s were ranked according to their growth in homelessness between 2001 and 2016. The 20 SA3s with the highest growth in homelessness, and the 20 SA3s with the slowest growth in homelessness, were selected and aggregated into two groups. This allows us to gauge the impact of our three shift-share components of growth for those areas where homelessness has risen the most steeply and declined most steeply. The change in homelessness between 2001 and 2016 in these two groupings could be due to their initial composition of homelessness. Severe crowding and supported accommodation are growing more rapidly nationally, and so those areas that initially had relatively high (low) representation of these categories will experience a relatively high (low) growth in total homelessness. If this effect is important, the homeless mix component should account for a large share of 2001–2016 change in the total homeless count measure. On the other hand, area-specific factors could cause each component's growth at the area level to diverge from each component's growth at the national level. If so, the area-based component will account for a large share.

Figure 8 below reports the growth in homelessness counts between 2001 and 2016 decomposed into: the national share, homeless mix share and area-based share. The values reported are the percentage of national increase in homelessness numbers that is attributable to each of these three components. Tables with the raw numbers and percentages are shown in Appendix 4. These tables show that in areas where homelessness grew the fastest and the slowest, the area-based share is most important (at 83% and 157% respectively)—that is, differences in the characteristics of areas such as housing markets, policy interventions, service capacity or demographic profiles are the most important factors driving geographical differences in the growth rates of homelessness. We know from earlier analyses that homelessness rates have fallen in remote and very remote areas, and so they will be well represented in the low growth category of the shift-share analysis. We also know increases in homelessness have been more apparent in major urban or capital city locations, and so they will be well represented in the high growth category of the shift-share analysis. The shift-share analysis, therefore, suggests that area-based factors specific to these remote and city locations are primarily driving the change in homelessness counts. These area-based factors may be distinct across locations. For example, it could be demographic profiles in one location and housing market conditions in another shaping the changing geography of homelessness.

[12] Please note that some operational group data was missing in 2001, as it was suppressed by the ABS for confidentiality reasons. For this analysis, we excluded SA3s with missing or suppressed data, leaving 214 SA3s for analysis. The top and bottom SA3s were selected from those with complete data. A number of operational groups also had a count of zero in either 2001 or 2016. In these cases, we adjusted zero values to 0.01 in order for the analysis to proceed.

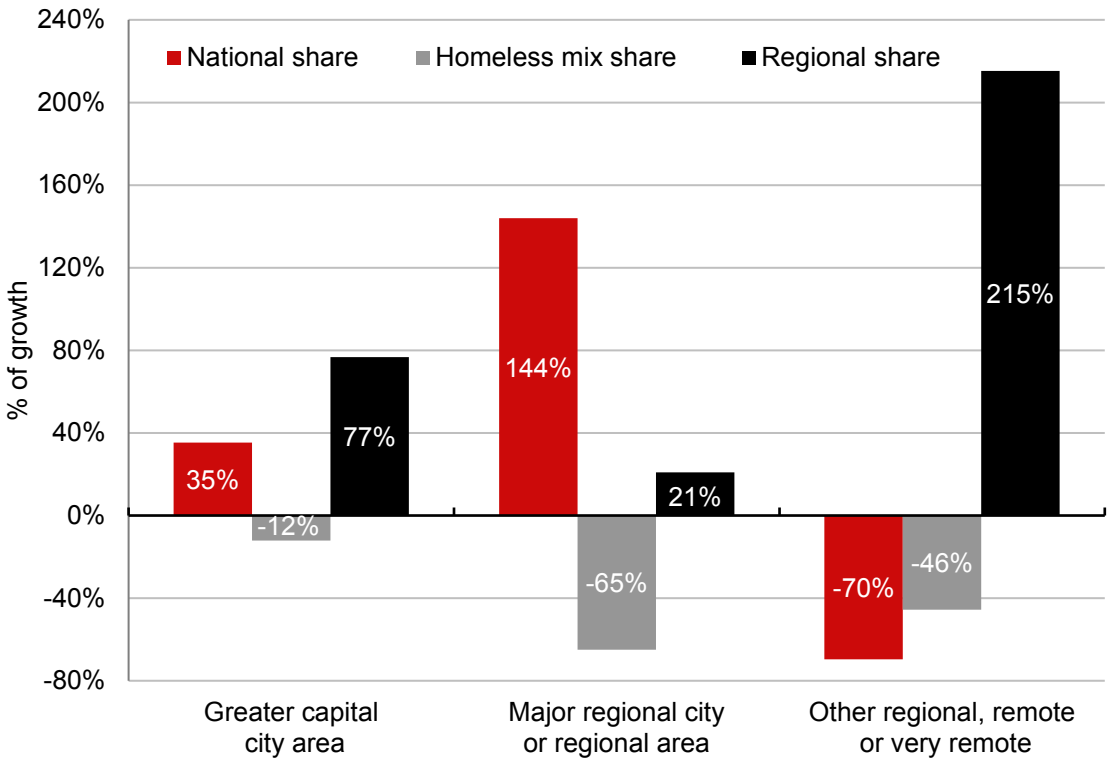
Figure 8: Components of change in homelessness counts 2001–2016 for the top 20 and bottom 20 SA3s with the highest/lowest growth in homelessness



Source: Authors' calculations using ABS homelessness estimates.

Interestingly, in Figure 9, which compares components of change across area types, the largest share of growth in homelessness is the area-based share in both greater capital city and other regional or remote areas. This again suggests that the change in homelessness between 2001 and 2016 is attributable to area-based factors such as housing and labour markets, homelessness service capacity and demographic profiles. However, in the regional locations, the largest component of growth in homelessness rates is due to changes in the national share (144%).

Figure 9: Components of change in homelessness counts by area type, 2001–2016



Source: Authors' calculations using ABS homelessness estimates.

In summary, changes in homelessness rates between 2001 and 2016 for the locations experiencing the highest and lowest growth are predominantly due to area-based factors, with little of the change accounted for by the mix of operational groups or overall national trends. This is consistent with the findings of Wood, Batterham et al. (2014) and underscores the importance of the modelling work in understanding what area-based factors might be driving the spatial distribution of homelessness.

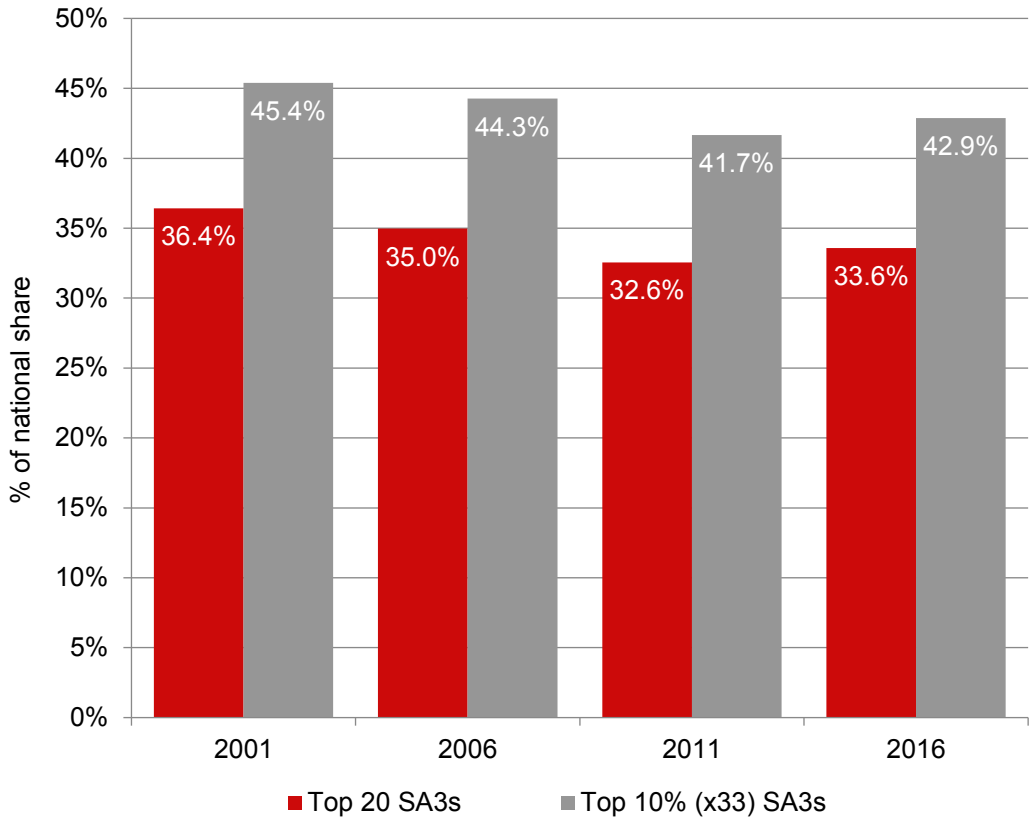
2.4 Is homelessness becoming more or less spatially concentrated across the nation?

The descriptive analysis presented so far has highlighted important differences in the incidence of and growth in homelessness across areas. This section quantifies the spatial concentration of homelessness and examines whether area-based rates of homelessness are converging (or diverging) over time. To do this, we follow Wood, Batterham et al. (2014) and apply two measures of spatial concentration: concentration ratios and the Herfindahl index.

2.4.1 National share of SA3s with the highest share (top 20 and top 10% of SA3s)

The concentration ratio is computed by summing the share of national homelessness accounted for by those SA3s with the highest national shares. We have computed the concentration ratio in two different ways: first, using the top 20 SA3s, and second, the top 10 per cent (33) of SA3 areas. Results are shown in Figure 10.

Figure 10: Share of national homelessness accounted for by the top 20 and top 33 (10%) SA3s, 2001–2016



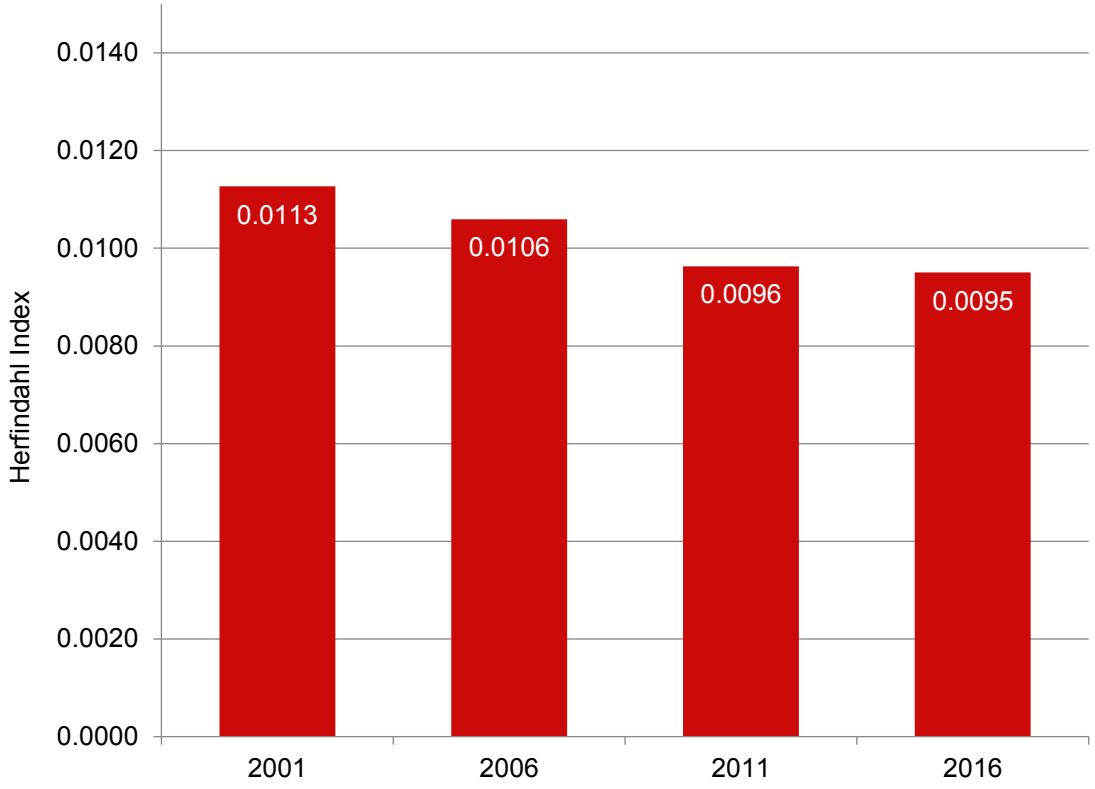
Source: Authors' calculations using ABS homelessness estimates.

The pattern in Figure 10 shows that the concentration ratio using the top 10 per cent measure was 45 per cent in 2001 and slowly but steadily declined to 42 per cent in 2011. However, 2016 shows a reversal of this trend with a small increase to 43 per cent. In 2016, just under 43 per cent of national homelessness could be found in just 10 per cent of regions. The same trend is evident for the top 20 SA3 measure: in 2016 these 20 SA3 regions accounted for around one in three homeless individuals that are spread across 300 SA3 regions in total. Homelessness is modestly spatially concentrated. But regardless of which measure is used, concentration was declining between 2001 and 2011 before the decline trend seems to have been reversed by a small increase over the last intercensal period 2011–2016.

2.4.2 The Herfindahl index

The Herfindahl index reflects the homelessness shares of all areas, rather than just the top 20 or top 10 per cent. The Herfindahl index computes the squared value of each area's share of national homelessness, and then sums these squared values across all 334 areas. The index ranges from 0 to 1, where a value of one indicates that all homelessness can be found in just one area, while a value of 0 indicates that homelessness is distributed evenly across area. Values closer to one indicate an increasingly unequal and therefore more geographically concentrated distribution. Figure 11 below computes the Herfindahl index for all years.

Figure 11: Herfindahl index for homelessness shares, 2001, 2006, 2011 and 2016



Source: Authors' calculations using the ABS homelessness estimates.

Across all years the value of the Herfindahl index is low. This reflects the fact that the area with the largest share of national homelessness in 2001 has only 4.2 per cent of national homelessness. This index is also sensitive to levels of aggregation (as are concentration ratios) with values decreasing as the number of areas included increase. Of particular note in Figure 11 though, is the pattern of decline in the index over time. While this decline stalls in 2016, it is not reversed. This is further evidence of a shift in the geography of homelessness that features increasing urbanisation towards major city centres and away from more regional and remote areas, which is also accompanied by a seemingly more even distribution of homelessness nationally.

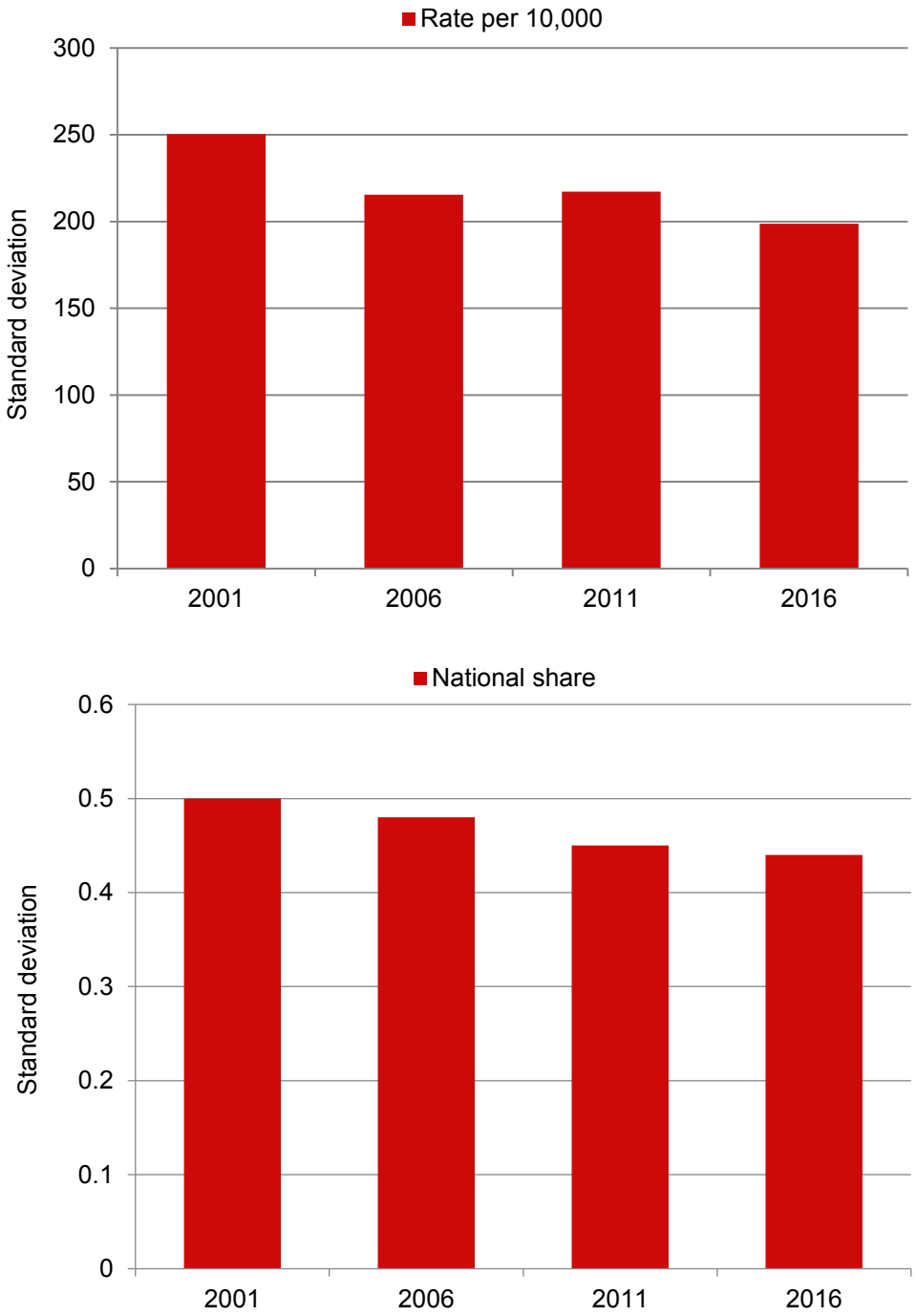
2.4.3 Sigma convergence: Standard deviation in national share and rate per 10,000 measures

We now use two measures of convergence to explore these patterns of spatial concentration further—sigma and beta convergence (Wood, Batterham et al. 2014; Wood, Sommervoll et al. 2016). Sigma convergence measures the variation in homelessness rates or shares and compares that variation over time—typically using the standard deviation or coefficient of variation measure. When dispersion in homelessness rates or shares increases, there is sigma divergence. When the variation in homelessness rates or shares decreases over time this indicates convergence.

Figure 12 uses our two different homelessness measures (rate per 10,000 and share of national homelessness) to compute standard deviation measures of sigma convergence. The share measure reveals a consistent decline in the standard deviation measure, while the rate per 10,000 measure shows an overall fall of over 20 per cent between 2001 and 2016. There is some fluctuation with a temporary rise in the standard deviation between 2006 and 2011 that is

subsequently reversed. The pattern evident from both measures is consistent with convergence.

Figure 12: Sigma convergence using the rate or national share of homelessness



Source: Authors' calculations using ABS homelessness estimates.

In view of the sigma convergence evidence and deconcentration trends evident from the Herfindahl and concentration ratio measures, we can safely rule out divergence in rates of homelessness. We can tentatively conclude that the changing spatial patterns suggest a more even dispersion in rates of homelessness that is also accompanied by a lower spatial concentration of homelessness. This shift most likely has its basis in the increasing urbanisation

of homelessness to major city centres away from regional and remote areas, but also that homelessness within these city centres is dispersing from the CBD and inner areas over time.

2.5 Policy implications

- Homelessness counts, especially those in severely crowded dwellings or sleeping rough, have been rising in major urban areas in line with population growth. Yet only a small fraction is accessing supported accommodation on any given night.
- Significant inroads have been made into reducing rates of homelessness in remote and very remote regions of Australia. Further research is needed to establish whether this is due to successful policy intervention, the relocation of at-risk groups to more urban areas, or to structural change in these remote regions. If due to relocation, continued efforts to stem homelessness in remote regions should remain a priority.
- Policy makers and providers also need to address the increasing growth of homelessness within the major capital city areas of our most populous states. This could involve increased resource support for services targeted on high-growth areas.
- Services and policy makers need to plan for and respond to the spatial dynamics of different types of homelessness, and especially those emerging within the more suburban areas of capital cities, which appear to be most vulnerable to severe crowding.

Next, we examine the geography of two key regional opportunity structures: supplies of affordable private rental housing and local specialist homelessness service capacity. Then in Chapter 4 we statistically model the role of housing affordability and other area-based structures to explore important differences between areas that might be shaping the uneven geography of homelessness over time.

3 Understanding changing spatial opportunity structures of homelessness over time

- Homelessness is rising in areas with a shortage of affordable private rental housing, as measured by the match between the supply of and demand for low-cost housing, as well as the geographical pattern of median rents. This rise is most acute in capital city areas—specifically Sydney, Hobart and Melbourne.
- Increases in median rents and supplies of affordable rental housing have had a marked impact on rates of severe crowding.
- There is substantial mismatch between the distribution of homelessness and specialist homelessness service capacity. Nationally, in 2016, 48 per cent of SHS accommodation capacity and 44 per cent of SHS service support capacity would need to shift across SA3 boundaries to better align with the distribution of homelessness across the nation.
- Most SHS capacity is located in and around capital city areas, with less capacity in regional and remote areas. We hypothesise that changes in this mismatch over time reflect the changing geography of homelessness rather than the changing geography of SHS capacity.

Housing markets have always been central to processes of segmentation that shape the opportunity structures of advantage and disadvantage in particular locations. However, the processes generating segmentation across cities and regions have been more extreme over the past two decades, giving rise to rapid changeover and wealth accumulation in some gentrifying areas, while further entrenching or cumulating concentrations of disadvantage in other areas (Baum and Gleeson 2010; Pawson and Herath 2015; Reynolds and Wulff 2005). Processes of gentrification in major cities continue to change the spatial landscape of the type of stock that is available, including the older housing stock at the low end of the market, and the single room boarding housing that was typical in the inner city areas and often a critical source of housing for single persons (Hulse and Yates 2017; Weller and van Hulten 2012). Boarding-room housing is now becoming more suburbanised as ordinary dwellings are transformed into multi-room occupancy (Chamberlain 2012). As gentrification gains momentum and house prices rise, the affordable housing stock in the affected areas continue to decline. New investment practices associated with owner-renters investing in rental properties in more affordable areas while they live elsewhere (or 'investification') is changing the distribution of rental properties, but not the income profile of the people living in the areas (Hulse and Reynolds 2018).

The inner Sydney and inner Melbourne markets in particular have experienced rapid growth in house prices over the past decade, off the back of an unprecedented housing investment boom exerting upward pressure on rents. In contrast, markets in other states and territories, satellite cities, regional and rural towns demonstrate different affordability dynamics with weaker labour markets (ABS 2017; CoreLogic 2017). From existing research, it is clear that low-income individuals and households are increasingly segregated in more affordable areas as the options to find better housing opportunities outside these markets become limited, and those with higher incomes are able to relocate to better-off areas. Concurrently, those who move from a more advantaged area will find they are forced to relocate as their capacity to compete in a higher priced market is diminished, even if they could stretch to meet costs. However, the pace of

spatial restructuring varies across cities and regions. In the five major cities of Australia—Sydney, Melbourne, Brisbane, Adelaide and Perth—Randolph and Tice (2017) reveal that the increasing 'suburbanisation of disadvantage' has been rapid and is having profound consequences for the equality of access to both housing and employment opportunities for those on a low income. Specifically, drawing on ABS data over a 25-year period, Randolph and Tice (2017) find an average loss of 67 per cent of disadvantage within a 10 km band across the five cities, and a simultaneous increase of 174 per cent within a 20–29 km band.

