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Wellbeing outcomes of lower income renters: a multilevel analysis of area effects

authored by

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ACRONYMS

AHURI	Australian Housing and Urban Research Institute Limited
ABS	Australian Bureau of Statistics
ACCS	Australian Community Capacity Study
ASGC	Australian Standard Georgraphical Classification
ASGS	Australian Standard Geographical Structure
ARIA	Accessibility/Remoteness Index of Australia
ATO	Australian Tax Office
BMI	Body Mass Index
CCD	Census Collection District
CD	Collection District
CRA	Commonwealth Rent Assistance
DSS	Department of Social Services (Commonwealth)
ERP	Estimated Resident Population
GDP	Gross Domestic Product
GIS	Geographic Information Systems
HILDA	Housing Income and Labour Dynamics in Australia
ICC	Intraclass Correlation Coefficient
ISP	Income Support Payments
LGA	Local Government Area
MIAESR	Melbourne Institute of Applied and Economic and Social Research
NLF	Not in the Labour Force
NSES	Neighbourhood Socio-economic status variables
OECD	Organisation for Economic Co-operation Development
OLS	Ordinary least squares
POA	Postal Area
SF-36	Short Form 36
SAs	Statistical Areas
SA1	Statistical Area Level 1
SA2	Statistical Area Level 2
SA3	Statistical Area Level 3
SA4	Statistical Area Level 4
SEIFA	Socio-economic Indexes for Areas
SES	Socio-economic Status
SLAs	Statistical Local Areas

TSP	Time Series Profile

EXECUTIVE SUMMARY

A critical assumption of area-based policies aiming to foster greater 'social mix' of communities is that the adverse consequences associated with concentrations of social disadvantage will be reduced. The main vehicle to facilitate contemporary policies of social mix in Australia has been through the promotion of 'tenure mix' where concentrations of social housing tenants are 'dispersed' among those renting privately or who own their homes (Arthurson 2008, 2010; Atkinson 2008; Groenhart 2013). However, many of the assumptions underpinning social mix policies, particularly those based on tenure mix, are not well tested nor is there robust evidence that concentrated areas of social housing have an 'area effect' above and beyond the characteristics of those who live there. Moreover, policies of tenure mix tend to neglect the area-based wellbeing of those who are renting privately.

Being able to isolate the 'area effect' on wellbeing outcomes above and beyond the characteristics of individuals selecting into particular locations requires the use of robust longitudinal methods (van Ham et al. 2012). The research findings in this Final Report are based on a longitudinal and multilevel spatial analysis of wellbeing outcomes of social and private renters living in areas and housing circumstances characterised by varying degrees of area-based tenure mix and concentrations of social housing. In recognising the multilevel nature of wellbeing, the research questions and our analytical approach are informed by the theoretical assumptions of the *Social Quality* framework in which wellbeing is conditional on four interrelated factors including socio-economic security, social inclusion, social cohesion, and social empowerment. In particular, we examine the question of whether the social quality of life of social and lower income private renters is better in areas with high tenure diversity and concentrations of social housing from those that are less diverse and with lower concentrations of social housing. This primary research question is answered by examining the following secondary research questions:

- What is the overlap between area diversity and advantage? Are socially diverse areas also those characterised as poorer or better off areas?
- Do the wellbeing outcomes of social and lower income private renters differ by areas according to their tenure mix and disadvantage?
- Do social and lower income private renters remain exposed to disadvantaged areas and those with high concentrations of social housing for extended periods and what impact does this have on their wellbeing?
- Is there evidence of any area level effects on wellbeing outcomes once statistically controlling for individual and household level characteristics?

To answer these questions we draw on nationally representative datasets, including the combined use of the in-confidence spatial Household and Labour Dynamics in Australia (HILDA) survey with the Australian Census, to consider the links between wellbeing and three broad indicators of area-based and tenure composition, including:

- The overall percentage of social housing within a Census statistical local area.
- An overall population measure of tenure mix based on diversity scores of the absolute shares of social renters, private renters and home owners living in a Census statistical local area.
- The type and density of the dwelling lived in from single to multiple story buildings, which is used as a proxy indicator for the micro concentration of tenure disadvantage for social renters in particular.

We also seek to examine the impact of the mix and concentration of tenure in an area taking into account absolute measures of area disadvantage and advantage drawing on the median household income of areas, rates of unemployment as well the ABS SEIFA index of relative advantage and disadvantage. Consistent with a *Social Quality* framework we examine the impact of these area-based measures on four broad wellbeing outcomes from the HILDA dataset including subjective wellbeing measures of mental health based on the short form SF-36, satisfaction with safety and with the neighbourhood and an objective wellbeing measure of employment participation.

Key findings from the spatial analysis

The first stage of the research involved a descriptive and mapping analysis of area-based tenure diversity and concentrations of social housing at the SLA level from the 2001 and 2011 Census. On analysing the spatial distribution of areas with varying degrees of area-based tenure diversity and concentration of social housing we find that:

- Between 2001 and 2011, the average percentage of SLAs with social housing in the 'very high' concentration category dropped from 12.4 per cent to 9.5 per cent, but the proportion of SLAs with lowest concentrations of social housing also fell from 19.4 per cent to 15.6 per cent. Over the same period, the proportion of SLAs in areas with no to very low area diversity fell from 26 per cent to 16 per cent. This suggests that areas are becoming more dynamic over time, possibly reflecting both social housing policies of dispersal as well as the movement of home owners and private renters into areas with the highest concentrations of social housing.
- There is significant geographical variation in the types of areas in which social housing is concentrated and where tenure at a broad area level is highly diversified. These range from inner city to outer suburban areas, and even further out to regional and remote centres. We employ specific steps in the multilevel modelling to control for this geographical variation according to major urban, urban, and rural divides.
- Areas with high concentrations of social housing tend to be 'poorer' areas. Tenure diversity, though, does not have a similar clear cut relationship with area (dis)advantage, though it does appear that 'moderate-to-high' and 'high' tenure diversity areas are on average 'poorer', these being areas with relatively high concentrations of social and private rental housing.

Key findings from the multilevel analysis

The second stage of the research involved a multilevel statistical analysis of the four wellbeing measures from the HILDA dataset while also controlling for area-based contextual effects from Census data associated with measures of tenure diversity and concentrations of social housing as well as absolute area-based measures for disadvantage including median income and rates of unemployment. We also model the wellbeing impact from longer-term exposure to disadvantaged areas and those with very high through low/no concentration of social housing.

Tenure diversity and concentrations of social housing

In summary, we find that there is evidence of area-level effects related to the diversity of tenure and concentration of social housing on wellbeing outcomes once statistically controlling for individual, household, and area disadvantage level characteristics. However, the links between tenure area diversity and concentration of social housing and wellbeing outcomes differ across tenure groups. Specifically we find that:

- In general, for all tenure groups including owners, mental wellbeing, satisfaction with safety and the neighbourhood is lower for those living in community areas

where the tenure mix is more diverse and with higher concentrations of social housing compared with those that are less diverse and concentrated. At the same time, the chances of being employed typically increase when living in more diverse areas and those with higher concentrations of social housing.

- Moderate to higher income private renters tend to be 'happier' and more likely to be employed in the more mixed areas but less satisfied with their safety and neighbourhood. Moderate to higher income private renters' happiness declines in areas with the very highest concentrations of social housing and they are less satisfied with their safety and neighbourhoods.
- Lower income private renters are less happy, satisfied with their safety and neighbourhood in areas that are more diverse and with high concentrations of social housing. The chances of lower income renters being employed significantly decrease in the areas with the highest concentrations of social housing.
- Social renters are happiest, more satisfied with their safety and neighbourhoods, as well as their chances of being employed when they reside in the more moderately mixed areas—neither predominately home owning areas nor highly mixed or with high concentrations of social housing. Social renters are also significantly less happy and satisfied with their safety and neighbourhoods when they live in higher density dwellings compared with medium density and detached dwellings.