The way that these changing housing opportunity structures might impact upon the changing geography of homelessness is intrinsically linked to the ability of those with the lowest incomes to compete with or gain access to the stock of affordable dwellings and rooms for rent in particular locations. Increasingly, the availability of affordable dwellings is becoming more concentrated in particular sub-markets, but there is also a growing room-rental sector where the most affordable rents are becoming dispersed, including being located in higher priced market segments, particularly around university hubs (Parkinson, James et al. 2018). Public housing is also located in areas with high and low area-based rents but has also become more dispersed with policies of tenure and social mix (Parkinson, Ong et al. 2014), while the construction of NRAS dwellings and a growing community housing sector has added to the mix of affordable dwellings located in more high-priced markets, though they are small in scale. However, overall affordable private rental dwellings are becoming confined to the outer fringe areas of major cities.

Next in this chapter we explore descriptive associations between changing rates of homelessness between 2001 and 2016, including a specific focus on overcrowding and indicators of private rental housing affordability. We also examine the extent to which the location of services and supported accommodation are well matched to the changing geography of homelessness. As such, we begin to answer our second research question of whether homelessness is rising or falling in areas with a shortage of affordable private rental housing and if Specialist Homelessness Services (SHS) are well located to intervene.

3.1 Homelessness rates and location of affordable private rental housing

Housing researchers (such as Hulse, Reynolds et al. 2014; Wulff, Reynolds et al. 2011; Yates and Milligan 2007) have been demonstrating for some time the mounting housing affordability supply problem for households living on a low income. These households have a decreased ability to compete for the limited affordable stock (of private rental dwellings) that is crowded out by the growing proportion of moderate and higher income households also seeking rental dwellings, including in more regional and remote areas. Rising household debt is also adding to the precarity of housing markets, and this also manifests unequally across locations, being more evident in the mortgage belt of Western Sydney, as well as the outer regions of Melbourne and other major metropolitan areas. The loss of mortgaged housing can precipitate an eventual —if not immediate—spiral into homelessness as resources to compete in the private rental sector deplete over time, particularly for those in midlife or late life who find themselves among a new group of long-term renters (Parkinson, James et al. 2018; Sharam, Ralston et al. 2016; Wood, Smith et al. 2017).

Therefore, examination of how changing rates of homelessness correspond with changes in area-based affordability is timely. Table 4 compares the rate of growth in area-rates of homelessness, with the growth of area-based median private rents over the period 2001–2016. The growth in median rent in each SA3 is referenced and calculated against the respective median growth for 'greater capital city' or 'rest of state' amounts during the period. For example, an SA3 falling within the Greater Sydney capital city area will be compared to the median

growth for that capital city area. Similarly, an SA3 falling within the 'rest of NSW state' will be compared against median growth in the 'rest of NSW' area. We then group all the capital city SA3s and divide them into those where the median private rent grew faster than the city-wide median rent, and those where the rate of increase in median rents was less than that experienced at the city-wide level (2001–2016). This process is repeated for the 'rest of state' areas.

While median weekly private rents of each SA3 increased in all but one (remote) area between 2001 and 2016, the rate of growth differed across states and between greater capital city and rest of state areas. The association between growth in median rents and homelessness rates is most pronounced for capital cities. Table 4 reveals that, for capital city areas where median private rents increased above capital city rates as a whole between 2001 and 2016, corresponding rates of homelessness also increased more rapidly—by 29 per cent compared with a 16 per cent increase for areas with growth below the city median.

Table 4: Homeless rates (per 10,000 persons) and median weekly private rents by area type: change 2001–2016

	Median private rent growth (%): above CC/RoS* level			Median private rent growth (%): below CC/RoS* level		
Area	**Homeless rate**		**% chg homeless rate**	**Homeless rate**		**% chg homeless rate**
	2001	**2016**	**2001–16**	**2001**	**2016**	**2001–16**
Capital cities	39	50	29	37	44	16
Major regional cities or areas	32	30	-5	35	33	-5
Other regional, remote, very remote areas	110	74	-33	150	104	-31
Australia	**40**	**46**	**14**	**63**	**55**	**-14**

** CC/RoS = Capital City or Rest of State*

Source: Authors' panel dataset (ABS Census homelessness estimates and special request files).

Breaking this down by individual capital cities, in Table 5 we find that the association between rental affordability and homelessness differs across housing sub-markets. The connection between declining rental affordability and growth in homelessness rates appears to be most striking for Sydney, Hobart and Melbourne. In Sydney, the rate of homelessness increased by 70 per cent in areas with above state median growth in rents, compared with 32 per cent in areas with below median growth. Hobart experienced a 54 per cent increase in the rate of homelessness in areas with above state median rental growth, compared with a 33 per cent increase in homelessness in areas with below median rental growth. For Melbourne, homelessness rates grew by 19 per cent in above median rent growth areas, and only 7 per cent in areas of lower median rent growth. However, this pattern is not so evident when comparing growth in homelessness rates and median rents across rest of state areas. With the exception of regional NSW, the rate of homelessness has typically declined in areas that have experienced both above and below state median growth in rents.

Table 5: Homeless rates (per 10,000 persons) and median weekly private rents by capital city and rest of state: change 2001–2016

	Median private rent growth (%): above region level			Median private rent growth (%): below region level		
Capital city / rest of state	**Homeless rate**		**% chg homeless rate**	**Homeless rate**		**% chg homeless rate**
	2001	**2016**	**2001–16**	**2001**	**2016**	**2001–16**
Sydney	38	65	70	40	53	32
Rest of NSW	29	33	13	36	33	-9
NSW total	35	55	55	38	45	17
Melbourne	43	51	19	39	42	7
Rest of VIC	31	27	-11	38	33	-14
VIC total	**40**	**45**	**14**	**39**	**40**	**2**
Brisbane	46	47	2	25	32	26
Rest of QLD	57	40	-30	79	61	-23
QLD total	**52**	**44**	**-16**	**57**	**48**	**-15**
Adelaide	29	35	23	30	38	23
Rest of SA	32	16	-51	88	52	-41
SA total	**29**	**33**	**13**	**53**	**43**	**-19**
Perth	35	32	-9	12	11	-6
Rest of WA	55	38	-31	199	91	-54
WA total	**38**	**33**	**-15**	**88**	**47**	**-47**
Hobart	27	41	54	24	32	33
Rest of TAS	55	19	-65	26	28	8
TAS total	**32**	**38**	**20**	**26**	**29**	**13**
Darwin	95	64	-32	203	158	-23
Rest of NT	1,162	974	-16	1,644	1,178	-28
NT total	**254**	**151**	**-40**	**1,003**	**694**	**-31**
ACT	**19**	**26**	**39**	**40**	**48**	**20**
Australia	**40**	**46**	**14**	**63**	**55**	**-14**

Source: Authors' panel dataset (ABS Census homelessness estimates and special request files).

Another way of approaching the question of whether homelessness is rising or falling in areas with a decline in affordable private rental housing is to examine the supply available to those

with the lowest incomes. In Table 6 we examine whether the supply of dwellings affordable to those in the lowest 40 per cent of the national income distribution also corresponds to areas with increases in rates of homelessness between 2001 and 2016. This measure builds directly on the analysis presented in the series of reports by the authors Yates (2004) Wulff (2011) Hulse (2014) and their co-authors that examines affordable rental supply (see Appendix 1, Section 3 for the construction of the measure).

Table 6 compares changing rates of homelessness with a housing supply measure that indicates whether there was: a gross surplus in private rental dwellings affordable to households with incomes in the lowest 40 per cent of the national income distribution (termed quintile 1 [Q1] and quintile 2 [Q2] households) in both 2001 and 2016; a gross shortage in both years; or a surplus in 2001 but a shortage in 2016. Gross surplus or shortage is derived from subtracting the number of low-income, private renter households from the number of dwellings that are affordable to them (using the 30% of gross income measure).

Table 6 shows that while homelessness grew across all three categories in capital city areas, the growth was more marked in areas where there was a gross shortage of affordable stock in both 2001 and 2016, with a growth rate of 32.6 per cent. This compares to a growth rate of 22.6 per cent in areas where there was a shortage in 2016 alone, and a growth rate of 19.8 per cent where there was a surplus of affordable stock in each year. Again, as with median rent change, this pattern does not hold for regional and remote areas of Australia. In fact, the table shows the higher gross supply of affordable private rental stock in the areas outside the capital cities; in major regional cities or areas there was only a shortage in 2016, and in the other regional and remote areas there was no shortage in either 2001 or 2016.

Table 6: Homeless rates and gross supply of private rental dwellings affordable to households in the lowest two income quintiles by area type: 2001 and 2016

	Gross affordable *surplus* each year			**Affordable *shortage* both years**			**Gross affordable *surplus* 2001: affordable *shortage* 2016**		
	Homeless rate		**% chg homeless rate**	**Homeless rate**		**% chg homeless rate**	**Homeless rate**		**% chg homeless rate**
	2001	**2016**	**2001–16**	**2001**	**2016**	**2001–16**	**2001**	**2016**	**2001–16**
Capital cities	35	41	19.8	43	57	32.6	38	47	22.6
Major regional cities or areas	34	31	-10.8	*n/a*	*n/a*	*n/a*	30	32	4.5
Other regional, remote, very remote areas	143	99	-30.9	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Total	**65**	**53**	**-18.3**	**43**	**57**	**32.6**	**37**	**44**	**19.3**

Source: Authors' panel dataset (ABS Census homelessness estimates and special request files).

The above analyses combined suggest, at least descriptively, that rising rental costs and a shortage in the supply of affordable rental housing has been playing a role in shaping the growth of urban city homelessness that was outlined in Chapter 2. Moreover, we find that the difference in homeless rates between capital city areas with slower and more rapid rent

increases widened over the 15 years. In 2001, the rates of homelessness in areas with slow and rapid growth were 39 and 37 persons per 10,000 population, respectively. By 2016, the gap between slow and rapid growth areas had widened to 50 and 44 persons per 10,000 population. We explore the impact of housing market measures after controlling for other demographic changes in the modelling reported in Chapter 4.

3.2 Persons in severely crowded dwellings

As the private rental sector becomes a longer-term housing option across all income groups (Hulse, Parkinson et al. 2018) low-income private renters are finding it more difficult to navigate the formal or mainstream private rental sector (Parkinson, James et al. 2018) and sustain their tenancies (Stone, Sharam et al. 2015). With increased competition in the PRS, low-income renters, particularly singles, become channelled into the less secure informal room-rental sector through online social media networks, where rents still remain high relative to income, and tenancies less secure. Single persons unable to secure room rentals and lacking a competitive online profile can have limited opportunities to form new households and are forced to share with others—either strangers or extended family members. The extent to which growth in overcrowding—including rogue illegal landlord practices—may be directly related to changing affordability dynamics, while qualitatively apparent (Parkinson, James et al. 2018), has not been rigorously examined using large national datasets. Crude assumptions about the reasons leading to overcrowding need to be supplemented with more nuanced analysis of housing affordability risk, to reveal how housing market opportunities are being reshaped and thus mediated differently across locations as individuals and households attempt to subvert a housing crisis, or collectively pool their own resources to remain 'housed'.

In Chapter 2, the increasing urbanisation of homelessness from more remote and regional areas to major cities appeared to be largely due to increases in severe crowding in capital city areas. The extent to which crowding is impacted by declining affordability has not been well explored to date. Table 7 presents the same affordability measure constructed for Table 6 but here we only focus on those who were living in crowded dwellings (operational group 6). As shown, crowding appears to be more strongly associated with the affordability supply measure than it is for aggregate rates of homelessness where all operational groups are combined. We again find the strongest association between affordability and homelessness rates in capital cities, although there is now also correlation between affordability and homelessness rates in regional areas as well. In capital cities, where there was a shortage of affordable housing supply in both 2001 and 2016, the rate of overcrowding grew by 290.5 per cent, more than double the rate where there were no shortages (119.1). While the percentage change of overcrowding is lower (167.5) in areas where there was a shortage in the most recent period of 2016 compared with both periods of time, it still exceeds the growth of overcrowding in areas where there was no shortage in 2001 or 2016.

Table 7: Overcrowding rates and gross supply of private rental dwellings affordable to households in the lowest two income quintiles by area type: 2001 and 2016

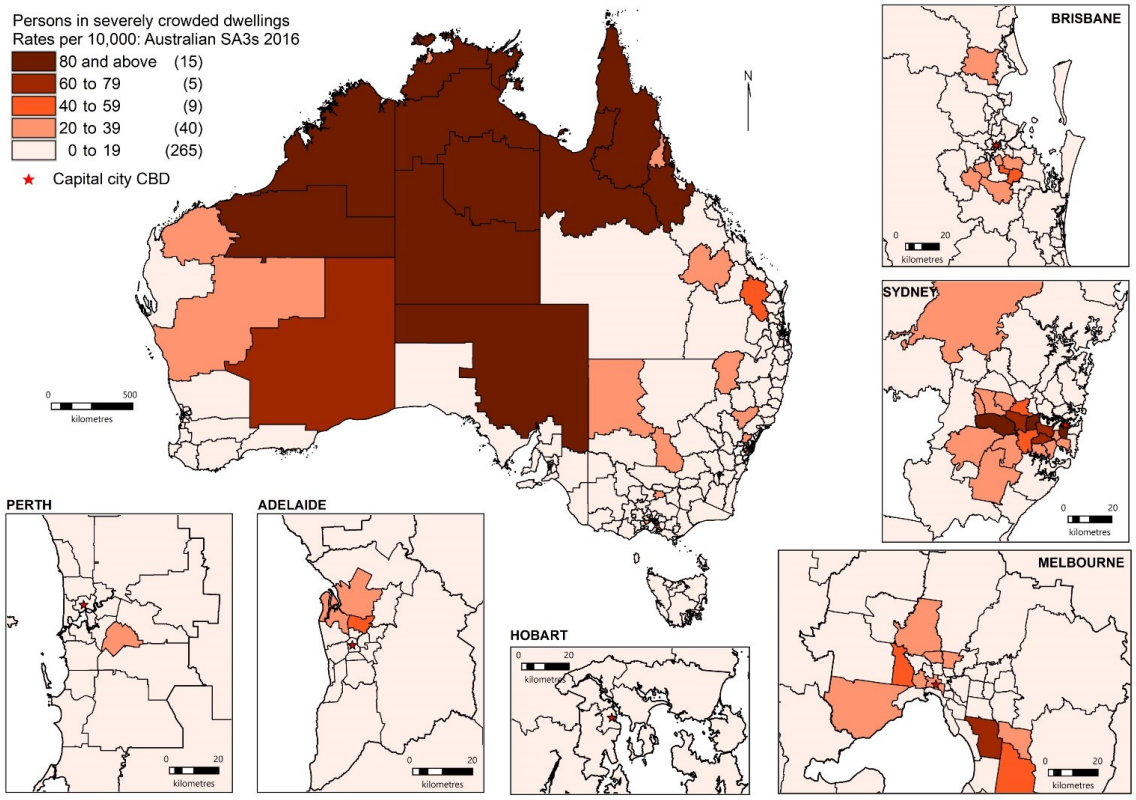
	Gross affordable *surplus* each year			Affordable *shortage* both years			Gross affordable *surplus* 2001: affordable *shortage* 2016		
	Over-crowding Rate		% chg over-crowding rate	Over-crowding rate		% chg over-crowding rate	Over-crowding rate		% chg over-crowding rate
	2001	2016	2001–16	2001	2016	2001–16	2001	2016	2001–16
Capital cities	9	19	119.1	6	25	290.5	7	18	167.5
Major regional cities or areas	4	6	73.0	*n/a*	*n/a*	*n/a*	2	5	155.5
Other regional, remote, very remote areas	93	62	-34.0	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Total	**31**	**26**	**-15.1**	**6**	**25**	**290.5**	**6**	**16**	**165.6**

Source: Authors' panel dataset (ABS Census homelessness estimates and special request files).

Examining the SA3 locations where crowding is more concentrated can also assist in understanding the impact of changing rental affordability. Typically in metropolitan areas the maps indicate that crowding is most concentrated in areas that are further away from the CBD. These are also areas that have more affordable rents; however, relative to demand, these areas have experienced increasing median rents and typically have a smaller supply of single- and two-bedroom accommodation. Figure 13 maps where crowding is most concentrated nationally for SA3s, highlighting how the highest through to lowest rates vary across capital city areas for the 2016 period. Figure 13 presents rates of persons in severely crowded dwellings as a proportion of overall homelessness rates for each SA3.

As shown in Chapter 2, overcrowding was most concentrated in remote areas. However the map in Figure 13 reveals that high rates of overcrowding in 2016 were also present in certain SA3s in greater capital city areas. Nationally, the vast majority of SA3s had less than 20 persons per 10,000 in severely crowded dwellings (× 265). Of the 15 SA3s with the highest rates of crowding, 12 were in the remote areas but three were in Sydney (Fairfield = 84; Sydney Inner City = 85, and Auburn with 167 per 10,000). In greater Melbourne, a high incidence of overcrowding was beyond the inner-city areas more traditionally associated with homelessness. The SA3 of Dandenong, around 25 km south-east of the CBD, had Melbourne's highest rate of overcrowding (69 per 10,000) and Brimbank, around 12 km to the west of the CBD had a rate of 54 persons per 10,000. The third highest rate of crowding in Melbourne was in Casey, more than 40 km south-east of the CBD (41 per 10,000). In comparison, the rate of crowding in Melbourne City was 32 persons per 10,000.

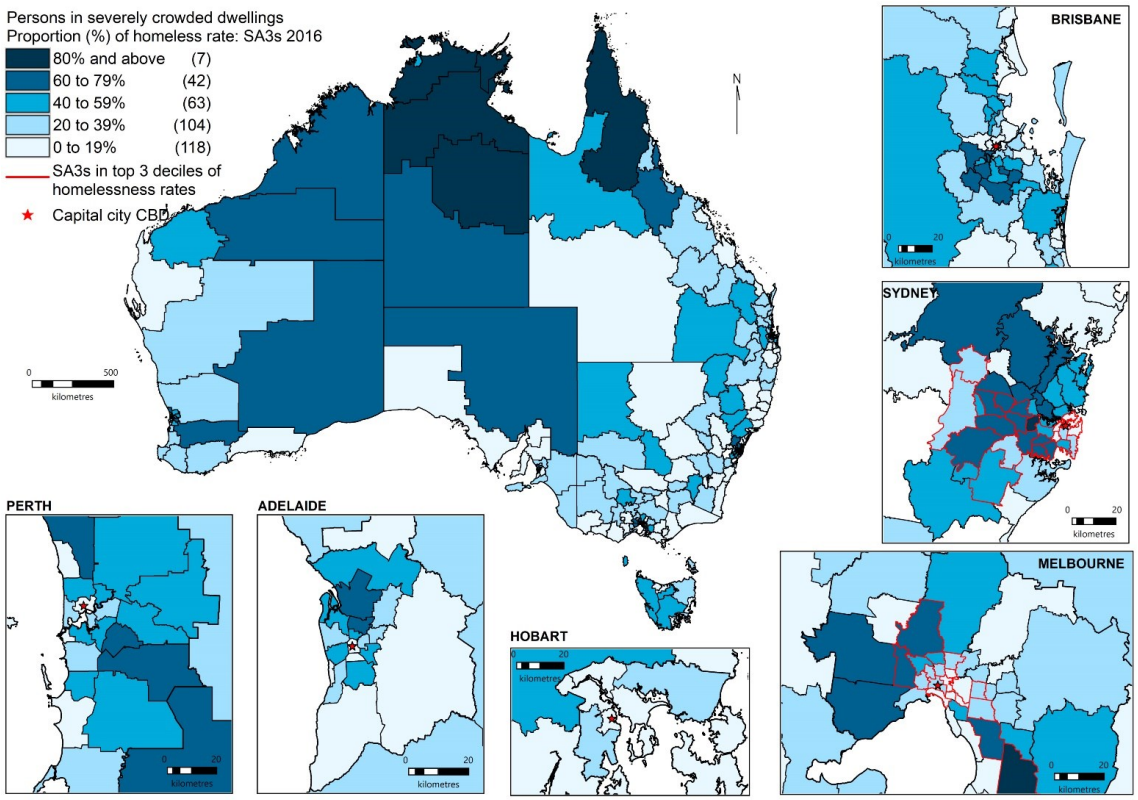
Figure 13: Rates of operational group 6—persons in severely crowded dwellings, Australian SA3s, 2016



Source: Authors' panel dataset (ABS Census homelessness estimates); ABS digital Statistical Geography Boundaries, SA3, 2016.

Figure 14 maps overcrowding as a percentage of all homelessness by SA3 in 2016. The maps identify those areas where total homelessness is mostly due to people living in severely crowded dwellings, rather than any other component of homelessness. Areas where crowding accounts for 80 per cent or more of the total homelessness rate were most concentrated in the northern regions of Northern Territory and Queensland. However, there were two SA3s in urban areas where overcrowding accounted for more than 80 per cent of total homelessness: Auburn in Sydney (87%) and Casey–South in Melbourne (82% and 40+ km from the CBD). These SA3s also fall within the highest three deciles (nationally) of overall homeless rates. Of the 42 SA3s where overcrowding accounted for between 60 and 80 per cent of the total homelessness rate, 34 of them fall within a greater capital city area. Sydney had half of these SA3s with overcrowding making up high proportions of homeless rates in Fairfield (78%), Canterbury (76%) and Merrylands–Guildford (74%). SA3s in the western fringe of Melbourne were also areas where homelessness is largely due to overcrowding. In Wyndham, on Melbourne's south-west fringe, overcrowding comprised 70 per cent of the overall homeless rate; in Melton–Bacchus Marsh, to the north of Wyndham, the proportion was 60 per cent—this is an SA3 where the population centres are more than 30 km from the CBD. Three other areas of note are Brimbank to the west of the CBD (68%); Tullamarine–Broadmeadows north of the CBD (70%); and Dandenong to the south-east (61%). These three SA3s are all in the highest deciles for overall rates of homelessness. Figure 14 also shows that Brisbane had seven SA3s where overcrowding accounts for between 60 and 80 per cent of homelessness; Perth had four; and Adelaide had two.

Figure 14: Rates of 'persons in severely crowded dwellings', as a proportion of overall homelessness rate: Australian SA3s, 2016



Source: Authors' panel dataset (ABS Census homelessness estimates); ABS digital Statistical Geography Boundaries, SA3, 2016.

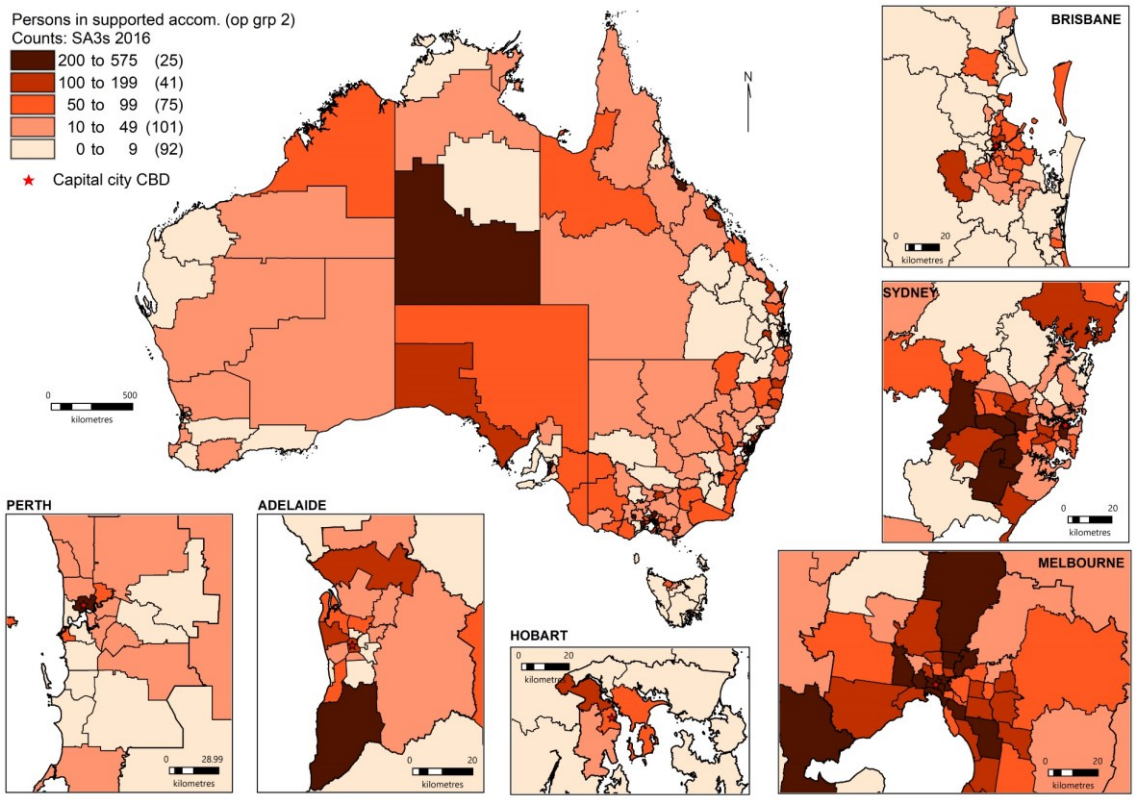
3.3 The alignment between specialist homelessness service capacity and homelessness

The location of homelessness services, including crisis accommodation beds within the central and inner-city areas and potential mismatch with where need originates has been an issue of some concern for decades (Parkinson, James et al. 2018). Many major services increased their crisis service responses in the outer and regional areas in the 1990s to situate services where a housing crisis emerged and to respond to a 'new homelessness' among families and women. Wood, Batterham et al. (2014) found that 'the alignment between homeless service capacity and demand for services showed a degree of mismatch' and argued that this 'mismatch should be given attention by both governments and service providers to ensure that homelessness resources are allocated to areas of high demand'. In this section, we update that analysis and extend it by providing a national map with insets showing the distribution of persons accommodated in SHSs on Census night, and by producing the mismatch measure with more detailed data from the Specialist Homelessness Service Collection (SHSC) at the national level, and also for each state and territory and capital city and balance of state areas. This gives a deeper sense of the geography of homelessness service capacity and how it aligns with the geography of homelessness.

We begin with an examination of the geography of persons accommodated by specialist homelessness services on Census night in 2016 (Figure 15). In contrast to Figure 3, in which rates of homelessness in 2016 are shown to be higher in remote areas and some pockets within capital cities, persons in supported accommodation are typically located in more central parts of cities and regions, with provision extending to some middle and outer suburban areas of capital

cities. For example, Melbourne supported accommodation is highly concentrated in the CBD and inner-city ring areas but also extends to highly concentrated areas in the outer northern, western and south-eastern growth corridors. Overall, Figure 15 highlights that service capacity is concentrated in capital city areas, with less capacity in regional cities and outer regional, remote and very remote areas.

Figure 15: Operational Group 2—persons in supported accommodation for the homeless



Source: Authors' panel dataset (ABS Census homelessness estimates); ABS digital Statistical Geography Boundaries, SA3, 2016.

The distribution of persons staying in SHSs on Census night gives a sense of the geography of service capacity at a point in time. Yet specialist homelessness services provide both accommodation and support to people who are homeless, or who are at imminent risk of homelessness.[13] Both homeless and at-risk clients may receive a wide variety of support services such as: case management, material aid, general counselling, health and medical services, drug and alcohol or mental health support, employment assistance, legal and court support, advice and information on accommodation, assistance with applications to public and community housing, and referral on to other specialist services. For a full list of services see AIHW (2012b).

In addition to this support, clients may also receive accommodation. This includes crisis accommodation and refuges (which typically—though not exclusively—have stays of between six weeks and three months), and medium-term accommodation such as the transitional housing program in Victoria (which provides tenancy agreements in three-monthly blocks). Sometimes emergency relief funds are used to purchase short stays in cheap hotels, motels or caravan parks as a form of overflow crisis accommodation. All SHSs receive funding under the

[13] Including women and children escaping family violence

joint commonwealth and state government National Housing and Homelessness Agreement (NHHA) and are required to provide data on use of services as part of the Specialist Homelessness Services Collection (SHSC).

In further examining the alignment between the location of specialist homeless service capacity and homelessness, we follow Wood, Batterham et al. (2014) and calculate a mismatch measure (M).[14]

The mismatch measure (M) is calculated for the two different indicators of service capacity that cover accommodation and support capacity separately, and were sourced from the Specialist Homelessness Service Collection (SHSC) (see Appendix 1, section 4 for a definition of these and other variables). These measures are calculated at the national level, at the state and territory level, as well as capital cities and balance of state areas. The formula is defined as:

$$\boldsymbol{M} = \mathbf{1}/_{\mathbf{2}} \sum_{\boldsymbol{i}=\mathbf{1}}^{\boldsymbol{n}} \left| \frac{\boldsymbol{S_i}}{\boldsymbol{S}} - \frac{\boldsymbol{H_i}}{\boldsymbol{H}} \right| \qquad (\mathbf{1})$$

Where *Si* is a measure of resource support (bed spaces, for example) in region *i*, S is the measure of resource support in the nation, *Hi* is the homeless count in region *i* and *H* is the homeless count in the nation. The *M* value ranges from 0 to 1 and indicates the proportion of service capacity (support places or accommodation places) that need to shift across SA3 boundaries to align with the distribution of homelessness. If there were only two regions and we obtain an *M* value equal to 1, it means that all resource support (bed spaces, for example) needs to be reallocated from their current location in one of the two regions, to a location within the boundaries of the other region to ensure perfect alignment. A value of zero suggests that the current alignment of resource support is perfectly matched to the location of the homeless.

Because persons staying in supported accommodation for the homeless are one of the six operational groups that make up the total homeless count, we recalculated homelessness shares to exclude this group from the analysis. By excluding this group, we obtain a more precise measure of the relationship between the presence of homeless persons outside the supported accommodation system, and the number of supported accommodation places in that region.

Table 8 summarises our results. Columns 1 and 2 report the mismatch measure for the SHS support capacity for the 2011–2012 and 2016–2017 financial years, respectively. Columns 3 and 4 report these same measures but for the SHS accommodation capacity measures. The first row of the table reports these coefficients at the national level. Moving down the table, coefficients are reported for each state and territory and then, finally, for capital cities and balance of state areas

Examining the national results first, reveals that 43 per cent of SHS support places would need to shift across SA3 boundaries to better align with the geography of homelessness in the 2011–2012 financial year. This is a significant level given the large areas contained within SA3 boundaries, especially those in regional and remote Australia. Comparing columns one and three shows that the mismatch for SHS support places is stable over time, though this is only a short 5-year timeframe. This is also the case for SHS accommodation capacity (columns two and four). Calculating the mismatch below the national level reveals important differences in the match between the distribution of homelessness, and the distribution of SHS support capacity. Between the two financial years, the mismatch between both support and accommodation capacity have worsened in capital city areas and eased in balance of state regions. This likely

[14] The mismatch measure is a dissimilarity index that is commonly used to gauge residential segregation.

reflects the increasing urbanisation of homelessness rather than a shift in the geography of support services.

Comparing the degree of service mismatch across the States, both Victoria and Tasmania experienced an increasing mismatch between homelessness and accommodation capacity between the two financial years. While other states and territories such as South Australia, Western Australia and the Northern Territory the mismatch between homelessness rates and accommodation improves. This may reflect changes in the geography of homelessness rather than the changing geography of SHS capacity. Specifically, it may reflect the increasing urbanisation of homelessness described in Chapter two, which has seen homelessness decrease in outer regional, remote and very remote areas and rise in capital cities—in particular New South Wales and Victoria.

Additionally, both Tasmania and the ACT have an increasing mismatch in support capacity between the two financial years, while Queensland, South Australia and Western Australia experience modest improvements.

Table 8: Mismatch coefficients for the relationship between homelessness and service capacity at the national, state/territory, and capital city balance of state areas

	(1)	(2)	(3)	(4)
	2011–12	2016–17	2011–12	2016–17
	Persons supported by SHS over the financial year	Persons supported by SHS over the financial year	Persons accommodated in SHS over the financial year	Persons accommodated in SHS over the financial year
National	**0.43**	**0.44**	**0.50**	**0.48**
New South Wales	0.42	0.42	0.42	0.42
Victoria	0.41	0.40	0.38	0.43
Queensland	0.44	0.37	0.36	0.35
South Australia	0.44	0.37	0.44	0.38
Western Australia	0.44	0.38	0.31	0.28
Tasmania	0.30	0.34	0.33	0.37
Northern Territory	0.47	0.48	0.47	0.45
Australian Capital Territory	0.36	0.50	0.38	0.38
Capital cities	**0.44**	**0.47**	**0.40**	**0.45**
Balance of state	**0.56**	**0.48**	**0.47**	**0.43**

Note: The distinction between 'support' provided and 'accommodation' provided is important because people who are homeless may receive outreach support until some form of accommodation (including crisis accommodation) can be found for them; and people may not wish to stay in short-term accommodation such as refuges or crisis accommodation, and instead prefer to receive other forms of support such as counselling and material aid until public housing, community housing or private rental housing can be arranged. These data items were only available for two years in the study period (2011–2012 and 2016–2017).

Source: Authors' calculations using the ABS homelessness estimates and SHSC data.

3.4 Policy development implications

- The growth of homelessness over time has been most marked in areas where rising rental costs and a shortage in the supply of affordable rental housing are most severe.
- A continued and expanded affordable housing supply-side response is critical to making inroads into preventing and resolving homelessness. Current service agreements emphasising commitments to housing supply need to consider the location and key priority areas for new housing development, as well as review the amounts of rental properties that are sustainable in the long term.
- The supply of affordable housing needs to match areas of population growth among lower income individuals and households in a way that also provides access to broader services, employment and amenities.
- Services are not currently well aligned with the changing geography of homelessness. Most service capacity for accommodation and support is located in and around capital city areas with less capacity in regional and remote areas. This misalignment could be having negative effects if some of the urbanisation of homelessness is due to the relocation of individuals that originally became homeless in remote regions of Australia.
- There is a need to gain more detailed insight into the service needs of those who are living in overcrowded dwellings.
- Flexible models to rent and purchase transitional and permanent housing in middle and outer suburbs and non-capital city areas should be further explored and scaled up to address the difficulties high-risk groups have in gaining access to affordable private rentals.

Next, we undertake a detailed spatial modelling analysis examining the strength and significance of area-based housing, labour market and demographic factors in shaping differences in homelessness nationally for capital cities, as well as for regional and remote areas of Australia.

4 Modelling the association between homelessness and spatial opportunity structures

- The supply of affordable private rental is significantly associated with the variation in homelessness rates nationally, in capital cities and in regional areas. This correlation with supplies of affordable rental housing is most conspicuous with respect to differences in overcrowding rates across regions, and especially in regions belonging to capital cities.
- In capital cities and regional towns, overcrowding and other forms of homelessness that exclude individuals staying in supported accommodation are significantly higher in poorer areas that have weaker labour markets. In remote areas this pattern is reversed.
- Homelessness rates, including overcrowding, are significantly lower in areas where the demographic profile features a relatively high share of married people.
- In capital cities, as distinct from other regions, rates of homelessness are strongly associated with areas that have a relatively high share of males in their population, and this effect is even stronger for overcrowding.
- Nationally and in capital cities, overcrowding is more typical in areas with young children aged less than 14 years, but other forms of homelessness rates are elevated in areas where those aged between 25 and 40 years are more prevalent. In regional and remote areas, rates of all forms of homelessness are elevated where there are higher concentrations of young children less than 14 years.
- Areas that are more culturally diverse, whether because of Indigenous status or non-English-speaking background, have higher rates of homelessness and overcrowding. A large component of the variation in area-based overcrowding is linked to the cultural diversity of areas.
- Indigenous background remains the strongest determinant of homelessness in remote areas, and much of this effect is accounted for by overcrowding. In capital cities, there is mismatch between the areas where Indigenous people are accommodated informally and the areas where they are supported more formally in homelessness services.

Gaining insight into the broader opportunity structures, 'triggers', or 'drivers' underpinning the spatial distribution of homelessness has been a focus of research for some time, although the ability for Australian researchers to draw on large quantitative cross-section–time series datasets is more recent. In this chapter, we present findings from a spatial modelling analysis that aids understanding of the relationship between homelessness rates and area-based employment, demographic and housing market attributes. In doing so, it addresses the third research question on the role that structural factors might play in shaping differences in rates of homelessness between Australian cities, regions and remote areas, between 2001 and 2016.

Studies modelling the structural correlates of homelessness typically draw on area-based aggregate Census or administrative data, or combine micro data on individuals with aggregate area-based measures either on a cross-sectional or longitudinal basis. Much of this research has come from the United States, where higher rates of homelessness are found to be associated with tight housing market conditions, high housing costs, areas blighted by poverty, particular climates and population density (e.g. Bohanon 1991; Early and Olsen 2002; Florida, Mellander et al. 2012; Honig and Filer 1993; Lee, Price-Spratlen et al. 2003; Quigley and Raphael 2001; Quigley, Raphael et al. 2001). Within this body of research, tight housing market conditions are found to lift area-based rates of homelessness regardless of whether the measure used relates to costs, cost-to-income ratios or vacancy rates. Though the strength of other indicators is often found to be less marked or more difficult to detect, area-based poverty and income measures are among the more important correlates of higher rates of homelessness (e.g. Quigley, Raphael et al. 2001) and unemployment (e.g. Kemp, Lynch and Mackay 2001). Moreover, areas with an over-representation of particular household types, especially single- and female-headed households, have also been linked to more elevated rates of homelessness (Bohanon 1991; Elliott and Krivo 1991).

Findings from one country will not necessarily transfer to another due to institutional differences across countries that serve to mediate how the opportunity structures within particular communities play out in increasing the risk of homelessness. In Australia, Batterham (2012) draws on cross-sectional Victorian area-based Census data to find that homelessness was higher in areas with lower median incomes, more affordable private rental housing costs, and relatively accessible public housing. This finding was further supported in subsequent work by Wood, Batterham et al. (2014; 2015) using Census data over the longer timeframe 2001–2011, and including regions from across Australia. Demographic profiles in regions became stronger predictors of homelessness rates, along with income inequality and the types of dwellings present in the local housing market.

The seemingly inconsistent findings regarding the influence of area-based housing costs in Australia compared with overseas studies may relate to the extent to which different country housing markets are segmented. In Australia, homelessness risk and episodes are as much a regional and rural phenomenon as an urban one, although our analysis in the previous chapter suggests that it is becoming more of an urban concern. Regional and rural areas tend to have more affordable housing—yet it is more scarce relative to need. Moreover, the spatial opportunity structures will give rise to the various dimensions of homelessness materialising differently across areas. Given that a large proportion of ‘at risk’ individuals rely on family or friends and informal networks for housing (Parkinson, James et al. 2018), the impact of housing costs is likely to be concealed, and perhaps at an aggregate level misrepresents the casual impact of area-based rents. This suggests that it is likely that the mix of dwelling and rents in an area is equally important as the overall median housing costs and therefore important to examine different measures of housing access and supply. Area-based rents may be insufficient alone in being able to predict homelessness because of the way that households might form to buffer risk, including overcrowding. We extend existing statistical analysis by inclusion of specific measures of housing affordability in city and regional areas, and to also examining overcrowding separately as a dimension of homelessness.

More recent studies such as Johnson, Scutella et al. (2015a) have attempted to disentangle the relationship between labour, housing markets and homelessness by combining individual and area-based measures. They find that housing and labour market factors in a region do matter in precipitating entries into homelessness, but are not relevant to the chances of exiting homelessness. However, not all vulnerable people are equally affected by housing and labour market conditions. For example, the chances of Indigenous persons becoming homeless are elevated by higher rents in private rental housing markets. In contrast, those individuals with diagnosed mental health issues are another group thought to be at relatively high risk of

entering homelessness, but their chances of becoming homeless are found to be unaffected by housing and labour market conditions.

A problem with existing studies drawing on aggregate data is that they tend to assume that the current location of a homeless person is in the same region as that where the spell of homelessness originated. Regional measures of housing market conditions are typically based on the current location, but the spatial-temporal dynamics of homelessness mean that such measures will not necessarily capture the relevant conditions precipitating homelessness. This is another reason why the relationship between homelessness and housing market conditions is not detected in cross-section–time series models (Bartelt, Eyrich-Garg et al. 2017; Culhane, Lee et al. 1996). However, although homelessness is dynamic, the spatial context where those with experience of homelessness are located at a point in time continues to be shaped by the spatial opportunity structures that either enable or impede the resolution of an episode of homelessness. People will bring with them individual characteristics that have been shaped by previous locations as a moderating effect, but there are concurrent mediating effects of new local contexts that inhibit a housing crisis from being resolved, or which shape the way a housing crisis is experienced across geographical space. These mediating effects could be services in a particular location, or they may be networks of family groups, or housing that is prone to overcrowding. Where services do not exist or affordable housing is scarce, a housing crisis may be resolved temporarily by sharing. Being able to examine these patterns in different locations provides insight into the potential mediating effects of individual and geographical attributes at play in different contexts, and how these might be changing over time.

For instance, O'Donnell (2016), drawing on Wood, Batterham et al. (2014; 2015), and focussing specifically on Sydney, showed that there is increasing suburbanisation of homelessness, and that this is mainly driven by the changing composition of homelessness, especially the growing numbers in the overcrowding homelessness category. O'Donnell (2016) also conducted a statistical test for spatial autocorrelation (which can be used to test whether homelessness tends to cluster together or is more randomly distributed) that confirm the presence of clusters of homelessness within Sydney. Although not tested in this research, we suspect that this finding is also likely to be influenced by the availability of affordable housing in different regions, and building on our descriptive chapter we pursue this theme in the analysis below.

4.1 A spatial panel model for area-based homelessness

The study method outlined in Chapter 1 introduced the panel and spatial structure of the dataset and described the construction of our dependent and independent variable measures (see Appendix 1, Section 1). In this section we extend the existing literature by estimating a spatially autoregressive error random effects models of homelessness, which take into account autocorrelation due to non-random clustering of the spatial areas, and from repeated observations of Census data over the timeframe 2001–2016 (Anselin et al. 2008; Ward and Gleditsch, 2008). This is a novel approach, as spatial econometric methods of estimation are rarely employed in homelessness studies, despite their widespread application in research addressing other social and economic issues that have a similarly strong geographical dimension. Following Anselin et al. (2008), first consider the pooled linear regression model:

$$\boldsymbol{y_{it}} = x_{it}\,\beta + \epsilon_{it} \qquad (1)$$

The dependent variable is denoted as y_{it} , where i is the index for the cross-sectional dimension, with $i = 1, \ldots\ldots\ldots, N$, and t denotes the time dimension, with $t = 1, \ldots\ldots T^2$. The right side is represented by x_{it} a $1 \times K$ vector of observations and β is a matching $1 \times K$ vector of regression coefficients, and ϵ_{it} is the error term.

The assumption of independence between observations in the above equation required for ordinary linear regression would hold if we only had a cross-sectional dimension and not a repeated time dimension. However, our dataset pools the observations for the time periods between 2001–2016 because we can use this additional information to derive better estimates of areas by controlling for change over time that cannot be observed from data modelled at a single point in time. However, by pooling the data we also have to address concerns that observations for the same areas over repeated time periods are no longer independent from each other—or, in other words, they become autocorrelated.

First, let's consider the issue of autocorrelation between our repeated observations. Repeated time-series observations from the same area are a source of autocorrelation because unmeasured variables that help determine area homelessness will also shape homelessness measures in that area over successive observations. Thus areas that have *relatively* high observations of homelessness in one time period are also more likely to have *relatively* high observations in the next time period. Not controlling for this correlation of panel data when modelling is likely to result in biased coefficient estimates. As our analysis is based on a panel of repeated observations from 2001 to 2016, this autocorrelation between observations over successive time periods is addressed by the inclusion of a random effect in the error term. Random effects models provide a solution to the autocorrelation problem through the inclusion of an additional error term in the regression equation that enable a weighted average to be calculated from both individual and group level variation.

From Anselin et al. (2008), the random effect included in the error term can be expressed as $\mu_i \sim \mathrm{IID}(0, \sigma_\mu^2)$ for the cross-sectional random component, and $v_{it} \sim IID(0, \sigma_v^2)$ the idiosyncractic error term, with μ_i and v_{it} independent from each other. In each cross-section, for $t = 1, \ldots\ldots, T$, the $N \times 1$ error vector ϵ_t becomes

$$\epsilon_t = \mu + v_t \qquad (2)$$

In spatial panel models, we have concerns with autocorrelation between time periods, and we also have concerns with autocorrelation between areas that share a spatial border or 'neighbour' each other. This spatial autocorrelation can be tested using the statistical measure Moran's *I* that determines whether areas are non-randomly clustered. For example, similar cultural groups with a high risk of homelessness might segregate from the other groups in society by locating in a group of adjacent neighbourhoods. Alternatively, homelessness services located in one neighbourhood might also provide temporary accommodation in adjacent neighbourhoods, thereby acting as a magnet that attracts those with experience of homelessness to this cluster of neighbourhoods.

Based on Moran's I calculated from the first cross-sectional wave of homelessness rates, we confirm that the concentration of homelessness is non-random or autocorrelated with a chi squared value ranging from 23.02 to 24.62 across models significant at $p < 0.001$. The statistical significance of the spatial autocorrelation coefficient suggests that neighbourhoods that share a common border are likely to share characteristics that influence the clustering of homelessness. Spatially autoregressive error models, as distinct from standard linear regression, provide a solution for spatially correlated data via the inclusion of an additional spatial error term in the regression equation where clustering or spatial dependence is captured through the residuals or unobserved component of the model rather than the systematic component. Values for nearby areas in the error term are calculated from a weight or contiguity matrix that assigns a non zero value for neighbouring areas and zero otherwise. Such a model

is called a Spatial Error Model (Ward and Gleditsch 2011).[15] Extending the random effects model from Anselin, Le Gallo et al. (2008) to a spatially autoregressive error model can be further expressed as:

$$v_t = \theta W_N v_t + \mu_t \quad (3)$$

Where μ is a $N \times 1$ vector of cross-sectional random components introducing a spatial error autocorrelation for the error component $v_{t,}$ for $t = 1, \ldots \ldots, T$. The spatial autoregressive parameter (constant over time) is expressed as θ and W_N as the spatial weights matrix calculated from nearby areas, and μ_t as an $i.i.d$ idiosyncratic error term with variance σ_v^2.

The final spatial autoregressive error model results appearing in tables 9–16 are estimated in Stata 15 using the spxtregress command, which enables estimation of a suite of spatial autoregressive models (SAR). The full coefficient estimates are presented in Appendix 5. The dependent variable is the log transformed per capita rate of homelessness or, where stated, a log variant of this based on different components of homelessness. The estimates in tables 9–16 report the percentage increase or decrease in the area rate of homelessness when there is a 1 per cent change in the independent variable.

We first present model findings for homelessness rates for all regions in the Australian sample including and omitting different components of homelessness. The findings from the capital cities, regional and remote models are presented and discussed in turn. It is important to model areas in capital cities separately because our descriptive analysis suggests that homelessness has become an increasingly urban phenomenon. This approach to modelling might uncover clues that hint at an explanation. In general, we find that the importance of different area-based measures vary across capital cities versus regional and remote areas, as well as by different operational groups of homelessness.

4.1.1 National rates of homelessness

A core focus of our modelling exercise is to test the relationship between housing, labour and area-based attributes on different components of homelessness building on the descriptive findings in chapters 2 and 3. With this aim in mind, in the first set of models 1–3 shown in Table 9, national rates of homelessness are estimated in aggregate with all six operational groups. This aggregate homelessness measure includes individuals residing in supported accommodation, as well as the largest component: overcrowding. As illustrated in Chapter 3, supported accommodation, particularly in capital cities, is often located in central and inner-city areas where housing costs are typically relatively high, and so can result in a simultaneous relationship between other dimensions of homelessness and unaffordable housing measures that can be the source of biased estimates. So in a second set of estimates in models 4–6 in Table 9 we present the findings of housing market measures when supported accommodation is omitted.