Wellbeing effects of exposure to disadvantaged areas and areas with high concentrations of social housing

In examining longer-term exposure we find that:

- Remaining in an area with high concentrations of social housing between consecutive years does not lower happiness but remaining in a disadvantaged area does. Satisfaction with safety and the neighbourhood declines for each year of exposure to areas with the highest concentrations of social housing. Satisfaction with safety and with the neighbourhood in highly disadvantaged areas declines after longer term exposure of more than five years.
- After controlling for those who relocate for work-related reasons, the move from a highly disadvantaged area to a more advantaged area, and the reverse transition, both result in significantly lower odds of being employed compared to remaining in a more advantaged area.
- Moving to or remaining in an area with the highest concentrations of social housing in the shorter-term increases the likelihood of being employed but long-term exposure within an area with the highest concentrations of social housing for more than five years lowers chances of being employed.
- Lower income private renters' wellbeing declines significantly when they remain in areas with a high concentration of social housing and disadvantage and is lifted when they move out of these areas.
- All moves for social renters lower wellbeing relative to remaining in a less concentrated area of social housing, suggesting that mobility per se may be detrimental for social renters as a group. However, remaining in a more advantaged area or one with a lower concentration of social housing lifts their happiness, feelings of safety, and satisfaction with the neighbourhood.

Other area-based, individual, and social conditions for wellbeing

In addition to tenure area-based measures, wellbeing is also significantly associated with proximity to major urban areas, density of the dwelling, duration of residence, social networks and socio-economic security. Specifically we find that:

- The urban to rural divide is a stronger predictor of wellbeing than area income and the area rate of unemployment. Individuals living in major urban areas have significantly lower mental wellbeing and satisfaction with both their neighbourhood and safety than those living in other urban, regional and rural areas.
- There is no area effect on mental wellbeing in locations with high levels of unemployment and low income independent of the characteristics of the individuals who live in these areas. However, those living in the lowest income areas are least likely to be employed. While those living in higher income areas feel less safe they are more satisfied with their neighbourhoods.
- Tenure is not associated with lower wellbeing per se, but living in a high density dwelling is negatively associated with lower wellbeing. Duration in a residence lifts wellbeing, increases odds of being employed and satisfaction with safety and the neighbourhood, which is likely to reflect the greater capacity to develop social ties and attachment to an area. Compared with all renter groups, home owners are more likely to be satisfied with the type of neighbourhood they live in and with their overall safety. Moderate to higher income private renters are more likely to be employed than all other tenure groups including home owners.
- Individual measures of social cohesion, social inclusion and socio economic security are strong predictors of mental wellbeing, satisfaction with safety and the neighbourhood. In particular having high social networks lifts wellbeing while threats to socio-economic security such as financial stress depress mental wellbeing, satisfaction with safety and the neighbourhood.

Policy implications and directions for future research

The findings in this research raise several implications for both individual and place-based policies and highlight areas for further research. Understanding the impact of and addressing the adverse consequences associated with concentrations of social housing and tenure diversity remains an important policy goal. This research identifies that both individual and place-based policies need to consider improving the social quality of the total living environment for both social renters and lower income private renters. Lower income private renters living in more disadvantaged areas share many of the attributes and needs as social renters yet policies directed at improving their place-based wellbeing remain underdeveloped.

The significant area effects for satisfaction with safety and the neighbourhood among areas with higher concentrations of social housing and tenure diversity suggest that localised strategies of urban renewal and social planning will be particularly important in lifting wellbeing and should remain an important policy goal for the existing social housing stock and surrounds. The emerging consensus from the national and international policy literature is that pursuing micro social mix policies does not deliver anticipated benefits in terms of social networking and bonds between tenure groups but may serve to enhance the quality of the living environment for lower income renting households. The findings of this research suggest that some degree of mix may be desirable for social and lower income private renters. There is potential merit in the provision of lower to medium density affordable housing in the moderately diverse areas and of aiming for social mix to be more moderated across locations, but this should not be at the cost of losing vital social housing stock or relocating tenants from important social networks. The wellbeing benefits of pursuing social mix and other place-based policies relating to the quality of the dwelling, neighbourhood, and broader opportunities available within the community needs to be considered in tandem across all tenure groups.

Area-based research in Australia is relatively underdeveloped by international comparison. Further longitudinal quantitative research is required at a smaller scale of

social mix and with the availability of better measures of the characteristics of neighbourhoods that is consistent with international research (see e.g. Sampson 2012; van Ham & Manley 2010; Musterd & Anderson 2005) and which can provide greater insights into the relationships and the mechanisms underpinning area effects. More detailed qualitative research would be fruitful to compare the wellbeing of social and lower income private renters living across areas of higher and lower diversity, including those living in different types of social housing stock and in different geographical areas. Further exploration into the spatial mismatch between affordable housing and employment opportunities for lower income private renters is also warranted.

1 INTRODUCTION AND METHOD OVERVIEW

The aim of this Final Report is to examine the question of whether the wellbeing of social and lower income private renters is better or worse in areas with low and high concentrations of social housing or where the community tenure mix is more diverse. This question remains a central concern for research attempting to establish the neighbourhood and broader area effects associated with concentrations of disadvantage and for policies aiming to ameliorate these effects by facilitating greater area-based social diversity on a more micro scale of social mix. Researchers and policy-makers have conceptualised and measured 'social mix' on the basis of income, occupation, education, ethnicity and tenure (Arthurson 2010). The growing concentration of lower income households in social and private rental relative to home ownership has meant that tenure mix is often used as a proxy for income mix. Tenure mix, in terms of the composition of different types of tenure in the one defined boundary, can be measured at different scales, from the types of residents living in the one dwelling, neighbourhood and in the broader community.

In Australia area-based diversity at a community level has been facilitated by retaining social housing stock within socially mixed areas including inner urban and newly gentrifying locations to provide access to essential services and opportunities for work. More recently, area-based diversity has predominately been facilitated through micro tenure mix policies aiming to disperse individual social housing renters among those who rent privately and own their homes. These initiatives have occurred through social tenant right-to-buy schemes, mixed income and tenure building development; the destruction and renewal of existing housing estates in deprived areas, and the spot purchasing of social housing properties in neighbourhoods with owners and other rental housing (Arthurson 2008, 2010; Atkinson 2008; Groenhart 2013).

While approaches differ across countries, the overall aim of contemporary social mix policies is to create more mobilised, cohesive and stable communities with increased opportunities for work and positive social engagement in the collective spaces within formerly disadvantaged areas or to create opportunities to move beyond deprived neighbourhood boundaries (Arthurson 2008, 2010; Chaskin & Joseph 2010). The assumed benefits from tenure mix policies are that the wellbeing of social renters will be better living in the same areas and often next door to more well off neighbours. However, such assumptions are not well tested nor is there robust evidence that concentrated areas of social housing have an 'area effect' above and beyond the characteristics of those who live there. Moreover, policies of tenure mix tend to neglect the implications for those who are renting privately. Based on the existing evidence, our initial Positioning Paper (Parkinson et al. 2013) concluded that the subjective wellbeing of lower income individuals living in more deprived areas may differ very little from those who live in better off areas. Similarly, lower income individuals living in or moving to more socially mixed areas at the smaller scale of measurement do not necessarily experience the anticipated benefits from increased 'exposure' to well off neighbours.

Understanding area-based diversity linked to tenure position has particular salience for housing policy in Australia. Despite the steady declines in the proportion counted as home owners, it still remains the dominant tenure in the Australian housing system. At the last Census, 67 per cent of households were living in owner occupied, 24 per cent in private rental (real estate agents, persons not in the same household, other landlords) and 4.7 per cent were in social rental housing[1] (ABS 2011a). However, at a smaller area level there can be significant variation in the concentrations of each type

[1] Excludes 'other tenures' and 'landlord not stated'.

of tenure with many areas comprising mostly home owners, while others have much higher shares of renters.