[15] A sensitivity analysis was conducted estimating SAR models with a lag of the dependant variable, which provides direct and indirect effects, and treats the systematic component of the model as meaningful rather than as a disturbance. As the indirect effects were small and insignificant for most estimates, we deemed a spatial error model as being sufficient to correct for spatial clustering. Models were also run with and without random effects, with random effects being the preferred model. Results of this analysis can be obtained from the authors upon request.

Table 9: SAR model results, national homelessness rates

	Log of homelessness rates all groups			Log of homelessness rates omitting supported accommodation		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Male %	0.676	1.329	0.181	2.306	3.128*	1.572
Age 0–14	0.011	0.451	-0.022	-1.872*	-1.311	-1.951*
Age 15–24	-1.469	-1.410	-1.607	-2.303*	-2.225*	-2.508*
Age 25–40	5.601***	5.169***	5.295***	4.091***	3.500***	3.499***
Unemployment %	-1.794	-2.186	-1.961	3.873*	3.314	3.614*
Married %	-3.478***	-3.748***	-3.709***	-3.488***	-3.883***	-3.873***
Indigenous %	5.022***	4.949***	5.011***	5.538***	5.454***	5.548***
Speaks other language at home %	2.071***	1.969***	2.122***	2.194***	2.092***	2.265***
Dwellings affordable to Q1	-0.300			-0.678***		
Dwellings affordable to Q1 & Q2%		-0.557***			-0.677***	
Median rents/10			0.656**			1.116***
Q4 Income %	-2.137**	-2.391**	-1.371	-1.035	-0.990	0.447
Q5 Income %	-0.738**	-1.568***	-1.084***	-0.476	-1.380***	-0.995**

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated and multiplied by 100 for ease of interpretation.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

In the next set of models shown in Table 10, we isolate the impact that area-based attributes have on overcrowding as a distinct dimension of homelessness. Here we estimate two further sets of models: one exclusively on overcrowding as a separate category, and a further set of models when overcrowding is omitted from the remaining five homelessness operational groups. In our earlier chapters, we discussed how overcrowding differed in its location and growth over time compared with other dimensions of homelessness. Overcrowding was found to be particularly concentrated further away from central city districts displaying a different spatial distribution to other dimensions of homelessness captured on Census night.

In addition to a standard set of demographic variables, a series of robustness checks is also conducted with respect to the housing affordability variables used to test their key relationship to homelessness. This is achieved by experimenting with alternative measures of affordable housing supply and the level of housing costs in models. For example, in Model 1, the first measure captures the influence of access to affordable private rental housing by including a measure of the percentage of private rental housing affordable to households in the lowest quintile (20%) of the income distribution. Model 2 replaces this measure by a similar variable that only differs by substituting the lowest and next lowest quintiles for the lowest quintile; it therefore measures access to affordable rental housing higher up the income distribution, not

just for the poorest. Finally, in Model 3, the median rent in SA3 regions is inserted instead of either of the access to affordable rental housing variables.

Table 10: SAR model results, national overcrowding rates

	Log of overcrowding rates			Log of all homelessness rates omitting overcrowding		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Male %	10.849***	11.516***	10.109***	-1.7446	-1.2323	-2.205
Age 0–14	5.012***	5.464***	4.812**	-1.577	-1.292	-1.636
Age 15–24	-1.005	-0.995	-1.282	-2.342*	-2.332*	-2.518*
Age 25–40	1.877	1.298	1.035	5.940***	5.548***	5.591***
Unemployment %	9.286**	8.937*	9.297**	-5.927***	-6.124***	-6.040***
Married %	-2.761*	-3.149**	-3.265**	-4.123***	-4.352***	-4.381***
Indigenous %	6.577***	6.556***	6.620***	2.071***	2.030***	2.061***
Speaks other language at home %	5.211***	5.117***	5.274***	0.309	0.230	0.349
Dwellings affordable to Q1 %	-1.163***			-0.251		
Dwellings affordable to Q1 & Q2%		-0.533**			-0.412***	
Median rents			1.227*			0.632*
Q4 Income %	-0.485	0.327	1.664	-1.961*	-2.088**	-1.232
Q5 Income %	-0.275	-0.801	-0.687	-1.084***	-1.676***	-1.420***

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated and multiplied by 100 for ease of interpretation.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

We first discuss the impact of housing affordability, income and labour markets on different dimensions of homelessness and then move on to discussing the significance of other demographic area-based attributes.

4.1.2 Housing, income and labour market effects on rates of homelessness

We commence with the estimates on our three measures of housing affordability. For ease of interpretation, the model coefficients of the log homelessness rates appearing in tables 9 and 10 have been exponentiated and multiplied by 100 to represent a percentage change in rates. As can be seen from Table 9, the relationship between housing affordability measures and national homelessness rates are in a similar direction across all sets of models with and without supported accommodation and overcrowding included. However, we are able to detect (or isolate) a much stronger and significant effect of our measures of housing affordability on homelessness rates when supported accommodation is omitted and when modelling overcrowding in insolation. As shown in models 4 and 5 in Table 9, which omits supported accommodation, a 1 per cent increase in the supply of affordable private rentals to those in the

lowest 40 per cent of the income distribution decreases the area rates of homelessness by around 0.7 per cent ($p < 0.001$). Similarly, for private rental costs, we find that for every $10 increase in area-based median rents, homelessness rates rise by 1.1 per cent ($p < 0.001$).

The effect of area-based housing affordability measures is most striking when we model overcrowding in insolation, as shown in Table 10. In particular, we detect the strongest effect from the first measure that captures a shortage of affordable dwellings for those in the lowest 20 per cent of the income distribution. Here we find that for every per cent increase in supply reduces the area rate of overcrowding by 1.2 per cent ($p < 0.001$). We see a similar percentage increase in rates of overcrowding for every $10 increase in area-based median rents.

All of our housing affordability measures are in the expected direction and combined suggest that the locations in which individuals might be residing temporarily with friends, living in crowding dwellings, or sleeping rough are areas that have a shortage in supply of housing that is affordable. Building on the descriptive analysis in Chapter 3 suggests that this affordability effect has worsened over time, contributing to increased observations of homelessness for certain groups and may be influencing the detection of significance of these measures than from the previous analysis (see Wood, Batterham et al. 2014).

The relationship between area-based measures of labour-market activity appear to be sensitive to the final measure of homelessness we estimate and therefore where particular groups of homelessness are most likely to be concentrated across locations. In capturing the effect of labour markets we use area-based rates of unemployment. When we model homelessness in aggregate, our unemployment measure is insignificant and negative, as it is when we exclude overcrowding. However, when we exclude supported accommodation or model overcrowding separately, the effect of unemployment in a region is positive and highly significant. Interestingly, unemployment is among the strongest predictors, ahead of some groups including those from an Indigenous background and those who do not speak English at home, but not males, as we discuss further below. For instance, as shown in Table 10, a 1 per cent increase in the rate of unemployment in a region lifts the rate of overcrowding by 9 per cent.

Looking at area-based incomes reveals that national rates of homelessness are more typically found in areas with a higher concentration of low to moderate household incomes, which lends support for the poverty thesis. That is, on Census night, individuals will be more likely to be accessing some kind of temporary accommodation, drawing on networks, sources of support or within the opportunity structures of lower to moderate income neighbourhoods. Competing for access to rental accommodation is most likely to also be occurring in these areas. However, the effect of household income loses significance in the overcrowding model. Crowding is likely to be the result of single persons living with existing multi-family and group households either formally or informally because their individual incomes are too low to access independent rental accommodation but, when combined, low individual incomes can lift overall household incomes into moderate to high quintile thresholds (Parkinson, James et al. 2018).

4.1.3 Other demographic effects on rates of homelessness

The demographic attributes of areas, such as age, Indigenous or ethnic background, and marital status, are typically strongly correlated with national rates of homelessness—but again these are also subject to variation across operational groups. When looking at our aggregate measure of national homelessness, the strongest effect is for age, whereby an increase in the percentage of those aged 25–40 years in an area lifts the rates of homelessness by 5 per cent. Similar effects are evident in models that omit supported accommodation. However, overcrowding modelled in isolation displays a different pattern and is more strongly associated with areas where there is an increase in the proportion of children aged younger than 14 years. In this instance we also see the overcrowding rates increase by 5 per cent, indicating that

overcrowding is prominent in areas with younger families who may be trapped in inadequate dwellings as their family has expanded.

The concentration of Indigenous persons in an area also elevates national rates of homelessness. The strength and direction are consistent across all models ranging from 4 per cent for all homelessness to 5 per cent when we omit supported accommodation, and increasing to 6 per cent when modelling overcrowding in isolation. An increase in the percentage of persons whose main language spoken at home is not English also elevates rates of national homelessness by 2 per cent for all aggregate homelessness and in models where supported accommodation is omitted. Like Indigenous status, this effect increases to 5 per cent when just estimating overcrowding in isolation. Interestingly, when we omit overcrowding from the estimates, non-English speaking background becomes insignificant, suggesting that a large component of area-based overcrowding is linked to more culturally diverse areas.

The gender composition of an area is not significant in observations of aggregate homelessness, but does become highly significant for overcrowding and this is mostly in areas where there are higher than average concentrations of males. This 'male effect' on overcrowding is very large, increasing rates by 10 per cent.

While the above indicators typically lift rates of homelessness, areas characterised by greater concentrations of married persons have decreased rates of homelessness. The effects of marital status are highly significant and are relatively stable across all models at around 3 per cent and increasing slightly to 4 per cent when we omit overcrowding.

The collective results across housing and demographic attributes support the poverty thesis where the opportunity structures shaping a homelessness episode are likely to correspond with social networks in poorer areas. Accessing supported accommodation in the more expensive housing markets of the inner city or central business districts of the area might offer better employment opportunities; however, the capacity to access more affordable housing options is likely to be constrained and therefore potentially extend durations of homelessness over time.

4.2 Variation in homelessness across capital cities, regional and remote areas

We now turn to a separate set of models for capital cities, and regional and remote areas to examine whether operational groups correlate with housing, labour and demographic characteristics of areas in different ways. Our earlier descriptive shift-share analysis pointed to the importance of regional factors in driving change in the homelessness rates over time. Similarly, we know that the adverse effect of housing affordability on lower income individuals and households has been particularly dramatic in our major capital cities and could be accounting in part for the increased urbanisation of homelessness. Estimating separate models can therefore shed important insights on what some of these factors might be, bearing in mind that we are left with fewer area-based observations and where the strength of various measures will be subject to more cautious interpretation and conclusions. In discussing results of these sets of models, we highlight key differences or deviations from the national pattern rather than discuss all measures in turn.

4.2.1 Capital cities

For capital cities, aggregate rates of homelessness are strongly shaped by the share of males in an area. As shown in tables 11 and 12, the effect is both significant and large; coefficient estimates imply that a 1 per cent increase in the male population share lifts the aggregate rate of homelessness in an area by 15 per cent. While it remains high across all sets of models, the effect is further strengthened and reaches 22 per cent when overcrowding is modelled separately. This is larger than the corresponding effect on total homelessness, which may mean

that male population shares matter more because of their association with overcrowding, rather than other forms of homelessness.

The effects of housing and labour market measures in the city models are particularly sensitive to whether supported accommodation and overcrowding is included in or omitted from models. When we omit supported accommodation, we find that the effects of housing market conditions are now strongly significant. Median weekly rents in particular have the highest effect, whereby a $10 increase in area-based median rents increases rates of homelessness by 1.4 per cent after controlling for the income of the areas. Again, dwellings affordable for the lowest 20 per cent of income groups is highly significant for overcrowding modelled in isolation, where an increase in supply at the lowest end of the rental market decreases overcrowding by 2 per cent. Curiously, when we omit overcrowding the effect of median rents all but disappears and the supply of affordable dwellings at the lowest end changes in direction.

The unemployment rate of an area bears little influence on aggregate rates of city homelessness, but becomes highly significant for area-based overcrowding in capital cities. The effect of unemployment is stronger than in the national estimate, increasing rates by 12–13 per cent across models. These findings reaffirm the important policy and service implications of better understanding the urban spatial distribution of overcrowding in conjunction with other homelessness operational groups.

The Indigenous are a very low share of populations in regions belonging to our capital cities (typically 1.5%) and are therefore unlikely to be a strong influence explaining variation in rates of homelessness. This is confirmed in models explaining rates of total homelessness but, curiously, when supported accommodation is omitted from the homelessness definition the Indigenous share becomes significantly positive, with 6 per cent increase. The effect increase is the same across separate models for overcrowding. This finding has a potentially important policy implication as it could mean that in urban settings homeless Indigenous persons are less likely to receive services in the form of supported accommodation. They therefore have a more prominent presence in the other homelessness categories that enable models to detect statistically significant effects. We typically observe similar patterns among non-English-speaking at home groups as for the national models.

In sum, the overcrowding models are in line with expectations. We find that city regions with a younger population, a higher share of males, the Indigenous and migrants from non-English-speaking backgrounds, with high unemployment, are liable to house many of its inhabitants in severely cramped accommodation. These population demographics are statistically significant, and some have large impacts.

Table 11: SAR model results, capital city homelessness rates

	Log of homelessness rates all groups			Log of homelessness rates omitting supported accommodation		
All	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Male %	14.912***	15.373***	15.027***	15.373***	15.720***	15.027***
Age 0–14	0.129	0.012	-0.149	-1.725	-1.489	-1.804
Age 15–24	3.256**	-3.391**	-3.353**	-3.285**	-3.324**	-3.169**
Age 25–40	2.994***	2.973***	2.932**	2.286*	2.286*	2.092*
Unemployment %	-4.007	-3.314	-3.265	5.348	5.348	5.338
Married %	-5.314***	-5.238***	-5.276***	-4.582***	-4.572***	-4.677***
Indigenous %	2.439	2.041	2.255	6.332**	5.622**	5.707**
Speaks other language at home %	2.041***	1.898***	1.969***	2.061***	1.908***	1.990***
Dwellings affordable to Q1	0.755			0.076		
Dwellings affordable to Q1 & Q2%		-0.171			-0.341*	
Median rents/10			0.369			1.400*
Q4 Income %	-1.784	-2.323*	-2.068	-1.558	-2.010	-1.410
Q5 Income %	-0.430	-0.866*	-0.769	0.091	-0.546	-0.766

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated and multiplied by 100 for ease of interpretation.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

Table 12: SAR model results, capital city overcrowding rates

	Log of overcrowding rates			Log of all homelessness rates omitting overcrowding		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Male %	22.630***	22.630***	22.140***	12.300***	12.412***	12.524***
Age 0–14	3.386*	4.164*	3.987*	-0.704	-1.341	-1.262
Age 15–24	-1.292	-1.035	-0.971	-4.295***	-4.534***	-4.524***
Age 25–40	0.370	0.338	0.010	2.860**	2.830**	2.840**
Unemployment %	14.683**	12.862*	12.975*	-10.506***	-9.108***	-9.145***
Married %	-2.274	-2.440	-2.635*	-6.387***	-6.256***	-6.228***
Indigenous %	6.631*	6.503*	6.067*	0.786*	0.977*	0.778*
Speaks other language at home %	4.582***	4.645***	4.655***	0.579*	0.536	0.488
Dwellings affordable to Q1 %	-2.293**			1.450**		
Dwellings affordable to Q1 & Q2 %		-0.154			0.093	
Median rents			1.339			0.005
Q4 Income %	-0.012	0.881	1.400	-1.292	-1.794	-1.921
Q5 Income %	-0.799	-0.701	-1.213	-0.376	-0.434	-0.616

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated and multiplied by 100 for ease of interpretation.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

4.2.2 Regional and remote models

The regional and remote models are estimates across a smaller number of observations—316 regions in the regional model and 276 in the remote model, whereas the capital city model is estimated on 728 regions. Given the smaller sample sizes and larger geographical expanses in some locations, the regional and remote models are likely to offer less precise estimates, and this is reflected in the generally weaker levels of statistical significance in these models. Sensitivity to three alternative measures of housing affordability is again investigated. However, we do not include models omitting supported accommodation, as regional and remote areas tend to cover larger boundaries where services and markets are less segmented.

We begin by contrasting findings from models estimated across the regional and remote geographical region classifications for aggregate measure of homelessness. The housing market measures including both supply measures of affordability and median area-based rents remain significant in the regional models, but not for those in remote areas. The strongest effect in the regional models is for median rents, which elevate homelessness by 2 per cent for every $10 increase. Interestingly, housing affordability market measures are not significant for

overcrowding in either regional or remote models, pointing to different drivers in these areas. It may also be that the measures specified do not adequately capture these housing markets, where there could be a complete absence of supply across all income groups because of lower investment activity.

The male share of an area's population was very important in the capital cities, and it still matters in the regional model, but the effect is smaller. Though the population share of males in remote areas is generally a little higher and typically over one-half of their populations, the effect on homelessness tails off and the relationship reverses to become negative.

Curiously, the pattern across different Australian geographies is the reverse of that found with respect to the Indigenous variable. While always a positive impact on homelessness, the Indigenous variable becomes weakly significant in the regional model and strongly significant in the remote model. Further, the size of the impact is relatively large in the regional and remote models. It is perhaps pertinent to note that Indigenous population shares in remote regions are typically more than five times those in city regions; and their shares of area populations are much more variable than they are across capital city areas—in some remote regions they are a majority share of the population.[16]

Unlike the previous models, higher household incomes increase area rates of remote aggregate homelessness and overcrowding. The positive relationship with income may also reflect higher rates of overcrowding relative to population numbers, which can lift overall household incomes despite being comprised of many low-income individuals. Also, mining areas are characterised by high household income and this could cause segmentation—albeit segmentation within the one spatial boundary. Moreover, it is likely that housing markets have not segmented to cater for lower income groups in these areas as they do in capital city or regional markets, thereby increasing competition and discrimination for the limited private housing stock that might be available.

The concentration of unemployment in the area is negatively associated with homelessness rates, with an increase in the rate of unemployment decreasing the rate of homelessness by 6–7 per cent across models after controlling for income.

[16] In capital cities, the Indigenous share is on average only 1.5 per cent, and the standard deviation is 1.6. In the regional classification of areas, the mean and standard deviation are 2.3 per cent and 1.4 respectively. Finally, in the remote areas the corresponding figures are 10.5 per cent and 13.3.

Table 13: SAR model results, regional homelessness rates

	Log of homelessness rates all groups		
All	**Model 1**	**Model 2**	**Model 3**
Male %	11.182*	11.963**	11.851**
Age 0–14	4.592*	4.613*	4.812*
Age 15–24	-7.077**	-5.965*	-6.331*
Age 25–40	0.503	0.997	0.930
Unemployment %	-6.677*	-5.984*	-6.349*
Married %	-6.387***	-6.209***	-6.480***
Indigenous %	6.099*	6.141*	5.802*
Speaks other language at home %	3.500**	3.355**	3.479**
Dwellings affordable to Q1	-0.331		
Dwellings affordable to Q1 & Q2 %		-0.529**	
Median rents/10			2.071*
Q4 Income %	-0.896	-1.636	-1.548
Q5 Income %	-2.518**	-3.353***	-3.275**

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated and multiplied by 100 for ease of interpretation.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

Table 14: SAR model results, regional overcrowding rates

	Log of overcrowding rates			Log of all homelessness rates omitting overcrowding		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Male %	3.396	3.200	3.728	9.199	10.241*	9.955*
Age 0–14	6.951	6.652	7.101	4.352	4.384	4.519
Age 15–24	-4.314	-4.094	-3.536	-6.134*	-5.710*	-6.059*
Age 25–40	1.745	1.816	2.041	1.969	2.204	2.194
Unemployment %	10.462	10.849	10.252	-10.685***	-9.444**	-9.878**
Married %	-2.010	-1.813	-1.911	-6.200***	-6.246***	-6.509***
Indigenous %	8.556	9.253	8.622	5.464	6.152*	5.802*
Speaks other language at home %	5.601**	5.548**	5.506**	2.778*	2.562*	2.757*
Dwellings affordable to Q1 %	-0.386			-0.797*		
Dwellings affordable to Q1 & Q2 %		-0.178			-0.624**	
Median rents			1.440			2.603**
Q4 Income %	-3.526	-3.449	-4.065	-1.951	-2.293	-2.196
Q5 Income %	0.258	0.132	-0.127	-2.878**	-3.767***	-3.729***

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated and multiplied by 100 for ease of interpretation.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

Table 15: SAR model results, remote homelessness rates

	Log of homelessness rates all groups		
All	**Model 1**	**Model 2**	**Model 3**
Male %	-6.518**	-6.218*	-6.882**
Age 0–14	-4.429	-4.171	-4.896
Age 15–24	3.593	3.655	3.634
Age 25–40	4.582	4.289	4.991
Unemployment %	-2.029	-2.030	-2.332
Married %	-0.535	-0.667	-0.549
Indigenous %	7.058***	6.983***	7.111***
Dwellings affordable to Q1	-0.121		
Dwellings affordable to Q1 & Q2%		-0.225	
Median rents/10			-0.175
Q4 Income %	0.691	0.736	0.474
Q5 Income %	1.715*	1.390	1.979*

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated. Removes speaks another language at home due to multicollinearity with Indigenous status.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

Table 16: SAR model results, remote overcrowding rates

	Log of overcrowding rates			Log of all homelessness rates omitting overcrowding		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Male %	3.946	3.334	1.898	-10.417***	-9.787***	-10.685***
Age 0–14	7.412	6.332	4.991	-6.499**	-5.927**	-6.667**
Age 15–24	-10.596	-10.685	-11.130	4.112	4.540	3.852
Age 25–40	-5.635	-5.993	-5.427	10.506***	9.834***	9.988***
Unemployment %	2.644	1.633	0.948	-4.285	-4.458	-4.505
Married %	-6.077	-6.900*	-7.049*	-0.036	-0.301	-0.445
Indigenous %	10.738***	10.738***	10.961***	2.368***	2.194***	2.357***
Dwellings affordable to Q1 %	-1.242*			-0.403		
Dwellings affordable to Q1 & Q2 %		-0.650			-0.591*	
Median rents			0.103			0.397

	Log of overcrowding rates			Log of all homelessness rates omitting overcrowding		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Q4 Income %	0.302	1.826	2.603	-0.747	-0.573	0.782
Q5 Income %	4.310**	3.997*	4.980*	-0.355	-1.074	-0.513

** p < 0.05, ** p < 0.01, *** p < 0.001. Controls for population density. Log coefficients have been exponentiated. Removes speaks another language at home due to multicollinearity with Indigenous status.*

Source: Authors' panel dataset (ABS Census homelessness estimates, TSP and special request files).

4.3 Policy development implications

- There is a need to better understand the service implications of the urban spatial distribution of overcrowding in conjunction with other homelessness components, and the implications this may have for social and economic participation.
- Careful planning of approvals granted to new supplies of affordable housing is required to ensure that new dwellings and housing assistance packages enable people to remain within their communities and close to support. Policy initiatives should include the exploration of more innovative responses to address issues of overcrowding, particularly among those with young children and extended kinship groups.
- There is a need for a more targeted response and culturally appropriate service response to individuals and households from culturally diverse backgrounds, including Indigenous people and those with English as a second language, within urban and suburban areas. This may include increased outreach and outposted services within areas that are more diverse, as well as those areas not already well serviced by housing and support services.
- Service mismatch has implications for how homelessness episodes are resolved. If more informal sources of support are in the more disadvantaged regions and individuals with experience of homelessness gravitate away from these networks, or 'opportunity structures', to access services, it is likely that it will be more difficult to resolve their housing crisis over time in higher-priced markets. Similarly, if people remain in disadvantaged areas without formal assistance, including housing and support, reliance on informal housing solutions for extended periods could push individuals into even more precarious living arrangements.
- There is a critical need for supply-side initiatives to increase the stock of and the accessibility of housing to lowest income individuals and households, including single persons living in overcrowded conditions. New housing stock needs to cater better to a range of household sizes, including options for multiple-bedroom as well as single-bedroom dwellings. Innovative solutions that include additional living space for families in existing properties could also alleviate crowding.