The dominance of home ownership in Australia relative to private and social renting tenures has come to represent a significant 'social cleavage' that is thought to be an important cause of observed differences in wellbeing in and of itself. Tenure is thought to influence wellbeing through the quality of the living environment and through upward and downward comparisons that influence how households act and feel relative to those assuming a different tenure position from themselves. Within this framework, those who live in the same type of tenure have shared experiences that may either lift or depress wellbeing. For instance, home ownership has typically been viewed as enhancing wellbeing by promoting ontological security (Hiscock et al. 2001) while at the other extreme social housing has been equated with stigma and exclusion that may depress wellbeing and area 'liveability' (Corcoran 2014; Haynes et al. 2014). Increasing diversity and/or the presence of a large concentration of more marginal tenures within the one location may impact upon wellbeing through lowered social cohesion and different expectations for forming bonds, care for the physical surroundings of the area, as well as upward and downward relative comparisons (see Parkinson et al. 2013).

The type of tenure lived in, where it is located, and who it is located next to thus remains an important influence on wellbeing yet we do not fully understand this relationship above and beyond the individual characteristics of those residing in different types of tenures and areas. Recent Australian research undertaken by Baker et al. (2013) and Baum et al. (2009) have started to address this question through the more sophisticated use of modelling to isolate 'causal' from 'compositional' effects of tenure and which examine the social context on wellbeing. However, questions remain on the links between area, tenure, and wellbeing outcomes. Moreover, the specific conditions linked to differences in locational choice, accessibility to valued resources, and the capacity for ongoing tenure among social and private renters is likely to result in varying degrees of exposure or neighbourhood 'dose' that could provide both adverse and beneficial outcomes depending on which aspect of wellbeing is being measured.

While policies of social mix now aim to de-concentrate and disperse social housing tenants we do not have a robust evidence base on the wellbeing impact of concentrations of social housing for those residing in this type of tenure and for those living in the surrounding areas and communities. In particular, there has been limited longitudinal and quantitative Australian research examining the impact of area-based tenure on wellbeing. This report seeks to establish an initial evidence base for whether the broad composition of tenures at a small area level and the density of the dwelling impact upon wellbeing independently of the individual (or compositional) characteristics, of those residing in social housing. It also seeks to examine whether the wellbeing of lower and higher income private renters varies according to the overall tenure diversity of an area.

The initial Positioning Paper outlined the current international and national evidence base associated with the area effects of concentrated disadvantage and social mix. This research adds to a growing field of housing and neighbourhood related research drawing on multilevel techniques to isolate the connections between individual characteristics, the social context and housing-related wellbeing outcomes (Bailey et al. 2012; Propper et al. 2005). It also seeks to build on the emerging evidence base from Australian housing researchers including (Baum et al. 2009; Atkinson 2008; Stone & Hulse 2007; Randolph et al. 2010) that have examined the relationship between locational disadvantage and wellbeing to inform current debates surrounding ideas of 'social mix' as a policy direction for housing lower income renting households.

This research, drawing on the availability of existing data sources, also aims to establish the rationale for the extension of area-based research and small area data collection of a comparable scale to that being undertaken in European countries (van Ham & Manley 2010; Musterd & Anderson 2005) and the US (Sampson 2012). To this end, the report makes three particularly novel contributions to the national and international literature.

Firstly, being able to isolate area effects requires the use of robust statistical methods that can simultaneously model individual, area level measures, and also control for selection effects into these areas. The research in this Final Report addresses these issues by undertaking a longitudinal and multilevel spatial analysis of wellbeing outcomes of social and private renters living in areas and housing circumstances characterised by varying degrees of tenure mix and concentrations of social housing. We draw on nationally representative datasets, including the combined use of the in-confidence spatial Household and Labour Dynamics in Australia (HILDA) longitudinal survey with contemporaneous Census data and imputed values in the non-Census years to match each year in the HILDA dataset. This longitudinal approach significantly extends on cross-sectional studies that cannot control for selection effects into areas. We also examine the impact of tenure mix, taking into account absolute measures of area disadvantage and advantage drawing on median household income of areas and rates of unemployment as well the ABS SEIFA index of relative advantage and disadvantage.

Secondly, there is very little evidence on whether the concentration of social housing and area diversity impacts tenure groups differently. While it is critical to understand the various underlying mechanisms that may be shaping differences in outcomes, we still have an inadequate comparative evidence base of how the wellbeing outcomes of similar socio-economic groups compare when living in different types of locations. In filling this gap, we compare the area-based wellbeing of three broad groups of renters including social renters, lower income private renters, and moderate to high income private renters while also retaining home owners in our sample. We include interaction effects in our multilevel models to isolate the impact of different measures of tenure diversity and concentration of social housing for each of the renter groups. We examine the area effect for different renter groups when they live in:

- Areas with very low through to very high concentrations of social housing within a Census statistical local area.
- Areas with very low area-based diversity through to very high population tenure mix based on diversity scores of the absolute shares of social renters, private renters and home owners living in a census statistical local area.
- Lower and higher density dwellings, which is used as a proxy indicator for the micro concentration of tenure disadvantage for social renters in particular.

Thirdly, we examine the impact of area-based measures on four broad wellbeing outcomes from the HILDA dataset. The general 'paradox' encountered in wellbeing research that those living in materially deprived conditions can often report high levels of subjective wellbeing despite their deprivation means that an assessment of wellbeing should be conceptualised and measured within an integrated framework incorporating the situational context as well as subjective and objective measures of quality of life. To this end, in the Positioning Paper, we argued for the need for a multilevel framework that can accommodate the interdependencies between subjective and objective wellbeing, social relations and place. We outlined a multilevel conceptual framework and empirical approach informed by the ideas of 'Social Quality'. Social Quality was defined as '… the extent to which people are able to

participate in social relationships under conditions which enhance their wellbeing, capacities and potential' (Beck et al. 2012, p.68).

We draw on four wellbeing measures within this Social Quality framework. The first is a measure of mental health based on the short form SF-36. The second set of subjective wellbeing measures include domains of life satisfaction that can be influenced by the location and types of dwellings that people live in including satisfaction with safety, and with the neighbourhood. The final objective wellbeing measure examined is whether the likelihood of being employed differs across areas and within renter groups. This significantly advances our understanding of the influence of tenure in a social context and builds a solid case for the need to extend area-based research in Australia.

1.1 Outline of the report

In the remaining sections of this first chapter we outline the broad research questions to be answered, our data sources, how we construct our sample of renters and area-based measures as well as the method for undertaking the multilevel analysis used in this report. Chapter 2 then presents an analysis of the Census including mapping of the broad area based measures. The chapter also includes an area based descriptive analysis of the characteristics of renter groups and measures of wellbeing. In Chapter 3, we present the findings of the multilevel modelling based on the four outcome measures of mental health, satisfaction with safety and the neighbourhood and finally employment participation. The report concludes with a discussion of some of the policy implications stemming from the findings and the suggested directions for future research.

1.2 Research questions

Building on the review of the international and Australian research, the central question we seek to answer in the research is:

- To what extent is the social quality of life of social and lower income private renters better in areas with high tenure diversity and concentrations of social housing from those that are less diverse and with lower concentrations of social housing?

The following secondary research questions guide the analysis:

- What is the overlap between area diversity and advantage? Are socially diverse areas also those characterised as poorer or better off areas?
- Do the wellbeing outcomes of social and lower income private renters differ by areas according to their tenure mix and disadvantage?
- Do social and lower income private renters remain exposed to disadvantaged areas and those with high concentrations of social housing for extended periods and what impact does this have on their wellbeing?
- Is there evidence of any area level effects on wellbeing outcomes once statistically controlling for individual and household level characteristics?

1.3 Research design

The research design combines the use of the HILDA survey and ABS Census data to provide a multilevel and spatial analysis of the wellbeing of renter groups living in areas indicative of low through to high concentrations of social housing and tenure diversity. The analysis of the HILDA survey is complimented by mapping in GIS of spatial data from the ABS Census to provide a spatial overview of measures of tenure diversity and social housing concentration as it applies to the total Australian

population. A summary overview of the research design is shown in Table 1 below and is expanded upon in the section to follow.

Table 1: Summary overview of research design

Data sources
Census and other spatial data used to rank and then cluster area-based measures. The area data are merged with the in-confidence HILDA dataset. Draws on a pooled dataset of 10 years of HILDA data.
Sample
Comparison of characteristics and wellbeing outcomes of social renters, lower income private renters, and moderate to high income private renters.
Analysis
Descriptive analysis and preliminary bi-variate statistical tests of social renters (social and community), lower income private renters and moderate to higher income renters. Descriptive analysis of wellbeing outcomes of different rental groups living in areas of higher and lower tenure mix. Three-level multilevel modelling of wellbeing outcomes using various level 3 area-based measures as proxies for social mix combined with level 2 personal characteristics nested within repeated observations for a maximum of 10 years. Controls for dynamic changes in outcomes between consecutive years.

1.3.1 About the HILDA in-confidence survey

The research makes use of 10 years (2001–10) of the in-confidence (more spatially detailed) Household, Income and Labour Dynamics in Australia (HILDA) pooled dataset to draw on a large sample of social and lower income private renters. HILDA is a nationally representative longitudinal survey that follows a sample of individuals aged 15 years and older and the households they live in each year. The survey commenced in 2001 when there were 13 969 individuals responding from 7682 households (see MIAESR 2011 for more details on the survey). In this report we make use of the in-confidence HILDA dataset, which has data available at the postcode and small area (collection district and statistical local area) level, allowing researchers to merge Australia-wide spatial measures of social and tenure mix from sources, primarily time series Census data. In addition, there are several area-based measures including SEIFA deciles[2] that can be readily identified in the existing HILDA dataset to examine advantage and disadvantage. While SEIFAs are useful in providing ready available measures of area-based variation of key demographic indicators, they do not adequately capture the housing dimensions of social mix. Moreover, the SEIFAs in HILDA are based on the 2001 Census for all 10 years of data, and we are interested in capturing changes to areas over time.

We draw on the ABS Time Series Profile (TSP) DataPack (2001–2011) which contains select demographic information at various spatial scales to augment the existing area-based measures available in HILDA. Statistical Local Area (SLA)[3] data are used as the basis for our definition of an area for two main reasons. Firstly, this is the smallest unit available published on a Time Series Profile (TSP) basis. The use of

[2] SEIFAs include four different area-based indices reflecting different dimensions of socio-economic conditions of particular locations and provide an aggregate of the overall characteristics of an area.

[3] Statistical Local Areas are a spatial unit defined under the Australian Standard Geographical Classification (ASGC); they form part of the ABS geographic collection and are the smallest spatial unit defined in the 2011 edition of ASGC. Since 2011, the ASGC has been superseded by the Australian Statistical Geography Standard (ASGS), although 2011 Census data for SLAs are still available under the former classification, ASGC, to allowing bridging with earlier years of data. The geographical descriptors included in HILDA are based on the earlier ASGC classification. For consistency, we also used ASGC classification when dealing with Census data.

collection districts, for example, would necessitate more complex and potentially less reliable spatial and temporal concordances across years. Secondly, SLAs, unlike newer statistical geography units such as Statistical Areas, are included in the HILDA dataset. The ABS definition of SLAs is as follows:

> SLAs are Local Government Areas (LGAs), or parts thereof. Where there is no incorporated body of local government, SLAs are defined to cover the unincorporated areas. SLAs cover, in aggregate, the whole of Australia without gaps or overlaps (ABS 2011b).

The 2011 median population across all SLAs in Australia was approximately 6900 (2600) persons (dwellings) in the TSP dataset, with population size varying from a high of 64 200 (24 000) to a low of around 433 (110) persons (dwellings).[4] SLAs capture variation in 'small areas' rather than in micro-scale neighbourhoods: this distinction, as we will discuss, is significant in the final interpretation of results.

Earlier neighbourhood effects studies examining multiple geographical scales of areas found neighbourhood effects are more pronounced when lower geographical scales are used (van Ham & Manley 2009). Galster (2008) suggests conducting parallel analyses of a particular outcome where the neighbourhood is measured at different spatial scales. This will enable the researcher to delineate which spatial scale produces the greatest neighbourhood effect. We employ some comparison of collection district (CD) and SLA data for 'null' multilevel models. However, the pooled final multilevel modelling is based on SLA data.

1.3.2 Sample of lower income renters and owners

The Positioning Paper for this project outlined the rationale and method for identifying our sample of lower income renters. Typically low-income renters are defined as those falling in the bottom 40 per cent of the income distribution based on equivalent disposable income (see Parkinson et al. 2013). Our starting point was to examine the distribution of renters falling at or below the 40 per cent low income threshold. The identification of low-income renting households falling at or below 40 per cent of the distribution involved removing households with negative disposable household income and eqivalising it using the OECD modified equivalence scale. The OECD modified equivalence scale assigns a weight of 1 to the first adult, 0.5 to each additional adult, and 0.3 to each child. Household disposable income is then divided by the total weight for each household. Disposable household income is equivalised to take into account overall economies of scale derived from the number of people living in the household who share an income. Household population weights within HILDA were then applied to determine the income threshold at each equivalised disposable income percentile generalisable to the Australian population. Using cross sectional weights enables robust estimates of the distribution of household income across the Australian population to be determined for each given year.

After trialling the 40 per cent threshold approach we found that a significant number of private renters in receipt of government income support and those in social housing actually had household incomes above this 40 per cent threshold. For the reasons outlined in the Positioning Paper, including the policy relevance of including all renters who were in receipt of income support or living in social housing, our approach to defining lower income renters was broadened to include the following groups shown in Table 2 below. We also maintain home owners in our sample to avoid omitted selection bias. The table shows the overall sample numbers used in the analysis. Pooled over 10 years of data the sample numbers of lower income renters are large enough to enable effects to be detected at the area level although the smaller number

[4] SLAs at the top and bottom 5 percentile of the population distribution were omitted from these calculations.

of social renters is likely to influence the significance of some of the interactions in the models.

Table 2: Classification of sample renter and owner groups

Renter and owner groups	Data definition	Sample numbers (pooled 2001–2010)[1]	
		N	*%*
Social renters	Includes those renting from a social or community landlord.	5,616	4.78
Lower income private renters	Private renters who are the recipients of government income support including the age pension and family assistance.	9,759	8.3
	Low-income private renters who fall at or below the 40 per cent income threshold for each corresponding year between 2001 and 2010 who are not in receipt of government income support.		
Moderate to high income private renters	Private renters who fall above the 40 per cent income threshold for each corresponding year between 2001 and 2010 who are not in receipt of government income support.	17,827	15.17
Home owners	Includes those who own their home outright and those paying off a mortgage	84,338	71.75
		117,540	100

Source: HILDA Release 10

1. In identifying who is most likely to be owner/renter in the household we remove both independent and dependent children in the final tenure group sample.