5 Policy development options

Despite significant knowledge of both the causes and consequences of homelessness, the goal of ending homelessness remains elusive. It is clear that continuing to focus on individual vulnerabilities alone will do little to resolve this entrenched social justice and policy issue. The 'new consensus' among practitioners, policy makers and researchers is that responding to and ending homelessness will involve better understanding the interrelationships or 'conjunction' between individual vulnerability or 'capacity' and the broader social structures that serve to reinforce and entrench unequal opportunities and access to resources (Fitzpatrick and Christian 2006; O'Flaherty 2004; Pleace 2000; Westmore and Mallett, 2011). Effective solutions to prevent and respond to homelessness thus require evidence on both its individual and structural determinants (Johnson et al. 2015a, 2015b; Wood et al. 2014).

Understanding how the changing geography of homelessness is shaped by broader structural differences across regions—or what we have termed opportunity structures—is central in being able to effectively plan for where need is growing, but also to identify where existing interventions have been effective. Some important inroads have been made in reducing rates of homelessness in remote areas but these areas also face challenges of a declining population, and perhaps the migration of homelessness risk to new areas. Gaining deeper insight into the relationship between population growth, mobility and homelessness should remain a core focus of housing and homelessness policy.

It is pleasing that there has been increased recognition of the need for supply-side initiatives in conjunction with individually tailored packages of support to more vulnerable population groups. However, we need to be doing more if the rising trend in homelessness is to be reversed, particularly in the context of the growing challenge of overcrowding in the urban and suburban areas of our capital cities. The growth in homelessness has continued despite many small-scale initiatives to increase the supply of affordable housing, and it is clear that there is a national misallocation of housing according to areas in greatest need and at a price point that is accessible to those most at risk of homelessness.

Some of this misallocation of affordable housing stems from the allocation policies of public housing authorities that typically redirect particular groups to the private rental sector—especially young people and those on Newstart, which are a large cohort at risk of homelessness. Similarly, community housing requires a mix of affordable dwellings accessible to low and moderate income groups if it is to remain viable. To end homelessness, policy interventions will need to focus directly on increasing supply at the lowest end to those with individual incomes in the lowest 20 per cent that are single (Parkinson et al. 2018). There will also need to be greater recognition of the cultural determinants of overcrowding and how this interacts with housing markets more generally. This includes better understanding the increased movement towards shared living in the context of growing inequality between generations, and also income polarisation that widens the divide between those that win out in the housing market and those that lose.

5.1 Conclusion

In this research, drawing on a specially created spatial panel dataset of Census and SHS (Specialist Homelessness Services) service data from 2001–2016, we first sought to answer the question of how the incidence of homelessness and its components varies within and between regions, states and territories, and whether over this period it was becoming more or less spatially concentrated. In answering this question, we find that the national per capita rate of homelessness has been more or less stable between 2001 and 2016, but the count measure of homelessness has increased by more than 20 precent over this timeframe, coinciding with

significant population growth. On the one hand, homelessness is becoming a more urbanised phenomenon—with increases in rates and shares in major cities, as well as the most populous states (NSW and Victoria) and concurrent falls for more remote areas but where the incidence still remains the highest nationally. On the other hand, we also identify a dual process of suburbanisation occurring within capital cities where homelessness is becoming more concentrated in the outer metropolitan areas of our major cities, particularly Sydney and Melbourne.

We also find geographical shifts in the location of rough sleepers and overcrowding to be the most important components steering the urbanisation between capital cities, regional and remote areas and the suburbanisation within cities. The geographical reshaping of homelessness over time appears to be related to the characteristics of the areas—or what we call regional opportunity structures—such as labour, housing markets and demographic characteristics of places.

First, in identifying the extent to which regional opportunity structures might be reshaping the distribution of homelessness, we explored descriptively whether homelessness, including overcrowding, was rising or falling in areas with a shortage of affordable private rental housing during our study time period. In turn, we also examined whether SHS were well located to intervene based on this changing geography of homelessness. In response to these points of inquiry, we found that homelessness is rising in areas with a shortage of affordable private rental housing as measured by the match between supply and demand for low-cost housing and median weekly rents. The descriptive association between high growth in homelessness rates and a corresponding growth in the shortage of affordable housing was most acute in capital city areas, specifically Sydney, Hobart and Melbourne. The most striking effect of this change was for areas that also had the largest shares of severe crowding as a component of homelessness. Our results suggest that, at least descriptively, rising rental costs and a shortage in the supply of affordable rents have been playing a role in shaping the growth of urban city homelessness. A deeper understanding of the dynamic nature of homelessness and how people move through different types of homelessness is required to understand which interventions might be needed in different regions.

Our findings also suggest a substantial mismatch between the distribution of homelessness and specialist homeless service capacity. Looking at 2016 nationally, 50 per cent of SHS accommodation capacity and 48 per cent of accommodation capacity would need to shift across SA3 boundaries to better align with the distribution of homelessness across the nation. Most SHS capacity is located in and around capital city areas with less capacity in regional and remote areas. We hypothesise that changes in this mismatch over time reflect the changing geography of homelessness rather than the changing geography of SHS capacity. It is to be noted that our finding of an increasingly urbanised homelessness count is accompanied by a sharp increase in capital city mismatch estimates—in only five years the persons supported measure increases by 7 per cent and the persons accommodated measure rises by an even larger 13 per cent. If the spatial allocation service capacity changes slowly, the implication is that the geography of homelessness in capital cities is changing in ways that leave them increasingly distant from the location of services. This is a warning sign for policy makers given the important geographical changes in patterns of homelessness that we detect in this report.

We further sought to answer the question on the influence of regional opportunity structures such as housing and labour markets in underpinning the changing geography of homelessness by estimating spatial economic models. We found that areas with elevated rates of homelessness are also those that are more culturally associated with overcrowding and poverty from single incomes. In urban areas these were most typically males. The availability and affordability of housing in an area matters and can be considered an important element shaping

the increase in the urbanisation of homelessness that we have observed in our major cities, particularly Sydney.

Similarly, the effect of household incomes differs according to location and potentially signals the important influence of the processes of segmentation and spatial polarisation occurring in our larger cities that displace certain groups into different submarkets. Whereas in remote areas there may be less choice, fewer opportunities and greater market failure in meeting housing needs. More nuanced analysis of the distinct spatial patterns of homelessness in particular locations is critical to reducing its impact. Also, part of understanding rising rates of homelessness is gaining deeper insight into changing practices in household formation in the context of both declining affordability and supply shortages.

The settlement of particular groups in an area will increase observations of homelessness not only because of low incomes or poverty, but also due to social and cultural practices in self-provisioning in the context of that poverty and the absence of resources or opportunities to resolve it. In areas where there are limited services and housing stock, we would expect to see rates of overcrowding and staying temporarily with others to be higher and this is particularly evident in the remote and very remote areas. The opportunity structures are strongly shaped by place and proximity to services. In the absence of state-based support, low-income individuals rely on informal means for survival (Parkinson et al. 2018). Overcrowding can be considered one manifestation of this.

Building on the descriptive analysis, we confirm from our modelling that area-based attributes impact upon area rates of homelessness, including distinct components such as overcrowding, in uneven ways across capital city, regional and remote locations. Geography thus presents distinct spatial opportunity structures that coalesce to mediate or exacerbate the effect of demographic and submarkets for employment and housing. Understanding homelessness and the supply of affordable housing in the context of this variation is a key area of policy intervention and further research.

References

Anselin L., Le Gallo J. and Jayet H. (2008) 'Spatial panel econometrics', in M. László and P. Sevestre (eds), *The Econometrics of Panel Data: Fundamentals and Recent Developments in Theory and Practice*, 3rd edn, Springer, Berlin: 625–660.

Australian Bureau of Statistics (2012a) *Information paper: a statistical definition of homelessness*, cat. no. 4922.0, ABS, Canberra.

Australian Bureau of Statistics (2012b) *Census of Population and Housing: estimating homelessness*, 2011, cat. no. 2049.0, ABS, Canberra.

Australian Bureau of Statistics (2012c) *Information paper: methodology for estimating homelessness from the Census of Population and Housing*, cat. no. 2049.0.55.001, ABS, Canberra.

Australian Bureau of Statistics (2012d) *Factsheet: enumeration procedures for the homeless*, Census of Population and Housing 2011, viewed 9 April 2019, www.abs.gov.au/websitedbs/censushome.nsf/home/factsheetseph?opendocument&navpos=450.

Australian Bureau of Statistics (2017) *Labour force, Australia*, June 2018, cat. no. 6202.0, ABS, Canberra.

Australian Bureau of Statistics (2018a) *Australian Statistical Geography Standard (ASGS)*, viewed 11 December 2018, www.abs.gov.au/websitedbs/D3310114.nsf/home/Australian+Statistical+Geography+Standard+(ASGS).

Australian Bureau of Statistics (2018b) *Australian Statistical Geography Standard (ASGS): volume 5 – remoteness structure*, July 2016, cat. no. 1270.0.55.005, viewed 28 November 2018, www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1270.0.55.005Main+Features1July%202016?OpenDocument.

Australian Bureau of Statistics (2018c) *Census of Population and Housing: Estimating homelessness, 2016*, cat. no. 2049.0, viewed 09 April 2019, https://www.abs.gov.au/ausstats/abs@.nsf/mf/2049.0.

Australian Institute of Health and Welfare (2012) *Specialist homelessness services 2011–12, supplementary tables*, cat. no. HOU 267, AIHW, Canberra.

Australian Institute of Health and Welfare (2018) *Housing assistance in Australia 2018*, cat. no. HOU 296, viewed 7 November 2018, https://www.aihw.gov.au/reports/housing-assistance/housing-assistance-in-australia-2018/contents/housing-in-australia.

AIHW (Australian Institute of Health and Welfare) (2017) *Specialist Homelessness Services 2016–17*, Cat. no: HOU 299, AIHW, Canberra.

Australian Treasury (2018) *Housing Policy*, Australian Government, viewed 7 December 2018, https://treasury.gov.au/housing-policy.

Baker, E., Bentley, R., Lester, L. and Beer, A. (2016) 'Housing affordability and residential mobility as drivers of locational inequality', *Applied Geography*, vol. 72, July: 65–75. doi: 10.1016/j.apgeog.2016.05.007.

Ballas, D., Dorling D. and Hennig, B. (2017) 'Analysing the regional geography of poverty, austerity and inequality in Europe: a human cartographic perspective', *Regional Studies*, vol. 51, no. 1: 174–185. doi: 10.1080/00343404.2016.1262019.

Bartelt, D., Eyrich-Garg K.M. and Lockwood, B. (2017) 'The relationships between community context and entry into a homeless shelter system', *Journal of Urban Affairs*, vol. 39, no. 5: 675–690. doi: 10.1080/07352166.2016.1271616.

Batterham, D. (2012) 'The structural drivers of homelessness: exploring the relationships between housing market, labour market, demographics, service availability and homelessness in Victoria', in A. Beer (ed), *Proceedings of the 6th Australasian Housing Researchers' Conference (AHRC12)*, University of Adelaide, Centre for Housing, Urban and Research Planning, Adelaide.

Batterham, D. (2017) 'Defining "at-risk of homelessness": re-connecting causes, mechanisms and risk', *Housing, Theory and Society*, doi: 10.1080/14036096.2017.1408678.

Baum, S. and Mitchell, W. (2008) 'Underutilisation and unemployment: an analysis of labour force outcomes for Australian youth', *Australian Journal of Labour Economics*, vol. 11, no. 3: 187–201.

Baum, S. and Gleeson, B. (2010) 'Space and place: social exclusion in Australia's suburban heartlands', *Urban Policy & Research*, vol. 28, no. 2: 135–159.

Bevitt, A. Chigavazira, A. Herault, N. et al. (2015) *Journeys Home Research Report No. 6: complete findings from Waves 1 to 6*, Melbourne Institute of Applied Economic and Social Research, Melbourne.

Bill, A. and Mitchell, W. (2005) *Exploratory spatial data analysis of long and short-term unemployment in Australia*, Working Paper no. 05–07, Centre of Full Employment and Equity, University of Newcastle, Callaghan.

Blessing, A. and Gilmore, T. (2011) 'The invisible hand? Using tax credits to encourage institutional investment in social housing', *International Journal of Housing Policy*, vol. 11, no. 4: 453–468.

Bohanon, C. (1991) 'The economic correlates of homelessness in sixty cities', *Social Science Quarterly*, vol. 72, no. 4: 817–825.

Campbell, I., Parkinson, S. and Wood, G. (2014) *Underemployment and housing insecurity: an empirical analysis of HILDA data*, AHURI Final Report No. 230, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/230.

Chamberlain, C. (2012) 'Counting boarding houses: reflections on homelessness research in Australia', Proceedings of the Homelessness Research Conference, 19–20 April 2012, Melbourne.

Chamberlain, C. and MacKenzie, D. 1992, 'Understanding contemporary homelessness: issues of definition and meaning', *The Australian Journal of Social Issues*, vol. 27, no. 4: 274–297. doi:10.1002/j.1839-4655.1992.tb00911.x.

Cheshire, L., Pawson, H., Easthope, H. and Stone, W. (2014) *Living with place disadvantage: community, practice and policy*, AHURI Final Report No. 228, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/228.

Commonwealth of Australia (2008) *The road home: a national approach to reducing homelessness*, White Paper, Department of Families, Housing, Community Services and Indigenous Affairs, Canberra.

Commonwealth of Australia (2017) *A new National Housing and Homelessness Agreement*, Federal Budget Fact Sheet 1.7, viewed 19 July 2017, http://www.budget.gov.au/2017-18/content/glossies/factsheets/download/FS_17_Housing_Affordability.pdf.

Corbett, T. (1991) 'The Wisconsin welfare magnet debate: what is an ordinary member of the tribe to do when the witch doctors disagree?', *Focus*, vol. 13, no. 3: 19–27.

CoreLogic (2017) *Housing market and economic update: June 2017*, viewed 28 June 2017, https://www.corelogic.com.au/resources/pdf/indices/chart-pack/2017-06--JunePropertyandEconomicOverview.pdf?language_id=1.

Cotter, D. (2009) 'Poor people in poor places: local opportunity structures and household poverty', *Rural Sociology*, vol. 67, no. 4: 534–555.·doi: 10.1111/j.1549-0831.2002.tb00118.x.

Culhane, P., Lee, C.-M. and Wachter, S.M. (1996) 'Where the homeless come from: a study of the prior address distribution of families admitted to public shelters in New York City and Philadelphia', *Housing Policy Debate*, vol. 7, no. 2: 327–365. doi: 10.1080/10511482.1996.9521224.

Early, D. and Olsen, E.O. (2002) 'Subsidized housing, emergency shelters, and homelessness: an empirical investigation using data from the 1990 census', *Advances in Economic Analysis & Policy*, vol. 2, no.1: 1–34. doi: 10.2202/1538-0637.1011.

Elliott, M. and Krivo, L.J. (1991) 'Structural determinants of homelessness in the United States', *Social Problems*, vol. 38, no. 1: 113–131.

Fitzpatrick, S. and Christian, J. (2006) 'Comparing homelessness research in the US and Britain', *International Journal of Housing Policy*, vol. 6, no. 3: 313–33.

Florida, R., Mellander, C. and Witte, P. (2012) *The geography of homelessness*, Working Paper series, Martin Prosperity Research, Toronto.

Galster, G. and Sharkey, P. (2017) 'Spatial foundations of inequality: a conceptual model and empirical overview', *Journal of the Social Sciences*, vol. 3, no. 2: 1–33.

Honig, M. and Filer, R.K. (1993) 'Causes of intercity variation in homelessness', *The American Economic Review*, vol. 83, no. 1: 248–255.

Hulse, K. and Pinnegar, S. (2015) *Housing markets and socio-spatial disadvantage: an Australian perspective*, AHURI Research Paper, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/research-papers/housing-markets-and-socio-spatial-disadvantage-an-australian-perspective.

Hulse, K. and Reynolds, M. (2018) 'Investification: financialisation of housing markets and persistence of suburban socio-economic disadvantage', *Urban Studies*, vol. 55, no. 8: 1655–1671.

Hulse, K. and Yates, J. (2017) 'A private rental sector paradox: unpacking the effects of urban restructuring on housing market dynamics', *Housing Studies*, vol. 32, no. 3: 253–270.

Hulse, K., Parkinson, S. and Martin, C. (2018) *Inquiry into the future of the private rental sector*, AHURI Final Report 303, Australian Housing and Urban Research Institute Limited, Melbourne, http://www.ahuri.edu.au/research/final-reports/303, doi: 10.18408/ahuri-5112001.

Hulse, K., Reynolds, M. and Yates, J. (2014) *Changes in the supply of affordable housing in the private rental sector for lower-income households, 2006–11*, Final Report No. 235, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/235.

Johnson, G., Parkinson, S. and Parsell, C. (2012) *Policy shift or program drift? Implementing Housing First in Australia*, AHURI Final Report No. 184. Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/184.

Johnson, G., Scutella, R., Tseng, Y.-P. and Wood, G. (2015a) *Entries and exits from homelessness: a dynamic analysis of the relationship between structural conditions and individual characteristics*, AHURI Final Report No. 248, Australian Housing and Urban Research Institute Limited, Melbourne, http://www.ahuri.edu.au/research/final-reports/248.

Johnson, G., Scutella, R., Tseng, Y.-P. and Wood, G. (2015b) *Examining the relationship between structural factors, individual characteristics, and homelessness*, AHURI Positioning Paper No. 161, Australian Housing and Urban Research Institute Limited, Melbourne, http://www.ahuri.edu.au/research/position-papers/161.

Kemp, P.A., Lynch, E. and Mackay, D. (2001) *Structural trends and homelessness: a quantitative analysis*, Homelessness Task Force Research Series, Scottish Executive Central Research Unit, Scotland.

Lee, B.A., Price-Spratlen, T. and Kanan, J.W. (2003) 'Determinants of homelessness in metropolitan areas', *Journal of Urban Affairs*, vol. 25, no. 3: 335–355.

Loveland, I. (1991) 'Local government responses to homelessness: a Californian case study', *Local Government Studies*, vol. 17, no. 1: 13–44.

May, J. (2003) 'Local connection criteria and single homeless people's geographical mobility: evidence from Brighton and Hove', *Housing Studies*, vol. 18, no. 1: 29–46. doi: 10.1080/0267303032000076821.

Nygaard, C., Wood, G. and Stoakes, A. (2005) 'A tale of three cities: labour and housing markets in a post-industrial era', paper, Second National Conference on the State of Australian Cities, December 2005, Brisbane.

O'Donnell, J. (2016) 'The suburbanisation of homelessness in Sydney, Australia', *Applied Spatial Analysis and Policy*, online. doi: 10.1007/s12061-016-9216-0.

O'Flaherty, B. (2004) 'Wrong person and wrong place: for homelessness, the conjunction is what matters', *Journal of Housing Economics*, vol. 13, no. 1: 1–15.

Parkinson, S. and Parsell, C. (2018) 'Housing First and the reassembling of permanent supportive housing: the limits and opportunities of private rental', *Housing, Theory and Society*, vol. 35, no. 1: 36–56. doi: 10.1080/14036096.2017.1281163.

Parkinson, S., James, A. and Liu, E. (2018) *Navigating a changing private rental sector: opportunities and challenges for low-income renters*, AHURI Final Report No. 302, Australian Housing and Urban Research Institute Limited, Melbourne, http://www.ahuri.edu.au/research/final-reports/302, doi: 10.18408/ahuri-5112301.

Parkinson, S., Ong, R., Cigdem, M. and Taylor, E. (2014) *Wellbeing outcomes of lower income renters: a multilevel analysis of area effects*, AHURI Final Report No. 226, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/226.

Pawson, H. and Herath, S. (2015) 'Dissecting and tracking socio- spatial disadvantage in urban Australia', *Cities*, vol. 44: 73–85. doi: 10.1016/j.cities.2015.02.001.

Pawson, H., Parsell,C., Saunders, P., Hill, T. and Lui, E. (2018) *Australian Homelessness Monitor*, Launch Housing, viewed 7 December 2018, https://www.launchhousing.org.au/australianhomelessnessmonitor/.

Picketty, T. (2014) *Capital in the Twenty-First Century*, Belknap Press, Cambridge.

Pleace, N. (2000) 'The new consensus, the old consensus and the provision of services for people sleeping rough', *Housing Studies*, vol. 15, no. 4: 581–594.

Quigley, J.M. and Raphael, S. (2001) 'The economics of homelessness: the evidence from North America', *European Journal of Housing Policy*, vol. 1, no. 3: 323–336.

Quigley, J.M., Raphael, S. and Smolensky, E. (2001) 'Homeless in America, homeless in California', *The Review of Economics and Statistics*, vol. 83, no. 1: 37–51.

Randolph, B. and Tice, A. (2017) 'Relocating disadvantage in five Australian cities: socio-spatial polarisation under neo-liberalism', *Urban Policy and Research*, vol. 35, no. 2: 103–121. doi: 10.1080/08111146.2016.1221337.

Randolph, B., Troy, L., Milligan, V. and van den Nouwelant, R. (2018) *Paying for affordable housing in different market contexts*, AHURI Final Report No. 293, Australian Housing and Urban Research Institute Limited, Melbourne, http://www.ahuri.edu.au/research/final-reports/293, doi: 10.18408/ahuri-7113301.

Rowley, S., James, A., Gilbert, C., Gurran, N., Ong, R., Phibbs, P., Rosen, D. and Whitehead, C. (2016) *Subsidised affordable rental housing: lessons from Australia and overseas*, AHURI Final Report No. 267, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/267, doi:10.18408/ahuri-8104301.

Sharam, A., Ralston, L., and Parkinson, S. (2016) *Security in retirement: the impact of housing and key critical life events*, Swinburne University of Technology, Melbourne.

Victoria State Government (2017) *Homes for Victorians: Affordability, Access and Choice*, viewed 7 December 2018.

Vinson, T., Rawsthorne, M., Beavis, A. and Ericson, M. (2015), *Dropping off the Edge 2015: Persistent Communal Disadvantage in Australia*, Jesuit Social Services and Catholic Social Services Australia, Richmond.

Ward, M.D and Gleditsch, K.S. (2008) *Spatial Regression Models*, Sage Publications, Thousand Oaks, California.

Weller, S. and van Hulten, A. (2012) 'Gentrification and displacement: the effects of a housing crisis on Melbourne's low-income residents', *Urban Policy and Research*, vol. 30, no. 1: 25–42. doi: 10.1080/08111146.2011.635410.

Westmore, T. and Mallett, S. (2011) *Ageing in what place? The experience of housing crisis and homelessness for older Victorians*, Final Report, Hanover Welfare Services, Melbourne.

Whelan, S. and Parkinson, S. (2017) *Housing tenure, mobility and labour market behaviour*, AHURI Final Report No. 280, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/280, doi:10.18408/ahuri-7307101.

Wood, G., Sommervoll, D.E. and de Silva, A. (2016) 'Do urban house prices converge?', *Urban Policy and Research*, vol. 34, no. 2: 102–115. doi: 10.1080/08111146.2015.1047492.

Wood, G., Batterham, D., Cigdem, M. and Mallett, S. (2014) *The spatial dynamics of homelessness in Australia 2001–2011*, AHURI Final Report No. 227, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/227.

Wood, G., Batterham, D., Cigdem, M. and Mallett, S. (2015) *The structural drivers of homelessness in Australia 2001–11*, AHURI Final Report No. 238. Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/238.

Wood, G.A., Smith, S.J., Cigdem, M. and Ong, R. (2017) 'Life on the edge: a perspective on precarious home ownership in Australia and the UK', *International Journal of Housing Policy*, vol. 17, no. 2: 201–226. doi: 10.1080/14616718.2015.1115225.

Wulff, M. and Reynolds, M. (2010) *Housing, inequality and the role of population mobility*, AHURI Final Report No.158, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/158.