1.4 Wellbeing as a multilevel concept

Wellbeing as a field of inquiry is essentially concerned with '… an evaluation of a person's situation, or more fittingly, an evaluation which is focused on the quality of the person's being' (Gasper 2010, p.187). Wellbeing is thought to comprise an emotive and intellectual assessment of one's happiness and meaning of their life or hedonic and eudaimonic conceptions shaped through personal history across time and context (Ryan & Deci 2001, p.148; Conradson 2012, p.17). In the Positioning Paper we presented a theoretical discussion of wellbeing from an individual components approach comprising different domains of subjective and objective functioning through to social and place-based conceptions of the preconditions for a good society or a social quality of life. We argued, building on ideas from Prilleltensky and Prilleltensky (2012, pp.63–68), that individual wellbeing is a multilevel construct that to be adequately explored needs to be conceptualised and analysed in a manner that seeks to incorporate 'webs of wellbeing'. In recognising the multilevel conception of wellbeing our analyses is informed by the theoretical assumptions of the Social Quality framework in which wellbeing is conditional on four interrelated factors including socio-economic security, social inclusion, social cohesion, and social empowerment that combined are the necessary preconditions to an overall quality of social life (Phillips 2006; Beck et al. 2012). Each of the conditional factors of social quality as shown in Table 3 below can be considered both an outcome and mediator of wellbeing measured at different levels of individual and social functioning.

Table 3: Definitions of conditional factors of social quality

Conditional factors of social quality	Cited definition
Socio-economic security	… is the extent to which individuals have resources over time.
Social cohesion	… is the extent to which social relations, based on identities, values and norms, are shared.
Social inclusion	… is the extent to which people have access to and are integrated into the different institutions and social relations that constitute everyday life.
Social empowerment	… is the extent to which the personal capabilities of individual people and their ability to act are enhanced by social relations.

Source: Taken from W Beck, LJG van der Maesen and A Walker (2012), 'Theoretical foundations', in LJG van der Maesen & A Walker (eds), A social quality: from theory to indicators, pp.61–62.

1.4.1 Measures of wellbeing outcomes examined in the research

Based on the initial descriptive analysis and modelling, as well as building on the existing neighbourhood and multilevel modelling literature, we concentrate on four outcomes that are likely to have important policy implications for social and lower income private tenants. The measures include mental health based on the short form SF-36, subjective wellbeing based on two domains of life satisfaction including satisfaction with safety and with the neighbourhood. Finally we examine an objective measure of employment participation. There is a comprehensive literature associated with how the area in which you live is associated with each of these outcomes. Our purpose is not to provide a detailed analysis and discussion of the predictors for each domain and explain the potential mechanisms underpinning them, but to provide an initial identification of the importance that density of dwellings, concentration of social housing, and population diversity of tenure may have on such indictors of wellbeing for different renter groups. Our discussion therefore centres on the potential impact for different rental groups living in different tenure-mix contexts as the primary focus of the research. A broader focus on a range of outcomes rather than limiting to a single domain was considered to be particularly informative for the purposes of this research in the context of the initial Positioning Paper and review of the literature identifying that areas are associated with both 'good and 'bad' outcomes depending on which measure is used and whether it is for private or social renters. This suggests that place-based policies need to be cognisant of the relative trade-offs associated with pursuing social mix policies.

The complexity of wellbeing as a concept makes it difficult to measure and any analysis can only form a partial understanding of the quality of person's life or the social quality of the community in which they reside. Analysis on a broad population basis across locations is also constrained by available measures that can miss finer grained assessments. To this end, the use of HILDA as our primary data source has both strengths and limitations. A significant limitation in using HILDA is the frequency of which wellbeing data is collected. For many, subjective assessments of personal satisfaction across different life domains may fluctuate through the months between data collection periods. At the individual level, HILDA contains many relevant measures of subjective wellbeing and life satisfaction. The domains of life satisfaction or subjective wellbeing include an individual's satisfaction with employment opportunities, financial situation, the home in which they live, with their health, how safe they feel, feeling part of the community, satisfaction with the neighbourhood in which they live, and the amount of free time they have. While these measures cover

the broad domains that are considered to comprise overall life satisfaction, their measurement based on a likert scale ranging from 0 to 10 can result in very little variation between groups. However, the strength of using HILDA is that we can draw on a large sample that can be followed over time and incorporate a large array of potential predictors of wellbeing, especially those related to socio-economic security and social inclusion. The in-confidence dataset allows us to identify smaller areas that can be merged with population-wide indicators to examine the multilevel influences on wellbeing. Next we discuss the main measures used and their construction.

SF-36 mental health

The SF-36 mental health variable in HILDA is one of eight psychometrically validated measures from the Medical Outcomes Study Short Form (SF-36). The questions that make up the measure include the following:

- Have you been a nervous person?
- Have you felt so down in the dumps that nothing could cheer you up?
- Have you felt calm and peaceful?
- Have you felt down?
- Have you been a happy person?

The Housing Income and Labour Dynamics in Australia (HILDA) survey contains a transformed version of the composite indicators that is measured on a scale from 0 to 100 where a score of 0 represents the lowest level of functioning associated with depression and nervousness through to 100 representing the highest sense of calmness and happiness. The validity of the measure as applied to the HILDA sample was tested by Butterworth and Crosier (2004). The authors concluded that while the SF-36 mental health component had a slightly lower population mean compared with other Australian surveys, it represented a valid instrument and when combined with other social indicators in the HILDA dataset will be particularly useful for measuring the impact of inequalities across the population. We include this measure as an outcome not only for its validity in measuring mental wellbeing but that it is likely to have particular salience for high needs residents in social housing and among lower income private renters, particularly in terms of the suitability of different types of living arrangements for those who reside in social housing. Furthermore, there has been limited investigation of the association between measures of tenure diversity and mental health functioning. The analysis in this report aims to build on two important Australian studies by Butterworth et al. 2006 and Baker et al. 2013 that have used HILDA data to examine mental health using the SF-36 measure.

Subjective wellbeing—domain based life satisfaction

Subjective wellbeing reflects a composite of specific life domains such as health, employment, family; that together inform how an individual will assess the quality of their life. Life satisfaction has thus been measured based on an aggregate score or index of different life domains or via a single question that is assumed to be capturing the underlying latent totality of these domains. While satisfaction in each life domain will be linked to an individual's overall life satisfaction score, the importance of one domain over the other is likely to be weighted differently in a person's own assessment, particularly at different stages of life. This suggests that each domain is not necessarily equal or purely additive in assessing overall life satisfaction (Rojas 2006). Moreover, examining a single or composite life satisfaction measure is likely to conceal important contextual influences that can be better isolated via a focus on domains related to a specific policy concern such as satisfaction with neighbourhood quality. For this reason many studies, particularly those examining the impact of area

effects have concentrated on domain satisfaction over an assessment of global life satisfaction. Our approach here is to build on the current domain satisfaction literature by examining satisfaction with safety and the neighbourhood. Respondents of the HILDA survey are asked to rate their satisfaction on a likert scale from 0 to 10 where 0 represents lowest satisfaction and 10 the highest. The measures were selected as they have particular salience for social mix and urban renewal housing policies.

Participation in employment

The final outcome we examine among lower income renter groups is whether their employment participation varies across area-based measures of tenure and also whether their likelihood of participating in work improves when they move to a 'better off area' or one that has lower concentrations of social housing. We know that there are significant disparities in both the quality, security of, and overall participation in employment among housing tenure groups (Campbell et al. forthcoming). However, very little is known about the extent to which renters of similar individual backgrounds are more or less likely to secure employment when they live in different areas. Directly being able to compare renters across different areas of tenure mix may suggest the presence of sub-labour markets for different housing assistance recipients. We measure the likelihood of being employed as a simple labour choice model between being employed and not employed drawing on the broad labour status variable in HILDA. The measure thus collapses those who are unemployed and not in the labour force into the one group of 'not employed'.

1.4.2 Predictors of wellbeing used in the models

In building a multilevel model of wellbeing of renters we include predictors at both the individual and area level informed by the 'social quality' framework introduced in the Positioning Paper. The broad domains of the conditional factors of social quality are shown in Table 4 below. Each domain has a series of potential indicators, many of which are measured at the broader area level, however they can also be collected and related to micro or individual measures, particularly those relating to socio-economic security and social inclusion. While not all domains are adequately captured in the HILDA dataset, the framework provides a guide for the indicators that are of conceptual importance for wellbeing and social quality of life. Based on the available variables in HILDA, we include measures of socio-economic security, social cohesion, and social inclusion. The final criterion for including variables in the models was if they were collected in each year of data over the 10-year period. HILDA contains variables of the quality of the neighbourhood in which people live, however these are not collected in every wave therefore limiting the longitudinal analysis that could be undertaken and making their inclusion in a pooled dataset for the final models problematic.

Table 4: The domains of the conditional factors of social quality

Socio-economic security	Social cohesion
Financial resources	Trust
Housing	Other integrative norms and values
Environment	Social networks
Health and care	Identity
Work	
Education	
Social inclusion	Social empowerment
Citizenship rights	Knowledge base
Labour market	Labour market
Services (social and private)	Supportiveness of institutions
Social networks	Social space
	Personal relations

Predictors of social quality of life

Measures of socio-economic security

In addition to standard demographic variables of gender, age, income, education and employment status, we include a set of individual based measures indicative of socio-economic security including financial stress and the presence of a chronic health condition. The financial stress measures in HILDA include responses to the question: '[I]n the past 12 months did any of the following happen to you because of a shortage of money? Following Campbell et al. (forthcoming) we cluster the indicators into two broad groups—bill paying difficulties and income supplementing strategies:

Bill paying difficulties

1. could not pay utilities on time
2. unable to heat home
3. could not pay the rent or mortgage on time
4. went without meals.

Income supplementing strategies

5. sought help from welfare/community organisations
6. pawned or sold a possession
7. sought financial help from friends or family.

Highest education status is coded into those with tertiary qualifications, a Degree or above, a Diploma/Certificate, Year 12, and Year 11 and below. We use the broad labour status variable that identifies whether an individual is employed, unemployed and out of the labour force. We include the log of equivalent household income. Household income is equivalised using the OECD modified income scale as discussed in Section 1.3.2 in defining the renter sample.

Social connection

In addition to variables such as education and employment listed above we include a self-reported scale of social connection. We follow the approach adopted by Baxter et al. 2012 in constructing a measure of social connection based on the following five items in HILDA: 'I seem to have a lot of friends', 'There is someone who can always cheer me up when I'm down', 'I enjoy the time I spend with the people who are

important to me', 'When something's on my mind, just talking with the people I know can make me feel better', and 'When I need someone to help me out, I can usually find someone'. These items were summed and the average ratings were re-scaled with scores ranging from 0 to 10 where the higher the score the greater the sense of social connection. We also include variables for whether an individual is a member of a sporting club, duration of residence, whether country of birth was English speaking, and marital status to capture measures of social inclusion and cohesion.

1.5 Area-based measures of tenure

1.5.1 Construction of HILDA/ABS merged sample

To construct a sample suitable for undertaking multilevel modelling, we first appended waves 1 to 10 of the HILDA responding person files into a single data file to arrive at a long file assembled in a person-period format. That is, each survey respondent contains multiple records of data, with each record attributable to the wave in which the respondent was interviewed. If, for example, person *i* was interviewed for 10 waves, he/she will have 10 records of data. Next, relevant HILDA variables were extracted from the dataset for inclusion in the models. Among the retained HILDA variables was the Census Collection District (CCD) and Statistical Local Area (SLA) identifiers which were later used to perform a match between each HILDA respondent and their corresponding neighbourhood-level information.

We use the ABS TSP database to obtain demographic information at an area-wide scale. Aggregate demographic data was extracted at the Statistical Local Area (SLA) level for years 2001, 2006 and 2011 on median household income and tenure and landlord type by dwelling structure; and other Expanded Community Profile data. Time series data are not published at the CCD level thereby limiting the smaller scale measures of tenure mix to be obtained. CCDs are subject to boundary and coding changes between Census years. Combined with the consideration that only one identifier year is included in HILDA, the extent of spatial concordance and difficulties in interpolating data between years was the main barrier to the use of CCD level data. Other considerations in the choice of the spatial unit are given in the Positioning Paper. SLAs were considered the most reliable, consistently reported small unit data available with full coverage of Australia from the ABS across the study period. It is recognised that there is a significant loss of spatial variation at the SLA level in classifying groups equating to small areas rather than to neighbourhoods. This will have implications particularly for larger SLAs on the outer urban fringe/regional and rural areas, however, for a vast majority of SLAs (75%) the number of dwellings is below 6000. Notwithstanding the potential loss of strength in the area effects that are able to be detected, the inclusion of cross-level interactions for individual and area-based tenure measures in the final models allows a smaller area neighbourhood effect to be approximated for social renters.

We use the SLA measures to construct six broad groupings of concentration of social housing and mix, allowing broad area comparisons from these SLA measures to be obtained. Information obtained from tenure and landlord type was used to create two separate measures of socio-economic mix: (1) proportion of households living in social housing, which measures the absolute share of social housing residents within each SLA; and (2) entropy score (see Section 1.5.2) on tenure to measure the degree of tenure diversity within each SLA. To obtain aggregated estimates during the non-Census years for median household incomes and percentages of households living in different tenure types, we use linear interpolation to impute SLA-level demographic data for the intervening years between 2001 to 2006, and 2006 to 2001. Table 5 below outlines the Census data derivation method for each year over the period 2001–2010.

Table 5: Approach to temporal interpolation of Census data

HILDA wave	Year	Actual/Interpolated data
1	2001	Actual Census data
2	2002	Imputed via linear interpolation using Census data from 2001 and 2006
3	2003	Imputed via linear interpolation using Census data from 2001 and 2006
4	2004	Imputed via linear interpolation using Census data from 2001 and 2006
5	2005	Imputed via linear interpolation using Census data from 2001 and 2006
6	2006	Actual Census data
7	2007	Imputed via linear interpolation using Census data from 2006 and 2011
8	2008	Imputed via linear interpolation using Census data from 2006 and 2011
9	2009	Imputed via linear interpolation using Census data from 2006 and 2011
10	2010	Imputed via linear interpolation using Census data from 2006 and 2011

Once we have 'filled in the gaps' of the secondary dataset, this produces 1278 spatial unit records with actual and interpolated Census variables for 10 years. These are also ranked and clustered into group variables. We then match each wave with the HILDA in-confidence dataset. Matching the HILDA data with the Census was not a straightforward process as the HILDA dataset used as its basis the 2001 and 2006 CD to create broader geographic regions like SLAs (Summerfield et al. 2011). The significance of this is that changes made to SLA boundaries between the 2011 Census and earlier Census years were not reflected in the SLA identifier within HILDA. This meant that a direct merge between the two datasets via their respective SLA identifiers could not be performed. To overcome this issue, we employed the ABS '2011 SLA from 2006 CD Correspondence files' and merged it with the HILDA dataset on CD name in an effort to attach the corresponding 2011 SLA name for each survey respondent within HILDA. Having obtained the common identifier 2011 SLA name between the Census and HILDA datasets, we matched the two datasets on data wave and SLA name to arrive at a wider sample which now contained SLA-specific demographic information for each year of the sample data range. Of the 136 347 observations within the pooled HILDA dataset, we were able to successfully match 136 211 observations which equates to approximately 99 per cent of the total HILDA dataset.