Wulff, M., Reynolds, M., Arunachalam, D., Hulse, K. and Yates, J. (2011) *Australia's private rental market: the supply of, and demand for, affordable dwellings*, AHURI Final Report No. 168, Australian Housing and Urban Research Institute Limited, Melbourne, available at: http://www.ahuri.edu.au/research/final-reports/168.

Yates, J., Milligan, V., Berry, M., Burke, T., Gabriel, M., Phibbs, P., Pinnegar, S. and Ran, B. (2007) *Housing affordability: a 21st century problem*, AHURI Final Report No. 105, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/105.

Yates, J., Randolph, B., Holloway, D. and Murray, D. (2006) *Housing affordability, occupation and location in Australian cities and regions*, Final Report No. 91, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/91.

Yates, J., Wulff, M. and Reynolds, M. (2004) *Changes in the supply of and need for low rent dwellings in the private rental market*, Final Report No. 61, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/61.

Appendix 1: Variables and descriptive tables by data source

The following tables of variables and descriptive information relate to the data sources described in Chapter 1: homelessness estimates (ABS Census); Time Series Profile and TableBuilder (ABS Census); special request files (ABS Census); and the Specialist Homelessness Services Collection (AIHW).

Section 1 ABS Census: homelessness estimates

Table A1: ABS Census homelessness estimate variables

Variable	Unit of analysis	Variable details
Total homeless persons	Persons	Total number of persons experiencing homelessness within SA3 *i* in year X
Total homeless persons in Operational group 1	Persons	Number of persons within SA3 *i* who are in improvised dwellings, tents or sleeping out in year X
Total homeless persons in Operational group 2	Persons	Number of persons within SA3 *i* in supported accommodation for the homeless in year X
Total homeless persons in Operational group 3	Persons	Number of persons within SA3 *i* staying temporarily with other households in year X
Total homeless persons in Operational group 4	Persons	Number of persons within SA3 *i* staying in boarding houses in year X
Total homeless persons in Operational group 5	Persons	Number of persons within SA3 *i* in other temporary lodging in year X
Total homeless persons in Operational group 6	Persons	Number of persons within SA3 *i* living in 'severely' crowded dwellings in year X

Source: ABS Census Times Series Homelessness Estimates 2001, 2006, 2011 and 2016

Table A2: Key homeless measures derived from the ABS homelessness estimates

Key measures*	Unit of measurement	Variable details
Homelessness rate	Persons	Number of homeless persons within SA3 *i* per 10,000 persons in year *X*
Homelessness share	Per cent	SA3 *i*'s national share of homelessness in year *X*
Change rate/share	Per cent	Per cent change in the homelessness rate or share in SA3 *i* between years 2001–16
Decile distributions	Deciles	10 equal groups of nationwide homeless rates or shares

**Rates, shares and change were also calculated for each of the six homelessness operational groups*

Source: ABS Census Times Series Homelessness Estimates 2001, 2006, 2011 and 2016

Table A3: Descriptive statistics—rate of homelessness per 10,000 persons by operational group and overall total homelessness: Australian SA3s, 2001, 2006, 2011 and 2016

	Year	N	Mean	SD	Median	Min	Max
Rate of rough sleepers per 10,000 persons	2001	334	7.66	18.6	1.65	0	157.67
	2006	334	5.47	14.16	1.15	0	152.11
	2011	334	4.21	8.92	1.26	0	75.2
	2016	334	4.58	10.08	1.38	0	79.15
Rate of persons in SHS per 10,000 persons[a]	2001	334	7.88	7.62	5.58	0	58.39
	2006	175	9.58	9.65	6.89	0	52.25
	2011	334	10.05	13.41	6.33	0	155.99
	2016	334	8.95	13.35	6.19	0	175.44
Rate of persons staying temporarily with other households per 10,000 persons	2001	214	10.51	4.68	9.89	0	35.74
	2006	326	9.59	4.77	8.49	0	36.91
	2011	334	8.78	4.29	8.25	0	36.08
	2016	334	8.6	4.79	7.57	0	31.31
Rate of persons in boarding houses per 10,000 persons	2001	216	14.72	28.12	6.28	0	236.28
	2006	184	10.51	24.98	2.74	0	169.56
	2011	334	6.2	15.2	1.57	0	133.41
	2016	334	6.73	16.19	1.62	0	146.55
Rate of temporary lodgings per 10,000 persons	2001	334	0.23	0.6	0	0	5.47
	2006	334	0.29	0.58	0	0	3.8
	2011	334	0.34	0.71	0	0	4.64
	2016	334	0.32	0.65	0	0	5.03
Rate of severely crowded persons per 10,000 persons	2001	334	38.03	233.46	3.74	0	3103.53
	2006	334	32.98	203.14	3.93	0	2512.77
	2011	334	35.33	208.81	6.06	0	2821.18
	2016	334	34.06	184.28	7.88	0	2794.26
Rate of homelessness per 10,000 persons	2001	334	75.58	250.36	31.48	0	3226.22
	2006	334	64.17	215.53	26.81	0	2572.97
	2011	334	64.92	217.25	30.22	0	2877.12
	2016	334	63.1	198.72	31.28	0	2967.98

Note: the ABS suppressed some cells in 2001 and 2006 for confidentiality reasons. Descriptive statistics above are calculated based on those SA3s without suppressed cells for each operational group. This is why the number of cases varies for some operational groups in some years.

Source: a. Specialist Homelessness Services Collection (AIHW) 2006-2016. Remaining figures sourced from ABS Census Times Series Homelessness Estimates and TableBuilder 2001, 2006, 2011 and 2016.

Section 2 ABS Census: Time Series Profile (TSP) and TableBuilder

Table A4: ABS Time Series Profile and TableBuilder variables

Variable	Unit of analysis	Variable details
Age	Persons	Per cent of persons within SA3 *i* in age bracket (0–14 yrs; 15–24 yrs; 25–40 yrs) in year *X*
Gender	Persons	Per cent of persons within SA3 *i* of gender (male) in year *X*
Registered marital status	Persons	Per cent of persons aged 15 years and over within SA3 *i* who are in a registered marriage in year *X*
Indigenous	Persons	Per cent of persons within SA3 *i* who identify as 'Aboriginal', 'Torres Strait Islander' or both in year *X*
Labour force status: unemployed	Persons	Per cent of persons aged 15 years and over within SA3 *i* who were unemployed in year *X*
Speaks other language at home	Persons	Per cent of persons within SA3 *i* who speak a language other than English at home in year *X*
Dwelling tenure: private rental	Dwellings	Per cent of occupied private dwellings within SA3 *i* that were rented, with landlord type: real estate agent; or person in other dwelling, in year *X*
Total population	Persons	Count of persons within SA3 *i*, on Census night (excluding overseas visitors), in year *X*

Source: ABS Census Times Series Homelessness Estimates and TableBuilder 2001, 2006, 2011 and 2016.

Table A5: Descriptive statistics—TSP and TableBuilder variables

	Year	N	Mean	SD	Median	Min	Max
Total population	2001	334	56160.57	35064.63	47209	12.03298	170625
	2006	334	59418.54	36514.73	49956	9.262649	171040
	2011	334	64350.5	39729.73	53867.5	17.72169	186717
	2016	334	70018.74	44597.23	57894.5	465	231523
Population density	2001	334	714.31	1027.16	168.11	0.02	5652.79
	2006	334	755.71	1087.73	190.35	0.02	6824.1
	2011	334	811.99	1165.81	210.42	0.02	7449.58
	2016	334	888.97	1297.7	227.22	0.02	9237.24
Male %	2001	334	49.75	1.85	49.44	46	63.91
	2006	334	49.72	1.89	49.32	46.46	60.11
	2011	334	49.79	2.39	49.29	46.72	67.69
	2016	334	49.69	2.4	49.22	46.7	68.69

	Year	N	Mean	SD	Median	Min	Max
Indigenous %	2001	334	3.19	7.07	1.37	0	59.43
	2006	334	3.33	7.11	1.4	0.11	59.55
	2011	334	3.63	7.14	1.68	0	58.57
	2016	334	3.98	7.3	1.96	0.17	64.73
Unemployed %	2001	334	4.41	1.27	4.38	0.75	8.79
	2006	334	3.05	0.84	2.92	0.92	5.92
	2011	334	3.35	0.81	3.33	0.82	5.44
	2016	334	3.94	1.05	3.86	0.61	7.55
Married %	2001	334	51.93	5.89	53	29.8	62.58
	2006	334	50.16	5.85	51.06	26.58	63.34
	2011	334	49.06	5.34	49.81	27.55	61.11
	2016	334	48.33	5.24	48.91	27.89	61.34
Median age of persons	2001	334	35.56	3.47	36	26	48
	2006	334	37.25	3.72	37	28	50
	2011	334	38.08	4.42	38	22	52
	2016	334	39.33	5.07	39	28	55
Speaks language other than English %	2001	334	12	12.91	6.62	0.79	65.91
	2006	334	12.46	13.17	6.8	0.97	67.05
	2011	334	14.41	14.27	8.33	1.31	70.42
	2016	334	16.31	15.32	9.82	1.24	71.65
Private rental dwellings %	2001	334	18.74	7.05	17.74	3.18	46.64
	2006	334	18.92	6.97	17.76	0	48.08
	2011	334	20.84	7.34	19.49	4.01	48.77
	2016	334	21.88	7.78	20.45	4.29	52.87

ABS Census Times Series Homelessness Estimates and TableBuilder 2001, 2006, 2011 and 2016.

Section 3 ABS Census: Special request files

Table A6: ABS Census special request data file variables

Variable	Unit of analysis	Variable details
Weekly household income*	Households	Per cent of households in SA3 *i*, within each national household income quintile (quintiles [Q] calculated for each Census year—see $ values below), in year *X*.
Median weekly private rent	Dollar	SA3 median weekly rent paid to private landlords—CPI adjusted to 2016-dollar values. GCCSA (capital city and rest of state balance for each state and territory with ACT as one value) median weekly private rent paid—CPI adjusted to 2016-dollar values
Weekly household income by affordable private rent paid (see measures below)	Households in private rental dwellings	Matrix: private renter households by national household income quintile and corresponding affordable private rent category (30% of household income upper quintile value—see values in Table A8)

**Weekly household income refers to gross unequivalised household income and is the sum of the individual incomes reported by household members aged 15 years and above.*

Source: ABS Census Special Request 2001, 2006, 2011 and 2016.

Private rental sector (PRS) affordability measures:

The 'household income by private rent' special request matrix obtained from the ABS enabled the calculation of several measures of PRS affordability:

1. Number/per cent of dwellings affordable for Q1 PRS households (i.e. very low income): this is the count/per cent of R1 dwellings
2. Number/per cent of dwellings affordable for Q2 PRS households (i.e. low income): this is the count/per cent of R1+R2 dwellings (as Q2 PRS households can afford both R1 and R2 stock)
3. Number/per cent of very low (Q1) and low (Q2) income private renter households
4. Gross shortage or surplus of PRS stock that is affordable for households with incomes in the bottom 40 per cent of the national income distribution.

Table A7: Weekly household income* quintile values (national, all households) and corresponding weekly affordable^ private rent category values, 2001–2016

Weekly household income quintile	Affordable rent category (weekly)
2001	
Quintile 1 ($1–$360)	R1: $1–$108
Quintile 2 ($361–$654)	R2: $109–$197
Quintile 3 ($655–$996)	R3: $198–$299
Quintile 4 ($997–$1501)	R4: $300–$451
Quintile 5 (More than $1501)	R5: More than $451
2006	
Quintile 1 ($1–$401)	R1: $1–$121
Quintile 2 ($402–$763)	R2: $122–$229
Quintile 3 ($764–$1191)	R3: $230–$358
Quintile 4 ($1192–$1858)	R4: $359–$558
Quintile 5 (More than $1858)	R5: More than $559
2011	
Quintile 1 ($1–$528)	R1: $1–$159
Quintile 2 ($529–$981)	R2: $160–$295
Quintile 3 ($982–$1590)	R3: $296–$477
Quintile 4 ($1591–$2487)	R4: $478–$747
Quintile 5 (More than $2487)	R5: More than $747
2016	
Quintile 1 ($1–$686)	R1: $1–$206
Quintile 2 ($687–$1104)	R2: $207–$332
Quintile 3 ($1105–$1802)	R3: $333–$541
Quintile 4 ($1803–$2719)	R4: $542–$816
Quintile 5 (More than $2719)	R5: More than $816

**Weekly household income refers to gross unequivalised household income and is the sum of the individual incomes reported by household members aged 15 years and above.*
^Affordable rent categories are defined by calculating 30 per cent of the upper value of the household income quintile range.

Source: ABS Census Special Request 2001, 2006, 2011 and 2016.

Table A8: Descriptive statistics—ABS special request data file, weekly household income quintiles

Variable	Year	N	Mean	SD	Median	Min	Max
% of households in household income quintile 1 (Q1)	2001	334	23.56	7.03	24.13	0	39.48
	2006	333	21.84	6.71	21.94	6.62	38.18
	2011	334	20.65	6.67	20.62	0	39.17
	2016	334	20.93	6.18	20.61	4.18	35.3
% of households in household income quintile 2 (Q2)	2001	334	19.15	4.11	19.86	0	27.81
	2006	333	19.07	4.13	19.42	5.66	28.18
	2011	334	20.26	6.77	20.15	4.41	100
	2016	334	20.05	4.69	20.56	4.14	30.16
% of households in household income quintile 3 (Q3)	2001	334	18.64	2.66	19.07	0	24.59
	2006	333	20.21	2.35	20.48	10.85	25.63
	2011	334	20.31	3.3	20.58	0	26.58
	2016	334	20.11	2.75	20.67	10.16	25.92
% of households in household income quintile 4 (Q4)	2001	334	19.64	3.64	19.36	0	29.34
	2006	333	19.57	3.3	19.15	10.94	29.92
	2011	334	19.42	3.68	19.21	0	29.86
	2016	334	19.76	3.6	19.58	10.55	28.79
% of households in household income quintile 5 (Q5)	2001	334	18.7	10.08	15.93	0	54.75
	2006	333	19.31	9.93	16.6	5.04	53.76
	2011	334	19.35	10.99	16.33	0	66.25
	2016	334	19.14	9.88	16.79	4.72	49.66

Source: ABS Census Special Request 2001, 2006, 2011 and 2016.

Table A9: Descriptive statistics—ABS special request file, median weekly PRS rents and affordable stock

Variable	Year	N	Mean	SD	Median	Min	Max
PRS weekly rents median CPI adjusted	2001	334	237.51	72.82	225.52	0	594.34
	2006	334	263.58	74.9	253.01	0	569.27
	2011	334	333.06	116.04	328.37	0	1197.38
	2016	334	345.7	95.58	345.5	160	669
% dwellings in affordable rent category R1	2001	333	17.88	16.04	12.86	0	70.14
	2006	333	12.52	13.16	7.16	0.55	61.54
	2011	333	10.86	12.64	5.34	0	77.5
	2016	334	14.44	15.91	7.4	0	73.66
% dwellings in affordable rent category R2	2001	333	55.8	18.89	58.95	4.05	89.39
	2006	333	48.18	19.32	52.35	3.3	82.94
	2011	333	37.57	20.01	39.28	2.04	78.4
	2016	334	34.21	18.8	33.73	2.53	100
% dwellings affordable for Q2 households (=R1+R2)	2001	333	73.68	25.1	83.71	5.07	100
	2006	333	60.7	26.47	64.26	5.55	100
	2011	333	48.42	28.37	45.13	4.72	97.32
	2016	334	48.65	29.51	43.9	3.82	100

Source: ABS Census Special Request 2001, 2006, 2011 and 2016.

Section 4 Specialist Homelessness Services Collection (SHSC): AIHW

Table A10: Measures of service capacity from the SHSC

Variable	Unit of analysis	Variable details
Specialist Homelessness Services (SHS) Support Capacity	National share	Persons supported by SHS in SA3 in financial year *X* (2011–2012 or 2016–2017)
Specialist Homelessness Services (SHS) Accommodation Capacity	National share	Persons accommodated by SHS in SA3 *i* in financial year *X* (2011–2012 or 2016–2017)

Source: Specialist Homelessness Services Collection (AIHW) 2006-2016

Table A11: Descriptive statistics—number, rate (per 10,000) and national share of clients supported, and clients accommodated in SHS for the 2011–2012 financial year and 2016–2017 financial year

	Year	N	Mean	SD	Median	Min	Max
Specialist Homelessness Services (SHS) Support Capacity	2011–12	334	0.3	0.55	0.12	0	4.53
	2016–17	334	0.3	0.54	0.11	0	4.17
Specialist Homelessness Services (SHS) Accommodation Capacity	2011–12	334	0.3	0.53	0.16	0	6.25
	2016–17	334	0.3	0.53	0.14	0	4.96

Source: Specialist Homelessness Services Collection (AIHW) 2006-2016.

Appendix 2: Technical notes—ABS homelessness estimates

The Australian homelessness estimates underwent a methodological review in 2012 that has seen the methodology for estimation updated and, for the first time, applied consistently across Census periods (for detailed information about the estimation strategy, see ABS 2012c).[17] During this review, the ABS also adopted a definition of homelessness for use across all of its relevant collections (for detailed information about this definition, see ABS 2012d).

Homelessness is inferred from responses to multiple questions on the Census form. ABS staff worked with state and territory organisations to correctly identify accommodation and sites where homeless persons are likely to be found. Persons experiencing homelessness were also asked for information on areas where others experiencing homelessness might be staying. Some staff working at homelessness services, as well as people experiencing homelessness themselves, were recruited and trained by the ABS to use a shortened Census form in order to collect Census information (ABS 2012c; 2012d). Additionally, staff at homelessness services explained to clients that they needed to specify their usual address as 'none' on the Census form because this is a key way that homeless people are identified in estimation methods.

The specific strategy for estimating those sleeping rough uses a number of variables collected in the Census. First, a sample is selected from those who were staying in accommodation that was recorded by the Census collector as an 'improvised dwelling, tent or sleepers out', and who reported either having no usual address or being at home on Census night. A number of people in these circumstances should not be considered homeless—for example, owner-builders living in a shed on their property while they build, or construction workers in temporary housing. In order to exclude those not homeless from this category, income, rent and mortgage payment details and employment details are used. Census collectors also make additional notes at some sites that help identify the circumstances of those in this dwelling type (for more detailed information, see ABS 2012c: 26–29).

Homeless estimates for 2001 and 2006 had been collected under an older geographical system. In response to our previous reports (Wood, Batterham et al. 2014; 2015), the ABS brought forward its plans to update its homelessness estimates to its new geographical structure (the ASGS), so that homelessness estimates would be available with both a consistent methodology and in consistent spatial units over time.

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[17] Minor revisions were also made to the estimation methodology in 2016, for persons staying in supported accommodation for the homeless, persons staying in temporary lodgings, and persons staying in boarding or rooming houses. This change was largely due to an additional step of cross-checking these three operational groups against people staying in category 20 of non-private dwellings, which includes backpacker hostels, ski lodges and other dwellings. These people were not automatically excluded, but their personal characteristics were checked (like income) and publicly available information about the dwelling was also used. More information is available here:
http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/2049.0Appendix22016?opendocument&tabname=Notes&prodno=2049.0&issue=2016&num=&view=

The only category where this has a noticeable effect was those staying in boarding or rooming houses: 'The number of persons in boarding houses in 2011 has been revised from 17,721 to 14,944'.
http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2049.0Explanatory%20Notes12016?OpenDocument

However, some operational group totals were suppressed at the local region (SA3) level for confidentiality reasons.[18] Further, estimates for persons staying in supported accommodation for the homeless (operational group 2) were not available for 2001 and needed to be imputed (see Wood, Batterham et al. 2014 for a description of the imputation process).

[18] Note there has been a change from 2001 and 2006 to 2011 and 2016 in the technique for supressing cells due to confidentiality. In the earlier two Census periods, cells that are missing are flagged as 'not for publication'. In later years (2011 and 2016) cells are flagged as 'nil or rounded to zero (including null cells)', meaning there is less missing data in later years.

Appendix 3 Homelessness operational groups

Table A12: National share of operational group by area type by year

	2001	2006	2011	2016
Persons who are in improvised dwellings, tents or sleepers out				
Greater capital city	32.50	37.20	41.44	46.83
Major regional city or regional area	20.63	20.99	25.86	23.44
Other regional, remote or very remote	46.86	41.80	32.71	29.73
Persons in supported accommodation for the homeless				
Greater capital city	63.44	68.19	64.55	69.06
Major regional city or regional area	21.76	19.61	21.36	18.32
Other regional, remote or very remote	14.80	12.20	14.09	12.63
Persons staying temporarily with other households				
Greater capital city	55.04	56.68	56.73	53.68
Major regional city or regional area	24.15	24.32	25.29	27.20
Other regional, remote or very remote	20.81	19.00	17.98	19.12
Persons staying in boarding houses				
Greater capital city	71.98	78.06	79.72	79.15
Major regional city or regional area	13.93	11.46	11.65	11.19
Other regional, remote or very remote	14.09	10.49	8.62	9.67
Persons in other temporary lodging				
Greater capital city	40.23	44.11	50.47	36.21
Major regional city or regional area	29.62	31.70	27.55	39.50
Other regional, remote or very remote	30.15	24.19	21.99	24.29
Persons living in 'severely' crowded dwellings				
Greater capital city	26.71	32.55	45.42	60.49
Major regional city or regional area	3.79	4.18	5.32	5.91
Other regional, remote or very remote	69.50	63.27	49.26	33.60

Source: Authors' panel dataset (ABS Census homelessness estimates 2001-2016).

Table A13: Rate of each operational group per 10,000 persons by area type by year

	2001	2006	2011	2016
Persons who are in improvised dwellings, tents or sleepers out				
Greater capital city	2.40	2.10	1.99	2.47
Major regional city or regional area	4.42	3.43	3.66	3.75
Other regional, remote or very remote	16.82	11.86	8.10	8.72
Persons in supported accommodation for the homeless				
Greater capital city	7.04	10.66	5.59	9.47
Major regional city or regional area	7.01	10.22	4.75	7.60
Other regional, remote or very remote	7.98	11.72	5.16	9.61
Persons staying temporarily with other households				
Greater capital city	5.62	7.62	7.04	6.18
Major regional city or regional area	7.16	9.45	9.27	9.47
Other regional, remote or very remote	10.33	12.83	11.52	12.22
Persons staying in boarding houses				
Greater capital city	11.04	7.38	8.50	8.96
Major regional city or regional area	6.20	3.13	3.67	3.83
Other regional, remote or very remote	10.51	4.98	4.75	6.08
Persons in other temporary lodging				
Greater capital city	0.11	0.17	0.23	0.15
Major regional city or regional area	0.24	0.36	0.37	0.49
Other regional, remote or very remote	*0.42*	0.47	0.52	0.56
Persons living in 'severely' crowded dwellings				
Greater capital city	7.38	7.99	13.41	19.97
Major regional city or regional area	3.04	2.97	4.64	5.90
Other regional, remote or very remote	93.33	78.01	75.07	61.60
All homelessness				
Greater capital city	38.07	36.12	40.95	47.12
Major regional city or regional area	32.87	28.20	31.19	31.08
Other regional, remote or very remote	142.78	120.50	111.02	98.63

Source: Authors' panel dataset (ABS Census homelessness estimates 2001-2016).

Appendix 4 Shift-share analysis

To identify the source of growth in homelessness rates between years 2001–11, we employ the three-component shift-share analysis which decomposes growth in homelessness operational group *i* into the following three components: national share (NS_i), homeless mix (HM_i) and regional share (RS_i). We use a variant of Stimson, Stough and Robert's (2006) notation to define growth in homelessness (Δh_i) in the following way:

$$\Delta h_i \equiv h_{i,t} - h_{i,t-1} \equiv NS_i + HM_i + RS_i \quad (1)$$

Where:

$h_{i,t}$ denotes homelessness rates for operational group i at the end of the data period t (2011); and

$h_{i,t-1}$ denotes homelessness rates for operational group i at the start of the data period, t–1 (2001).