1.5.2 Definition of socio-economic mix and creation of the Theil's entropy score

To gain a better understanding of the extent to which the concentration of social housing and tenure diversity within a neighbourhood influence the wellbeing outcomes of residents, we create (1) entropy based on tenure type (outright home owners, home owners with a mortgage, private renters renting from a real estate agent, social renters renting from a state housing authority and other tenure type); (2) proportion of households living in housing that is rented from a state housing authority (social housing). We measure the degree of tenure diversity within an SLA boundary by calculating the Theil entropy score (Massey & Denton 1988) to distinguish areas with a disproportionately high degree of tenure mix from those areas where tenure mix is relatively low. A higher entropy score represents greater diversity, while the opposite is true for a lower entropy score. Our decision to use an entropy score is guided by Baum et al. (2009) who similarly apply it to measure the socio-economic mix of an area. The entropy score is distinct from the entropy index in that the entropy score provides a measure of diversity within a geographical area while the latter measures

the degree of evenness in terms of spatial distribution of a particular group—that is, the degree to which a particular group is evenly distributed in a neighbourhood (Iceland 2004). In the context of social mix as defined by housing tenure, we can describe the entropy score as measuring how diverse or equally representative different housing tenure groups are in a given SLA. As stated above, we create the following five categories of housing tenure types:

1. outright home owners
2. home owners with a mortgage
3. private renters renting from a real estate agent
4. social renters renting from a state housing authority
5. other tenure type.

To generate an entropy score, we calculate the following formula:

$$E = \sum_{r=1}^{r} (\Pi_r)\, ln[1/\Pi_r]$$

where *E* represents the entropy score and *Πr* represents group *r*'s proportion of the whole SLA population. The maximum entropy score is obtained by taking the natural log of the number of tenure categories that make up the entropy score. As there are five categories of tenure type, the maximum tenure entropy score is 1.6094 which suggests maximum tenure diversity.

For entropy based on tenure type, we create a categorical variable to distinguish between differing degrees of tenure diversity within an SLA by dividing areas into the following six groups:

1. no/very low tenure diversity
2. low tenure diversity
3. moderate-low tenure diversity
4. moderate-high tenure diversity
5. high tenure diversity
6. very high tenure diversity.

To establish the absolute share of disadvantage in an area we use the proportion of households renting in social housing figures calculated in the above step to create a separate measure of socio-economic mix. We delineate between varying degrees of social mix in a neighbourhood area by dividing the proportion of households in social housing into the following six unequal groups:

1. no/very low percentage of households in social housing
2. low percentage of households in social housing
3. moderate-low percentage of households in social housing
4. moderate-high percentage of households in social housing
5. high percentage of households in social housing
6. very high percentage of households in social housing.

The above social mix variables are incorporated into the multilevel models to control for socio-economic diversity, where the categorical variable denoting the proportion of households renting in social housing acts both as a proxy for disadvantage as well as signifying social mix.

The diversity score essentially measures the extent to which groups are mixed in one location with the highest proportions for each tenure equating to the most mixed or diverse area. This means that homogenous areas can be those that are mostly home owners or mostly renters or social renters. In reality, given the dominance of home ownership in Australia there are only a handful of areas where the number of renters are higher than owners. A homogenous area or the lowest diversity corresponds to areas that are predominately made up of home owners with virtually no or very small concentrations of social renters. We selected the six groups based on examination of a cut off threshold and deviation from 10 broad groupings of deciles, which is the standard classification of SEIFA areas. The classifications were tested and refined using the area maps. We took the percentage of home ownership as an overriding framework for assessing the cut off points for the six groups. Using this framework we found that those at both the very lowest and very highest deciles differed markedly from their 'neighbouring' decile groups and so these deciles were left comprising 10 per cent cut off. The remaining groups were clustered into quintile groups. Table 6 below presents summary statistics on the tenure entropy groups. Entropy scores range from 0.53 to 1.60, where areas with low tenure entropy are characterised as having low area-level variation in terms of housing tenure and therefore more homogeneous, while areas with a high entropy score are identified as being more diverse.

The distribution of scores across spatial areas differs from the distribution across the Australian population, and across the HILDA sample. A difficulty was to attain adequate spatial differentiation, particularly within urban areas, without adding unmanageable detail to the categories. Mapping of tenure entropy groupings based on quintiles, for example, put most urban areas in one category. The six entropy categories applied are based on the distribution of tenure entropy scores within the HILDA sample, and were selected due to showing patterning between and within spatial groups. Some background to the grouping of spatial areas, and issues with this process, is given below.

Table 6: Descriptive statistics on area mix thresholds based on tenure entropy groups

Entropy groups	Mean	Median	Minimum	Maximum	Standard deviation	Count
No/very low tenure diversity	1.08	1.08	0.53	1.14	0.05	13,604
Low tenure diversity	1.21	1.21	1.14	1.25	0.03	27,231
Moderate-low tenure diversity	1.29	1.30	1.25	1.33	0.02	27,264
Moderate-high tenure diversity	1.37	1.37	1.33	1.40	0.02	27,227
High tenure diversity	1.43	1.43	1.40	1.47	0.02	27,234
Very high tenure diversity	1.50	1.50	1.47	1.60	0.03	13,651
Total	1.32	1.33	0.53	1.60	0.13	136,211

Table 7 below presents summary statistics on the six categories constructed to represent the degree of concentration of social housing tenants in an area. Areas with less than 1 per cent of social housing tenants are considered as having minimal concentrations of social housing, while those with more than 9.4 per cent of

households in social housing tenants are considered as having very high concentrations of social tenants.

Table 7: Descriptive statistics on area mix thresholds based on proportion of social housing groups

Proportion of social housing groups	Mean	Median	Minimum	Maximum	Standard deviation	Count
No/very low percentage of households in social housing	0.23	0.19	0.00	0.57	0.19	13,613
Low percentage of households in social housing	1.24	1.25	0.57	1.83	0.36	27,234
Moderate-low percentage of households in social housing	2.47	2.50	1.83	3.24	0.39	27,247
Moderate-high percentage of households in social housing	4.28	4.23	3.24	5.43	0.59	27,222
High percentage of households in social housing	7.12	6.93	5.43	9.41	1.15	27,263
Very high percentage of households in social housing	13.77	12.42	9.41	41.22	5.36	13,632
Total	4.43	3.24	0.00	41.22	4.24	136,211

Effort has been made to develop spatial categories containing similar proportions of the Australian population. The spatial units (SLAs) were ranked by an aggregate measure (percentage of social housing); and by a measure of tenure mix (entropy). Although these concepts overlap, they also speak to diverging research questions and assumptions (Galster 2007). The focus of the spatial data is on the Census of Population and Housing; and particularly Time Series Profile data covering 2001, 2006 and 2011. These roughly equate to the longitudinal coverage of the HILDA dataset and take into account changes in spatial boundaries over time. In the models, for inter-Census years, linear interpolation has been applied to derive the spatial Census data underlying the scores. All spatial data has been aligned by calendar years to HILDA wave years. The models integrate measures of the relative concentration or mix of socio-economic and demographic variables in the SLA relative to other Australian SLAs. While this method does lose the localised spatial analysis that can be undertaken for more in-depth case studies, more general inferences can be made as to whether there is any variance in wellbeing according to particular area attributes across Australia.

Density of the dwelling

We create a categorical variable to denote the different dwelling types occupied by the HILDA respondents so as to explore the relationship between the wellbeing outcomes and the type and density of the dwelling. We create the following five indicators to capture the type and density of the dwelling an individual lives in:

1. House/town house—includes detached housing such as separate house, one-storey semi-detached house/row of terrace houses, town house and two or more storey semi-detached house/row of terrace house.
2. Medium density units—includes one to three-story block of flats and units/apartments.
3. High density units—includes more than four-storey block of flats/units/apartments.
4. Caravan.
5. Other types—not defined.