To calculate the National Share component of growth in homelessness rates in operational group *i*, we apply the following formula:

$$NS_i \equiv h_{i,t-1}\left(\frac{H_t - H_{t-1}}{H_{t-1}}\right) \quad (2)$$

Where $H_{i,t}$ and $H_{i,t-1}$ represent national homelessness rates in years 2011 and 2001, respectively, and $h_{i,t-1}$ represents regional (or SA3-level) homelessness rates for operational group *i* in year 2001.

The equation for measuring homeless mix is as follows:

$$HM_i \equiv h_{i,t-1}\left(\frac{H_{i,t} - H_{i,t-1}}{H_{i,t-1}} - \frac{H_t - H_{t-1}}{H_{t-1}}\right) \quad (3)$$

Where $H_{i,t}$ and $H_{i,t-1}$ represent overall homelessness in operational group *i* for years 2011 and 2001, respectively.

Finally, we measure Regional Share as follows:

$$RS_i \equiv h_{i,t-1}\left(\frac{h_{i,t} - h_{i,t-1}}{h_{i,t-1}} - \frac{H_{it} - H_{it-1}}{H_{it-1}}\right) \quad (4)$$

Where $h_{i,t}$ and $h_{i,t-1}$ represent SA3-level homelessness rates for operational group *i* in years 2011 and 2001, respectively.

Table A14: Components of change in homelessness counts 2001–2016 by area type

	Greater capital city area		Major regional cityor area		Other regional, remote or very remote area	
	Increase in count	% of growth rate	Increase in count	% of growth rate	Increase in count	% of growth rate
National share	6682.02	35.33	1880.21	144.02	4784.04	-69.61
Homeless mix share	-2289.74	-12.11	-848.23	-64.97	3137.96	-45.66
Regional share	14521.44	76.78	273.52	20.95	-14794.96	215.26
Total growth	18913.72	100.00	1305.50	100.00	-6872.96	100.00

Source: Authors' panel dataset (ABS Census homelessness estimates 2001-2016).

Table A15: Components of change in homelessness counts 2001–2016 for the top 20 and bottom 20 SA3s with the highest/lowest growth in homelessness

	Top 20 regions		Bottom 20 regions	
	Increase in count	% of growth rate	Increase in count	% of growth rate
National share	891.97	11.68	1681.18	-35.42
Homeless mix share	386.00	5.05	1044.99	-22.02
Regional share	6361.68	83.27	-7472.23	157.44
Total growth	7639.65	100.00	-4746.06	100.00

Source: Authors' panel dataset (ABS Census homelessness estimates 2001-2016).

Appendix 5 Descriptive statistics for models

Table A16: All homelessness models

Variable	Obs	Mean	Std. Dev.	Min	Max
Rates of homelessness	1,320	67.40898	222.2855	5.270214	3226.223
Rates of homelessness logged	1,320	3.525157	0.835151	1.662071	8.079067
Rates of homelessness omitting supported accommodation	1,320	59.64376	220.9132	3.085229	3208.034
Rates of homelessness omitting supported accommodation logged	1,320	3.28955	0.881128	1.126626	8.073414
Rates of homelessness omitting overcrowding	1,320	31.88153	33.9643	3.0706	385.2343
Rates of homelessness omitting overcrowding logged	1,320	3.174633	0.700415	1.121873	5.953852
Rates of homelessness overcrowding	1,320	35.52744	209.1599	0	3103.532
Rates of overcrowding logged	1,320	1.758082	1.375715	-0.95128	8.040297
Population density logged	1,320	4.4535	3.088703	-3.87866	9.130998
Males %	1,320	49.67298	1.956447	46.29321	68.69295
Aged 0–14 years %	1,320	19.7892	3.55878	5.515918	30.84089
Aged 15–24 years %	1,320	12.92697	2.461488	5.739582	28.48743
Aged 25–40 years %	1,320	20.58287	4.733828	10.61422	41.31868
Indigenous %	1,320	3.555759	7.192943	0.078644	64.73316
Speaks other language at home %	1,320	13.87976	14.08337	0.789251	71.65109
Unemployment rate	1,320	3.711774	1.112876	1.361068	8.786476
Married persons %	1,320	49.90994	5.701498	26.58417	63.34447
Dwellings affordable to Q1	1,320	13.89543	14.72107	0.54732	77.5
Dwellings affordable to Q1 & Q2 %	1,320	57.86284	29.35509	3.818182	100
Median rents/10	1,320	295.8784	101.5234	70.06452	1197.384
Q4 Income %	1,320	19.6215	3.45267	10.02527	29.91878
Q5 Income %	1,320	19.1411	10.17631	4.422915	66.2504

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A17: Capital city area models

Variable	Obs	Mean	Std. Dev.	Min	Max
Rates of homelessness	728	40.64087	43.70282	5.270214	438.9102
Rates of homelessness logged	728	3.406841	0.709738	1.662071	6.084295
Rates of homelessness omitting supported accommodation	728	32.46175	36.87122	3.085229	380.5233
Rates of homelessness omitting supported accommodation logged	728	3.160634	0.731097	1.126626	5.941547
Rates of homelessness omitting overcrowding	728	30.32652	39.32637	3.0706	385.2343
Rates of homelessness omitting overcrowding logged	728	3.049323	0.758967	1.121873	5.953852
Rates of homelessness overcrowding	728	10.31435	13.60944	0	166.8759
Rates of overcrowding logged	728	1.752625	1.104088	-0.95128	5.11725
Population density logged	728	6.518239	1.496185	0.994085	9.130998
Males %	728	49.1632	1.281836	46.29321	60.78802
Aged 0–14 years %	728	19.38799	4.091876	5.515918	30.79719
Aged 15–24 years %	728	13.88296	2.401311	8.022269	28.48743
Aged 25–40 years %	728	22.443	4.782423	10.61422	41.31868
Indigenous %	728	1.500538	1.591471	0.078644	11.60107
Speaks other language at home %	728	20.17335	14.91557	1.485203	71.65109
Unemployment rate	728	3.688165	1.116104	1.734806	8.786476
Married persons %	728	49.01584	6.627593	26.58417	63.34447
Dwellings affordable to Q1	728	5.718504	5.048215	0.775695	39.34426
Dwellings affordable to Q1 & Q2 %	728	43.94012	26.24147	3.818182	98.03279
Median rents/10	728	337.2372	91.22285	163.3645	669
Q4 Income %	728	20.94929	2.992505	12.39335	29.91878
Q5 Income %	728	23.83749	9.725787	6.641129	54.74968

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A18: Regional area models

Variable	Obs	Mean	Std. Dev.	Min	Max
Rates of homelessness	316	30.08806	13.16717	7.509118	85.3076
Rates of homelessness logged	316	3.312935	0.430741	2.016118	4.446264
Rates of homelessness omitting supported accommodation	316	23.44571	10.76813	6.532264	79.52332
Rates of homelessness omitting supported accommodation logged	316	3.057794	0.440743	1.876754	4.37605
Rates of homelessness omitting overcrowding	316	25.96887	12.13834	7.357497	82.27026
Rates of homelessness omitting overcrowding logged	316	3.153772	0.457702	1.99572	4.41001
Rates of homelessness overcrowding	316	4.11919	3.698952	0	22.11381
Rates of overcrowding logged	316	1.120334	0.8386	-0.69457	3.096202
Population density logged	316	3.519641	2.016783	0.347224	7.837041
Males %	316	49.21677	0.972915	46.70178	52.94705
Aged 0–14 years %	316	19.93391	2.537046	11.77073	25.75286
Aged 15-24 years %	316	11.99667	1.875554	8.14308	17.90334
Aged 25–40 years %	316	17.57292	2.576223	10.96271	23.29412
Indigenous %	316	2.257429	1.421385	0.370634	6.927441
Speaks other language at home %	316	4.995611	3.759825	1.31328	20.27838
Unemployment rate	316	3.914206	1.061775	1.98025	7.14625
Married persons %	316	51.10893	3.9526	38.6212	62.57524
Dwellings affordable to Q1	316	16.508	11.74267	0.54732	55.02959
Dwellings affordable to Q1 & Q2 %	316	69.42782	24.48067	6.680868	98.77913
Median rents/10	316	263.3797	68.30779	144.6072	450
Q4 Income %	316	18.00638	2.879081	10.86183	25.80142
Q5 Income %	316	12.93349	4.519165	4.443421	32.66397

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files).

Table A19: Remote area models

Variable	Obs	Mean	Std. Dev.	Min	Max
Rates of homelessness	276	180.7445	464.0642	7.323027	3226.223
Rates of homelessness logged	276	4.080216	1.18454	1.991024	8.079067
Rates of homelessness omitting supported accommodation	276	172.7854	462.6438	3.661513	3208.034
Rates of homelessness omitting supported accommodation logged	276	3.894931	1.270731	1.297877	8.073414
Rates of homelessness omitting overcrowding	276	42.75274	33.32341	7.323027	186.4131
Rates of homelessness omitting overcrowding logged	276	3.529046	0.649685	1.991024	5.227965
Rates of homelessness overcrowding	276	137.9917	442.687	0	3103.532
Rates of overcrowding logged	276	2.502653	2.006379	-0.27099	8.040297
Population density logged	276	0.076578	1.914628	-3.87866	5.842895
Males %	276	51.53995	2.916436	47.96497	68.69295
Aged 0–14 years %	276	20.68176	2.803454	12.97512	30.84089
Aged 15–24 years %	276	11.47051	2.060238	5.739582	19.07883
Aged 25–40 years %	276	19.12262	4.207795	11.49145	35.33366
Indigenous %	276	10.46327	13.34692	0.678752	64.73316
Speaks other language at home %	276	7.451005	10.48584	0.789251	62.1936
Unemployment rate	276	3.542275	1.13065	1.361068	8.02666
Married persons %	276	50.89551	4.141921	37.09149	61.50843
Dwellings affordable to Q1	276	32.47235	16.81959	2.885704	77.5
Dwellings affordable to Q1 & Q2 %	276	81.34547	20.14763	12.61596	100
Median rents/10	276	223.9957	105.6615	70.06452	1197.384
Q4 Income %	276	17.96844	3.687958	10.02527	28.78915
Q5 Income %	276	13.86077	9.622358	4.422915	66.2504

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A20: National homelessness rates, log of all homelessness rates

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0966***	-0.0996***	-0.0964***
	[-0.0151]	[-0.0142]	[-0.0146]
Male %	0.00674	0.0132	0.00181
	[-0.012]	[-0.0119]	[-0.0122]
Age 0–14 years	0.000108	0.0045	-0.00022
	[-0.0082]	[-0.00811]	[-0.00821]
Age 15–24 years	-0.0148	-0.0142	-0.0162
	[-0.0102]	[-0.0101]	[-0.0102]
Age 25–40 years	0.0545***	0.0504***	0.0516***
	[-0.00733]	[-0.00723]	[-0.00735]
Indigenous%	0.0490***	0.0483***	0.0489***
	[-0.00425]	[-0.00425]	[-0.00427]
Speaks other language at home %	0.0205***	0.0195***	0.0210***
	[-0.00217]	[-0.00217]	[-0.00218]
Unemployment %	-0.0181	-0.0221	-0.0198
	[-0.016]	[-0.0157]	[-0.0158]
Married %	-0.0354***	-0.0382***	-0.0378***
	[-0.00642]	[-0.00639]	[-0.00646]
Dwellings affordable to Q1 %	-0.003		
	[-0.00175]		
Dwellings affordable to Q1 & Q2 %		-0.00559***	
		[-0.00092]	
Median rents/10			0.00654**
			[-0.0025]
Q4 Income %	-0.0216**	-0.0242**	-0.0138
	[-0.00794]	[-0.0077]	[-0.00792]
Q5 Income %	-0.00741**	-0.0158***	-0.0109***
	[-0.0027]	[-0.00304]	[-0.00312]
1.year	0	0	0
6.year	-0.190***	-0.255***	-0.200***
	[-0.0359]	[-0.0371]	[-0.0355]

Variable	Model 1	Model 2	Model 3
11.year	-0.217***	-0.343***	-0.271***
	[-0.0413]	[-0.0462]	[-0.048]
16.year	-0.236***	-0.368***	-0.315***
	[-0.0499]	[-0.0542]	[-0.0588]
_cons	4.830***	5.258***	4.995***
	[-0.687]	[-0.682]	[-0.693]
W e.h_10~0_log	0.218***	0.229***	0.185**
	[-0.0599]	[-0.0597]	[-0.0622]
sigma_u_cons	0.335***	0.337***	0.338***
	[-0.0172]	[-0.0167]	[-0.017]
sigma_e_cons	0.274***	0.269***	0.273***
	[-0.0064]	[-0.00622]	[-0.00634]
N	1320	1320	1320
adj. R-sq	0.728	0.729	0.726

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A21: National homelessness rates, log of overcrowding

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.135***	-0.112***	-0.116***
	[-0.0261]	[-0.0248]	[-0.0253]
Male %	0.103***	0.109***	0.0963***
	[-0.0224]	[-0.0227]	[-0.0229]
Age 0–14 years	0.0489***	0.0532***	0.0470**
	[-0.0143]	[-0.0147]	[-0.0145]
Age 15–24 years	-0.0101	-0.01	-0.0129
	[-0.0172]	[-0.0176]	[-0.0174]
Age 25–40 years	0.0186	0.0129	0.0103
	[-0.014]	[-0.0141]	[-0.0142]
Indigenous %	0.0637***	0.0635***	0.0641***
	[-0.00677]	[-0.00692]	[-0.00687]
Speaks other language at home %	0.0508***	0.0499***	0.0514***
	[-0.00357]	[-0.00365]	[-0.00363]
Unemployment %	0.0888**	0.0856*	0.0889**
	[-0.0339]	[-0.0339]	[-0.0339]
Married %	-0.0280*	-0.0320**	-0.0332**
	[-0.0114]	[-0.0116]	[-0.0116]
Dwellings affordable to Q1 %	-0.0117***		
	[-0.00328]		
Dwellings affordable to Q1 & Q2 %		-0.00534**	
		[-0.00187]	
Median rents/10			0.0122*
			[-0.00508]
Q4 Income %	-0.00486	0.00326	0.0165
	[-0.0153]	[-0.015]	[-0.015]
Q5 Income %	-0.00275	-0.00804	-0.00689
	[-0.00468]	[-0.00551]	[-0.00553]
1.year	0	0	0
6.year	0.0886	0.0678	0.0976
	[-0.0795]	[-0.0814]	[-0.0794]

Variable	Model 1	Model 2	Model 3
11.year	0.336***	0.266**	0.266**
	[-0.0862]	[-0.0962]	[-0.101]
16.year	0.495***	0.383***	0.352**
	[-0.0977]	[-0.107]	[-0.117]
_cons	-3.770**	-3.758**	-3.828**
	[-1.27]	[-1.293]	[-1.291]
W e.h_10~0_log	0.177**	0.159**	0.157*
	[-0.0599]	[-0.0607]	[-0.061]
sigma_u_cons	0.434***	0.453***	0.448***
	[-0.0288]	[-0.0285]	[-0.0288]
sigma_e_cons	0.658***	0.654***	0.656***
	[-0.015]	[-0.0148]	[-0.0149]
N	1320	1320	1320
adj. R-sq	0.667	0.661	0.662

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A22: National homelessness rates, log of all homelessness rates, staying in supported accommodation omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.114***	-0.109***	-0.108***
	[-0.0159]	[-0.0148]	[-0.0152]
Male %	0.0228	0.0308*	0.0156
	[-0.013]	[-0.013]	[-0.0133]
Age 0–14 years	-0.0189*	-0.0132	-0.0197*
	[-0.00859]	[-0.00856]	[-0.00865]
Age 15–24 years	-0.0233*	-0.0225*	-0.0254*
	[-0.0106]	[-0.0106]	[-0.0107]
Age 25–40 years	0.0401***	0.0344***	0.0344***
	[-0.00799]	[-0.00789]	[-0.00803]
Indigenous %	0.0539***	0.0531***	0.0540***
	[-0.00432]	[-0.00433]	[-0.00435]
Speaks other language at home %	0.0217***	0.0207***	0.0224***
	[-0.00224]	[-0.00224]	[-0.00226]
Unemployment %	0.0380*	0.0326	0.0355*
	[-0.0182]	[-0.0179]	[-0.0181]
Married %	-0.0355***	-0.0396***	-0.0395***
	[-0.00679]	[-0.00677]	[-0.00685]
Dwellings affordable to Q1 %	-0.00680***		
	[-0.0019]		
Dwellings affordable to Q1 & Q2 %		-0.00680***	
		[-0.00103]	
Median rents/10			0.0111***
			[-0.0028]
Q4 Income %	-0.0104	-0.00995	0.00446
	[-0.0087]	[-0.00841]	[-0.0086]
Q5 Income %	-0.00477	-0.0139***	-0.0100**
	[-0.00283]	[-0.00323]	[-0.00331]
1.year	0	0	0

Variable	Model 1	Model 2	Model 3
6.year	-0.0836	-0.149***	-0.0942*
	[-0.0427]	[-0.0435]	[-0.0417]
11.year	-0.294***	-0.430***	-0.376***
	[-0.0477]	[-0.0528]	[-0.0545]
16.year	-0.324***	-0.478***	-0.452***
	[-0.0561]	[-0.0606]	[-0.0654]
_cons	4.218***	4.586***	4.351***
	[-0.743]	[-0.741]	[-0.751]
W e.h_10~0_log	0.280***	0.272***	0.226***
	[-0.0593]	[-0.0589]	[-0.0622]
sigma_u_cons	0.318***	0.321***	0.324***
	[-0.0174]	[-0.0169]	[-0.0173]
sigma_e_cons	0.322***	0.317***	0.321***
	[-0.00745]	[-0.00728]	[-0.0074]
N	1320	1320	1320
adj. R-sq	0.728	0.731	0.727

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A23: National homelessness rates, log of all homelessness rates, overcrowding omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0738***	-0.0747***	-0.0747***
	[-0.016]	[-0.015]	[-0.0154]
Male %	-0.0176	-0.0124	-0.0223
	[-0.0125]	[-0.0125]	[-0.0127]
Age 0–14 years	-0.0159	-0.013	-0.0165
	[-0.0086]	[-0.00856]	[-0.0086]
Age 15–24 years	-0.0237*	-0.0236*	-0.0255*
	[-0.0107]	[-0.0106]	[-0.0107]
Age 25–40 years	0.0577***	0.0540***	0.0544***
	[-0.00761]	[-0.00756]	[-0.00763]
Indigenous %	0.0205***	0.0201***	0.0204***
	[-0.00449]	[-0.00449]	[-0.0045]
Speaks other language at home %	0.00309	0.0023	0.00348
	[-0.00229]	[-0.00229]	[-0.0023]
Unemployment %	-0.0611***	-0.0632***	-0.0623***
	[-0.0163]	[-0.0162]	[-0.0162]
Married %	-0.0421***	-0.0445***	-0.0448***
	[-0.00676]	[-0.00675]	[-0.0068]
Dwellings affordable to Q1 %	-0.00251		
	[-0.00181]		
Dwellings affordable to Q1 & Q2 %		-0.00413***	
		[-0.00096]	
Median rents/10			0.00630*
			[-0.00257]
Q4 Income %	-0.0198*	-0.0211**	-0.0124
	[-0.00828]	[-0.00806]	[-0.00824]
Q5 Income %	-0.0109***	-0.0169***	-0.0143***
	[-0.00284]	[-0.00318]	[-0.00324]
1.year	0	0	0

Variable	Model 1	Model 2	Model 3
6.year	-0.269***	-0.316***	-0.281***
	[-0.0353]	[-0.0371]	[-0.0353]
11.year	-0.376***	-0.468***	-0.432***
	[-0.0413]	[-0.0471]	[-0.049]
16.year	-0.427***	-0.526***	-0.507***
	[-0.0504]	[-0.0556]	[-0.0605]
_cons	6.925***	7.233***	7.130***
	[-0.726]	[-0.724]	[-0.733]
W e.h_10~0_log	0.0914	0.112	0.0734
	[-0.0637]	[-0.0637]	[-0.0645]
sigma_u_cons	0.357***	0.358***	0.360***
	[-0.0179]	[-0.0176]	[-0.0178]
sigma_e_cons	0.287***	0.285***	0.286***
	[-0.00667]	[-0.00657]	[-0.00662]
N	1320	1320	1320
adj. R-sq	0.573	0.574	0.571

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

City models

Table A24: Capital cities, log of all homelessness rates

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0541	-0.0633*	-0.0655*
	[-0.0288]	[-0.0279]	[-0.0281]
Male %	0.139***	0.143***	0.140***
	[-0.0211]	[-0.0211]	[-0.0211]
Age 0–14 years	0.00129	0.000118	-0.00149
	[-0.0103]	[-0.0102]	[-0.0102]
Age 15–24 years	-0.0331**	-0.0345**	-0.0341**
	[-0.0114]	[-0.0113]	[-0.0113]
Age 25–40 years	0.0295***	0.0293***	0.0289**
	[-0.00881]	[-0.00881]	[-0.00884]
Indigenous %	0.0241	0.0202	0.0223
	[-0.0198]	[-0.0199]	[-0.0198]
Speaks other language at home %	0.0202***	0.0188***	0.0195***
	[-0.00251]	[-0.00256]	[-0.00249]
Unemployment %	-0.0409	-0.0337	-0.0332
	[-0.0258]	[-0.0255]	[-0.0254]
Married %	-0.0546***	-0.0538***	-0.0542***
	[-0.00838]	[-0.00838]	[-0.00837]
Dwellings affordable to Q1 %	0.00752		
	[-0.00464]		
Dwellings affordable to Q1 & Q2 %		-0.00171	
		[-0.0013]	
Median rents/10			0.00368
			[-0.00505]
Q4 Income %	-0.018	-0.0235*	-0.0209
	[-0.0112]	[-0.0112]	[-0.011]
Q5 Income %	-0.00431	-0.00870*	-0.00772
	[-0.00347]	[-0.00422]	[-0.00465]
1.year	0	0	0

Variable	Model 1	Model 2	Model 3
6.year	-0.192***	-0.234***	-0.221***
	[-0.0497]	[-0.052]	[-0.0503]
11.year	-0.164**	-0.243***	-0.234***
	[-0.0518]	[-0.0605]	[-0.071]
16.year	-0.175**	-0.248***	-0.246**
	[-0.0591]	[-0.0665]	[-0.0815]
_cons	-0.354	-0.0674	-0.155
	[-1.105]	[-1.096]	[-1.095]
W e.h_10~0_log	0.269**	0.299***	0.275**
	[-0.0835]	[-0.0825]	[-0.0839]
sigma_u_cons	0.285***	0.280***	0.280***
	[-0.0202]	[-0.0199]	[-0.0199]
sigma_e_cons	0.266***	0.267***	0.268***
	[-0.00833]	[-0.00835]	[-0.00836]
N	728	728	728
adj. R-sq	0.694	0.700	0.698

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A25: Capital cities, log of overcrowding

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0815	-0.0501	-0.0572
	[-0.0417]	[-0.0403]	[-0.0403]
Male %	0.204***	0.204***	0.200***
	[-0.0341]	[-0.0343]	[-0.0341]
Age 0–14 years	0.0333*	0.0408*	0.0391*
	[-0.0164]	[-0.0164]	[-0.0162]
Age 15–24 years	-0.013	-0.0104	-0.00976
	[-0.017]	[-0.0171]	[-0.017]
Age 25–40 years	0.00369	0.00337	0.000102
	[-0.0149]	[-0.0149]	[-0.015]
Indigenous %	0.0642*	0.0630*	0.0589*
	[-0.0286]	[-0.0293]	[-0.0289]
Speaks other language at home %	0.0448***	0.0454***	0.0455***
	[-0.00363]	[-0.00373]	[-0.00361]
Unemployment %	0.137**	0.121*	0.122*
	[-0.048]	[-0.048]	[-0.0478]
Married %	-0.023	-0.0247	-0.0267*
	[-0.0135]	[-0.0135]	[-0.0135]
Dwellings affordable to Q1 %	-0.0232**		
	[-0.0082]		
Dwellings affordable to Q1 & Q2 %		-0.00154	
		[-0.00229]	
Median rents/10			0.0133
			[-0.00786]
Q4 Income %	-0.00012	0.00877	0.0139
	[-0.0178]	[-0.0177]	[-0.0175]
Q5 Income %	-0.00802	-0.00703	-0.0122
	[-0.00528]	[-0.00656]	[-0.00691]
1.year	0	0	0
6.year	0.191*	0.238*	0.220*
	[-0.0959]	[-0.0986]	[-0.0954]

Variable	Model 1	Model 2	Model 3
11.year	0.496***	0.551***	0.447***
	[-0.0942]	[-0.109]	[-0.123]
16.year	0.530***	0.565***	0.437**
	[-0.0995]	[-0.114]	[-0.138]
_cons	-8.645***	-9.212***	-9.198***
	[-1.776]	[-1.784]	[-1.757]
W e.h_10~0_log	0.119	0.12	0.103
	[-0.0859]	[-0.0871]	[-0.0875]
sigma_u_cons	0.290***	0.292***	0.287***
	[-0.0332]	[-0.0333]	[-0.0334]
sigma_e_cons	0.585***	0.588***	0.589***
	[-0.0179]	[-0.018]	[-0.018]
N	728	728	728
adj. R-sq	0.647	0.644	0.646

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A26: Capital cities, log of all homelessness rates, staying in supported accommodation omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0703*	-0.0729*	-0.0793**
	[-0.0299]	[-0.0288]	[-0.0289]
Male %	0.143***	0.146***	0.140***
	[-0.0231]	[-0.0229]	[-0.0229]
Age 0–14 years	-0.0174	-0.015	-0.0182
	[-0.0112]	[-0.011]	[-0.0109]
Age 15–24 years	-0.0334**	-0.0338**	-0.0322**
	[-0.0122]	[-0.0121]	[-0.012]
Age 25–40 years	0.0226*	0.0226*	0.0207*
	[-0.00969]	[-0.00965]	[-0.0097]
Indigenous %	0.0614**	0.0547**	0.0555**
	[-0.0206]	[-0.0207]	[-0.0205]
Speaks other language at home %	0.0204***	0.0189***	0.0197***
	[-0.00262]	[-0.00267]	[-0.00258]
Unemployment %	0.0521	0.0521	0.052
	[-0.0304]	[-0.0299]	[-0.0296]
Married %	-0.0469***	-0.0468***	-0.0479***
	[-0.00904]	[-0.00901]	[-0.009]
Dwellings affordable to Q1 %	0.000763		
	[-0.00532]		
Dwellings affordable to Q1 & Q2 %		-0.00341*	
		[-0.00146]	
Median rents/10			0.0139*
			[-0.00543]
Q4 Income %	-0.0157	-0.0203	-0.0142
	[-0.0121]	[-0.012]	[-0.0119]
Q5 Income %	0.000906	-0.00547	-0.00769
	[-0.00371]	[-0.00452]	[-0.00492]
1.year	0	0	0
6.year	-0.0229	-0.0702	-0.0623
	[-0.0597]	[-0.0614]	[-0.0585]

Variable	Model 1	Model 2	Model 3
11.year	-0.191**	-0.290***	-0.338***
	[-0.0611]	[-0.0704]	[-0.079]
16.year	-0.252***	-0.347***	-0.418***
	[-0.0683]	[-0.0764]	[-0.0901]
_cons	-1.085	-0.782	-0.974
	[-1.206]	[-1.194]	[-1.186]
W e.h_10~0_log	0.286***	0.302***	0.246**
	[-0.0851]	[-0.083]	[-0.087]
sigma_u_cons	0.267***	0.265***	0.263***
	[-0.0211]	[-0.0207]	[-0.0206]
sigma_e_cons	0.323***	0.322***	0.323***
	[-0.01]	[-0.00998]	[-0.01]
N	728	728	728
adj. R-sq	0.663	0.667	0.670

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A27: Capital cities, log of all homelessness rates, overcrowding omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.017	-0.0358	-0.0355
	[-0.0327]	[-0.0317]	[-0.0319]
Male %	0.116***	0.117***	0.118***
	[-0.0234]	[-0.0234]	[-0.0234]
Age 0–14 years	-0.00706	-0.0135	-0.0127
	[-0.0118]	[-0.0117]	[-0.0116]
Age 15–24 years	-0.0439***	-0.0464***	-0.0463***
	[-0.0128]	[-0.0127]	[-0.0127]
Age 25–40 years	0.0282**	0.0279**	0.0280**
	[-0.00952]	[-0.00957]	[-0.00958]
Indigenous %	0.00783	0.00972	0.00775
	[-0.0227]	[-0.0227]	[-0.0227]
Speaks other language at home %	0.00577*	0.00535	0.00487
	[-0.00285]	[-0.0029]	[-0.00284]

Variable	Model 1	Model 2	Model 3
Unemployment %	-0.111***	-0.0955***	-0.0959***
	[-0.0273]	[-0.0272]	[-0.0272]
Married %	-0.0660***	-0.0646***	-0.0643***
	[0.00933]	[-0.0093]	[-0.00931]
Dwellings affordable to Q1 %	0.0144**		
	[-0.00497]		
Dwellings affordable to Q1 & Q2 %		0.000925	
		[-0.00141]	
Median rents/10			5.19E-05
			[-0.00558]
Q4 Income %	-0.013	-0.0181	-0.0194
	[-0.0125]	[-0.0124]	[-0.0123]
Q5 Income %	-0.00377	-0.00435	-0.00618
	[-0.00388]	[-0.00468]	[-0.00516]
1.year	0	0	0
6.year	-0.291***	-0.315***	-0.327***
	[-0.0514]	[-0.0542]	[-0.053]
11.year	-0.357***	-0.391***	-0.416***
	[-0.0542]	[-0.0638]	[-0.0771]
16.year	-0.406***	-0.433***	-0.457***
	[-0.0626]	[-0.0705]	[-0.0893]
_cons	1.612	1.937	1.98
	[-1.234]	[-1.226]	[-1.225]
W e.h_10~0_log	0.177	0.200*	0.207*
	[-0.0909]	[-0.0906]	[-0.0901]
sigma_u_cons	0.337***	0.329***	0.329***
	[-0.023]	[-0.0227]	[-0.0228]
sigma_e_cons	0.287***	0.291***	0.290***
	[-0.00895]	[-0.00906]	[-0.00907]
N	728	728	728
adj. R-sq	0.659	0.667	0.665

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Regional models

Table A28: Regional, log of all homelessness rates

Variable	Model 1	Model 2	Model 3
Population Density_log	0.00264	-0.0211	-0.0235
	[-0.0332]	[-0.0333]	[-0.0339]
Male %	0.106*	0.113**	0.112**
	[-0.0432]	[-0.043]	[-0.0429]
Age 0–14 years	0.0449*	0.0451*	0.0470*
	[-0.0224]	[-0.0221]	[-0.0221]
Age 15–24 years	-0.0734**	-0.0615*	-0.0654*
	[-0.0271]	[-0.0271]	[-0.0267]
Age_25–40 years	0.00502	0.00992	0.00926
	[-0.023]	[-0.0229]	[-0.0228]
Indigenous %	0.0592*	0.0596*	0.0564*
	[-0.0263]	[-0.0247]	[-0.0247]
Speaks other language at home %	0.0344**	0.0330**	0.0342**
	[-0.0111]	[-0.0112]	[-0.0111]
Unemployment %	-0.0691*	-0.0617*	-0.0656*
	[-0.0317]	[-0.0312]	[-0.0311]
Married %	-0.0660***	-0.0641***	-0.0670***
	[-0.0167]	[-0.0166]	[-0.0164]
Dwellings affordable to Q1 %	-0.00332		
	[-0.00375]		
Dwellings affordable to Q1 & Q2 %		-0.00530**	
		[-0.00188]	
Median rents/10			0.0205*
			[-0.00807]
Q4 Income %	-0.009	-0.0165	-0.0156
	[-0.0211]	[-0.0207]	[-0.0207]
Q5 Income %	-0.0255**	-0.0341***	-0.0333**
	[-0.0099]	[-0.0103]	[-0.0103]
1.year	0	0	0
6.year	-0.385***	-0.416***	-0.408***
	[-0.0818]	[-0.0799]	[-0.0796]

Variable	Model 1	Model 2	Model 3
11.year	-0.490***	-0.543***	-0.595***
	[-0.107]	[-0.107]	[-0.115]
16.year	-0.559***	-0.617***	-0.705***
	[-0.134]	[-0.135]	[-0.143]
_cons	2.253	2.185	1.554
	[-2.246]	[-2.257]	[-2.258]
W e.h_10~0_log	0.189	0.177	0.167
	[-0.127]	[-0.124]	[-0.125]
sigma_u_cons	0.245***	0.254***	0.247***
	[-0.0291]	[-0.0277]	[-0.0274]
sigma_e_cons	0.236***	0.230***	0.233***
	[-0.0115]	[-0.011]	[-0.0111]
N	316	316	316
adj. R-sq	0.364	0.354	0.370

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A29: Regional, log of overcrowding

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0918	-0.0902	-0.102
	[-0.0638]	[-0.0638]	[-0.0648]
Male %	0.0334	0.0315	0.0366
	[-0.0868]	[-0.0869]	[-0.0866]
Age 0–14 years	0.0672	0.0644	0.0686
	[-0.0461]	[-0.0454]	[-0.0456]
Age 15–24 years	-0.0441	-0.0418	-0.036
	[-0.0524]	[-0.055]	[-0.0536]
Age 25–40 years	0.0173	0.018	0.0202
	[-0.0486]	[-0.0491]	[-0.0489]
Indigenous %	0.0821	0.0885	0.0827
	[-0.0501]	[-0.0465]	[-0.0469]
Speaks other language at home %	0.0545**	0.0537**	0.0536**
	[-0.0198]	[-0.0201]	[-0.0199]

Variable	Model 1	Model 2	Model 3
Unemployment %	0.0995	0.103	0.0976
	[-0.0721]	[-0.0713]	[-0.0715]
Married %	-0.0203	-0.0183	-0.0193
	[-0.0298]	[-0.0302]	[-0.0299]
Dwellings affordable to Q1 %	-0.00387		
	[-0.00815]		
Dwellings affordable to Q1 & Q2 %		-0.00178	
		[-0.0041]	
Median rents/10			0.0143
			[-0.0169]
Q4 Income %	-0.0359	-0.0351	-0.0415
	[-0.0467]	[-0.0467]	[-0.0466]
Q5 Income %	0.00258	0.00132	-0.00127
	[-0.0202]	[-0.0212]	[-0.021]
1.year	0	0	0
6.year	0.0801	0.0863	0.0708
	[-0.187]	[-0.185]	[-0.184]
11.year	0.383	0.381	0.319
	[-0.231]	[-0.233]	[-0.248]
16.year	0.642*	0.618*	0.547
	[-0.28]	[-0.279]	[-0.292]
_cons	-0.724	-0.676	-1.308
	[-4.394]	[-4.427]	[-4.494]
W e.h_10~0_log	-0.0445	-0.0495	-0.056
	[-0.119]	[-0.121]	[-0.121]
sigma_u_cons	0.301***	0.311***	0.308***
	[-0.0602]	[-0.0575]	[-0.0573]
sigma_e_cons	0.667***	0.664***	0.665***
	[-0.0313]	[-0.0309]	[-0.0308]
N	316	316	316
adj. R-sq	0.236	0.233	0.236

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A30: Regional, log of all homelessness rates, staying in supported accommodation omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0131	-0.0379	-0.0467
	[-0.0337]	[-0.0342]	[-0.0346]
Male %	0.0992*	0.104*	0.106*
	[-0.0457]	[-0.0454]	[-0.0451]
Age 0–14 years	0.0271	0.0281	0.0304
	[-0.0228]	[-0.0228]	[-0.0226]
Age 15–24 years	-0.0933***	-0.0761**	-0.0787**
	[-0.0278]	[-0.0283]	[-0.0276]
Age 25–40 years	-0.0127	-0.0052	-0.00413
	[-0.0242]	[-0.0244]	[-0.0242]
Indigenous %	0.0590*	0.0625*	0.0568*
	[-0.0278]	[-0.0258]	[-0.0256]
Speaks other language at home %	0.0345**	0.0320**	0.0330**
	[-0.0111]	[-0.0114]	[-0.0111]
Unemployment %	0.0104	0.0157	0.0107
	[-0.035]	[-0.0342]	[-0.0341]
Married %	-0.0621***	-0.0582***	-0.0615***
	[-0.0165]	[-0.0167]	[-0.0163]
Dwellings affordable to Q1 %	-0.00484		
	[-0.00404]		
Dwellings affordable to Q1 & Q2 %		-0.00645**	
		[-0.00204]	
Median rents/10			0.0285***
			[-0.00862]
Q4 Income %	0.0135	0.00226	0.00142
	[-0.0227]	[-0.0225]	[-0.0224]
Q5 Income %	-0.0202	-0.0295**	-0.0303**
	[-0.0107]	[-0.0111]	[-0.011]
1.year	0	0	0
6.year	-0.239**	-0.271**	-0.269**
	[-0.0928]	[-0.0899]	[-0.0892]

Variable	Model 1	Model 2	Model 3
11.year	-0.541***	-0.595***	-0.679***
	[-0.117]	[-0.116]	[-0.123]
16.year	-0.598***	-0.658***	-0.785***
	[-0.143]	[-0.144]	[-0.151]
_cons	2.29	2.314	1.291
	[-2.325]	[-2.352]	[-2.349]
W e.h_10~0_log	0.339**	0.301**	0.285*
	[-0.115]	[-0.116]	[-0.116]
sigma_u_cons	0.218***	0.232***	0.223***
	[-0.0289]	[-0.0269]	[-0.0264]
sigma_e_cons	0.274***	0.266***	0.268***
	[-0.0131]	[-0.0125]	[-0.0126]
N	316	316	316
adj. R-sq	0.333	0.332	0.350

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A31: Regional, log of all homelessness rates, overcrowding omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	0.000393	-0.0115	-0.0184
	[-0.0359]	[-0.0354]	[-0.0364]
Male %	0.088	0.0975*	0.0949*
	[-0.0458]	[-0.0453]	[-0.0453]
Age 0–14 years	0.0426	0.0429	0.0442
	[-0.0236]	[-0.0234]	[-0.0233]
Age 15–24 years	-0.0633*	-0.0588*	-0.0625*
	[-0.0288]	[-0.0287]	[-0.0284]
Age 25–40 years	0.0195	0.0218	0.0217
	[-0.0243]	[-0.0239]	[-0.0239]
Indigenous %	0.0532	0.0597*	0.0564*
	[-0.0274]	[-0.0264]	[-0.0263]
Speaks other language at home %	0.0274*	0.0253*	0.0272*
	[-0.012]	[-0.0121]	[-0.012]
Unemployment %	-0.113***	-0.0992**	-0.104**
	[-0.0323]	[-0.0322]	[-0.032]
Married %	-0.0640***	-0.0645***	-0.0673***
	[-0.0182]	[-0.0179]	[-0.0178]
Dwellings affordable to Q1 %	-0.00770*		
	[-0.00374]		
Dwellings affordable to Q1 & Q2 %		-0.00626**	
		[-0.00194]	
Median rents/10			0.0257**
			[-0.00839]
Q4 Income %	-0.0197	-0.0232	-0.0222
	[-0.0216]	[-0.0214]	[-0.0214]
Q5 Income %	-0.0292**	-0.0384***	-0.0380***
	[-0.0102]	[-0.0107]	[-0.0107]
1.year	0	0	0
6.year	-0.446***	-0.462***	-0.456***
	[-0.0824]	[-0.0819]	[-0.0811]

Variable	Model 1	Model 2	Model 3
11.year	-0.601***	-0.653***	-0.723***
	[-0.111]	[-0.113]	[-0.121]
16.year	-0.667***	-0.756***	-0.871***
	[-0.141]	[-0.143]	[-0.153]
_cons	3.13	3.101	2.346
	[-2.391]	[-2.388]	[-2.392]
W e.h_10~0_log	0.117	0.171	0.144
	[-0.131]	[-0.127]	[-0.127]
sigma_u_cons	0.288***	0.294***	0.288***
	[-0.0317]	[-0.0303]	[-0.0302]
sigma_e_cons	0.231***	0.227***	0.229***
	[-0.0112]	[-0.0108]	[-0.011]
N	316	316	316
adj. R-sq	0.346	0.334	0.349

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Remote models

Table A32: Remote, log of all homelessness rates

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.0676*	-0.0687*	-0.0623*
	[-0.0312]	[-0.031]	[-0.0313]
Male %	-0.0674**	-0.0642*	-0.0713**
	[-0.0261]	[-0.0264]	[-0.0262]
Age 0–14 years	-0.0453	-0.0426	-0.0502*
	[-0.0238]	[-0.0241]	[-0.0245]
Age 15–24 years	0.0353	0.0359	0.0357
	[-0.0281]	[-0.0282]	[-0.0283]
Age_25-40 years	0.0448	0.042	0.0487
	[-0.0253]	[-0.0256]	[-0.0265]
Indigenous %	0.0682***	0.0675***	0.0687***
	[-0.00524]	[-0.00533]	[-0.00532]
Unemployment %	-0.0205	-0.0205	-0.0236
	[-0.0258]	[-0.0256]	[-0.0257]
Married %	-0.00536	-0.00669	-0.00551
	[-0.0156]	[-0.0155]	[-0.0157]
Dwellings affordable to Q1 %	-0.00122		
	[-0.00252]		
Dwellings affordable to Q1 & Q2 %		-0.00225	
		[-0.00258]	
Median rents/10			-0.00175
			[-0.00398]
Q4 Income %	0.00689	0.00733	0.00473
	[-0.0154]	[-0.0149]	[-0.0176]
Q5 Income %	0.0170*	0.0138	0.0196*
	[-0.00674]	[-0.00793]	[-0.00782]
1.year	0	0	0
6.year	-0.276***	-0.284***	-0.271**
	[-0.0835]	[-0.084]	[-0.0837]

Variable	Model 1	Model 2	Model 3
11.year	-0.423***	-0.441***	-0.408***
	[-0.116]	[-0.119]	[-0.119]
16.year	-0.469**	-0.492**	-0.468**
	[-0.158]	[-0.156]	[-0.159]
_cons	6.836***	6.926***	7.072***
	[-1.663]	[-1.648]	[-1.674]
W e.h_10~0_log	-0.0848	-0.0774	-0.093
	[-0.142]	[-0.142]	[-0.142]
sigma_u			
_cons	0.357***	0.359***	0.361***
	[-0.0362]	[-0.0358]	[-0.0359]
sigma_e_cons	0.272***	0.271***	0.271***
	[-0.0135]	[-0.0135]	[-0.0134]
N	276	276	276
adj. R-sq	0.856	0.856	0.855

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A33: Remote, log of overcrowding

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.133*	-0.113	-0.104
	[-0.0672]	[-0.0678]	[-0.0686]
Male %	0.0387	0.0328	0.0188
	[-0.0635]	[-0.0653]	[-0.0652]
Age 0–14 years	0.0715	0.0614	0.0487
	[-0.0551]	[-0.0566]	[-0.0573]
Age 15–24 years	-0.112	-0.113	-0.118
	[-0.0635]	[-0.0649]	[-0.0654]
Age_25–40 years	-0.058	-0.0618	-0.0558
	[-0.0624]	[-0.0636]	[-0.0668]
Indigenous %	0.102***	0.102***	0.104***
	[-0.0112]	[-0.0117]	[-0.0116]
Unemployment %	0.0261	0.0162	0.00944
	[-0.0704]	[-0.0706]	[-0.0708]
Married %	-0.0627	-0.0715*	-0.0731*
	[-0.0352]	[-0.0356]	[-0.036]
Dwellings affordable to Q1 %	-0.0125*		
	[-0.00629]		
Dwellings affordable to Q1 & Q2 %		-0.00652	
		[-0.00674]	
Median rents/10			0.00103
			[-0.0104]
Q4 Income %	0.00302	0.0181	0.0257
	[-0.0394]	[-0.0386]	[-0.0454]
Q5 Income %	0.0422**	0.0392*	0.0486*
	[-0.0162]	[-0.0192]	[-0.019]
1.year	0	0	0
6.year	-0.450*	-0.451*	-0.439
	[-0.223]	[-0.224]	[-0.224]
11.year	-0.616*	-0.635*	-0.598
	[-0.296]	[-0.302]	[-0.305]
16.year	-0.298	-0.443	-0.447

Variable	Model 1	Model 2	Model 3
	[-0.386]	[-0.384]	[-0.392]
_cons	3.581	4.586	4.766
	[-3.868]	[-3.882]	[-3.996]
W e.h_10~0_log	0.139	0.14	0.128
	[-0.132]	[-0.133]	[-0.133]
sigma_u	0.690***	0.715***	0.724***
_cons	[-0.0799]	[-0.0815]	[-0.0822]
	0.740***	0.739***	0.738***
sigma_e_cons	[-0.0368]	[-0.0368]	[-0.0368]
N	276	276	276
adj. R-sq	0.742	0.734	0.731

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

Table A34: Remote, log of all homelessness rates, overcrowding omitted

Variable	Model 1	Model 2	Model 3
Population Density_log	-0.069**	-0.069**	-0.065*
	[-2.64]	[-2.62]	[-2.44]
Male %	-0.110***	-0.103***	-0.113***
	[-4.45]	[-4.12]	[-4.58]
Age 0_14 years	-0.067**	-0.061**	-0.069**
	[-3.17]	[-2.82]	[-3.13]
Age 15_24 years	0.040	0.044	0.038
	[1.62]	[1.76]	[1.48]
Age 25_40 years	0.099***	0.094***	0.095***
	[4.01]	[3.75]	[3.64]
Indigenous %	0.023***	0.022***	0.023***
	[5.37]	[4.81]	[5.14]
Unemployed %	-0.044	-0.046	-0.046
	[-1.73]	[-1.82]	[-1.82]
Married %	-0.0004	-0.003	-0.004
	[-0.03]	[-0.22]	[-0.32]

Variable	Model 1	Model 2	Model 3
Dwellings affordable to Q1 %	-0.004		
	[-1.70]		
Dwellings affordable to Q1 & Q2 %		-0.006*	
		[-2.36]	
Median rents/10			0.004
			[1.01]
Q4 Income %	-0.008	-0.006	0.008
	[-0.49]	[-0.39]	[0.45]
Q5 Income %	-0.004	-0.011	-0.005
	[-0.56]	[-1.46]	[-0.69]
1.year	0	0	0
6.year	-0.224**	-0.237**	-0.223**
	[-2.73]	[-2.91]	[-2.71]
11.year	-0.351**	-0.388***	-0.362**
	[-3.12]	[-3.42]	[-3.12]
16.year	-0.363*	-0.415**	-0.426**
	[-2.41]	[-2.81]	[-2.78]
_cons	8.671***	8.874***	8.794***
	[5.78]	[5.96]	[5.74]
W			
e.h_10000_oc_log	-0.224	-0.226	-0.219
	[-1.57]	[-1.61]	[-1.55]
sigma_u			
_cons	0.273***	0.281***	0.285***
	[8.68]	[9.01]	[9.02]
sigma_e _cons	0.285***	0.282***	0.284***
	[19.86]	[20.00]	[19.99]
N	276	276	276
adj. R-sq	0.627	0.622	0.614

*Note: Standard errors in parentheses. Statistical significance at the 5, 2.5 and 1 per cent levels are indicated by *, ** and *** respectively*

Source: Authors' pooled panel dataset (ABS Census homelessness estimates, TSP, ABS special request data files 2001-2016).

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Level 1
114 Flinders Street
Melbourne Victoria 3000

T +61 3 9660 2300
E information@ahuri.edu.au

ahuri.edu.au

ACN 090 448 918

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