Our motivation for including a dwelling type and density measure in the empirical analysis is guided by the empirical literature which suggests a causal link between dwelling density and mental health. After a comprehensive review of the literature on housing and mental health, Evans et al. (2003) found strong support for the links between adverse psychological health and multi-dwelling housing. In general, people living in high-rises seem to have poorer mental health than those living in low-rises or houses. In light of these findings, we include dwelling density measures in our modelling analysis.

Table 8 below produces cross-tabulations of the number and percentage of individuals within tenure type, tenure area and dwelling measures. As expected, social housing tenants exhibit higher incidence of living in areas with high concentrations of social housing tenants. They also, however, occupy areas marked by high tenure diversity. Similar patterns are observed for lower income private renters. Home owners on the other hand are more inclined to reside in more homogenous areas with low proportions of households in social housing.

Table 8: Sample frequencies of the three area-based mix measures by tenure type

		Home owners		Lower income private renters		Moderate-to-high income private renters		Social housing tenant		Total	
		N	%	N	%	N	%	N	%	N	%
Tenure entropy groups	No/very low tenure diversity	9,954	11.81	477	4.89	921	5.17	145	2.59	11,497	9.79
	Low tenure diversity	18,873	22.39	1,368	14.03	2,373	13.33	455	8.14	23,069	19.64
	Moderate to low tenure diversity	17,407	20.65	1,854	19.02	3,354	18.84	944	16.88	23,559	20.06
	Moderate to high tenure diversity	16,334	19.38	2,051	21.04	4,121	23.15	919	16.43	23,425	19.95
	High tenure diversity	15,074	17.88	2,600	26.67	4,349	24.43	1,609	28.77	23,632	20.12
	Very high tenure diversity	6,660	7.9	1,399	14.35	2,682	15.07	1,520	27.18	12,261	10.44
Proportion of social housing groups	No/very low households in social housing	9,778	11.6	548	5.62	1,352	7.6	50	0.89	11,728	9.99
	Low percentage of households in social housing	18,105	21.48	1,671	17.14	3,273	18.39	445	7.96	23,494	20
	Moderate to low proportion of households in social housing	17,449	20.7	1,678	17.21	3,527	19.81	680	12.16	23,334	19.87
	Moderate to high proportion of households in social housing	16,162	19.17	2,242	23	3,961	22.25	1,099	19.65	23,464	19.98
	High proportion of households in social housing	15,675	18.59	2,405	24.67	3,753	21.08	1,751	31.31	23,584	20.08
	Very high proportion of households in social housing	7,133	8.46	1,205	12.36	1,934	10.87	1,567	28.02	11,839	10.08
Dwelling type	House/town house	79,426	95.09	6,857	71.93	12,937	74.35	3,737	67.55	102,957	88.76
	Medium density units	3,116	3.73	2,059	21.6	3,488	20.05	1,410	25.49	10,073	8.68
	High density units	525	0.63	159	1.67	640	3.68	285	5.15	1,609	1.39
	Caravan	297	0.36	99	1.04	60	0.34	4	0.07	460	0.4
	Other	166	0.2	359	3.77	274	1.57	96	1.74	895	0.77

Other area-based measures

We also make use of additional area-based measures such as median household income within each SLA (based on the ABS' Census data), the rate of unemployment within the wider Metropolitan Statistical Region (based on data from HILDA) in our multilevel models. Controlling for area-level income and unemployment enables us to factor in the wider macro-economic factors that may influence wellbeing outcomes.

An important methodological challenge that should be addressed when quantifying neighbourhood effects relates to measuring exposure to a particular neighbourhood. Musterd et al. (2012) tackle this issue in a study which investigates the impact of mixed-income neighbourhoods on labour incomes. We test whether exposure to a disadvantaged area and one with a high concentration of social housing has a significant impact on employment incomes. We also vary the period over which neighbourhood exposure is measured by using separate variables to measure neighbourhood exposure for *t* years, *t-1* years etc.

The multilevel model

Multilevel data can be thought of as comprising different levels of a hierarchy. Area-based data form a hierarchical structure whereby individuals *i* (level 1) are 'nested' in particular areas, *n*(level 2). Moreover, when we have repeated observations from the same individuals we have an additional level with observations nested within individuals. This hierarchical structure of areas is a key rationale for the use of multilevel analysis, which allows one to concurrently examine the area and individual level effects on wellbeing outcomes (Diez-Roux 2000).

In standard regression models, such as ordinary least squares, the hierarchical nature of the data is ignored. One of the key issues with using individual-level data is that it does not take into account the likelihood that the wellbeing outcomes of individuals residing within the same neighbourhood may be more alike than those residing in different neighbourhoods (Oakes 2004; Ballas & Tramner 2011). This is to say that individuals residing in a neighbourhood where average life satisfaction is relatively high may generate more positive subjective wellbeing outcomes than those belonging to a different neighbourhood which reports lower average life satisfaction outcomes. Thus, there is a group clustering effect that is not often captured by individual-level data (Ballas & Tramner 2011). This violates the assumption of independence in standard ordinary least squares (OLS) regression, which presupposes that all individuals are extracted from a random sample so that the mean of the error term, which captures all unmeasured causes of the dependent variable, *y*, is independent of the values of the explanatory variables (Allison 1998). Thus, employing OLS regression methods to discern neighbourhood effects would invariably result in the acute issue of omitted variable bias.

Multilevel models provide an extension of the standard regression model by allowing the different hierarchies to be isolated and analysed concurrently in the one regression. So, in the case of examining individuals within clusters of a neighbourhood, a multilevel model provides both the average and the variation around the average at both the individual and the neighbourhood level. We outline the multilevel model in more detail in Chapter 3.

2 AREA CHARACTERISTICS AND WELLBEING OUTCOMES: DESCRIPTIVE STATISTICS

This chapter presents key descriptive statistics that highlight the interplays between tenure mix, area (dis)advantage and lower income renters' wellbeing outcomes. Section 2.1 profiles the characteristics of the areas that lower income renters typically reside in. Specifically, we use spatial mapping tools to identify areas where tenure mix and area (dis)advantage are most pronounced. The mapping exercise also allows us to chart the extent to which there are systematic parallels between tenure mix and area (dis)advantage. This section therefore provides important geographical detail that will facilitate in-depth interpretation of the modeling findings in Chapter 3. In doing so, it will address the following research question:

→ What is the overlap between tenure mix and area (dis)advantage? Are socially mixed areas typically characterised as poorer or better off areas?

Section 2.2 uncovers important statistical associations between the wellbeing outcomes of lower income renters and the characteristics of the areas (SLAs) they reside in. These descriptive statistics provide *prima facie* evidence of statistical links between area characteristics and wellbeing outcomes that are further tested in Chapter 3 through multilevel modelling that can empirically isolate confounding influences on wellbeing outcomes. Specifically, Section 2.2 will address the following research question:

→ Do the wellbeing outcomes of social and lower income private renters vary by areas according to their tenure mix and area disadvantage?

Section 2.3 will extend the analysis of the nexus between area characteristics and the wellbeing outcomes of lower income renters by introducing a dynamic element into the analysis. In doing so, it will investigate important issues that arise due to duration dependence, in particular, the links between long-term exposure to disadvantage and wellbeing outcomes to address the following research question:

→ Do social and lower income private renters remain exposed to disadvantaged areas and those with high concentrations of social housing for extended periods and what impact does this have on their wellbeing?

Section 2.4 concludes this chapter by offering a summary of the key findings from the descriptive analysis.

2.1 Tenure mix and area (dis)advantage

In this section we examine the spatial distribution of two area tenure-based measures of the concentration of social housing and tenure diversity. This will be followed by a separate assessment of the spatial distribution of area (dis)advantage, using measures of *area disadvantage and advantage* drawing on median area household income and area rates of unemployment. An integrated spatial distribution analysis will then be conducted to detect whether any significant interplays exist between area tenure measures and area (dis)advantage.

2.1.1 Concentration of social housing

First we draw on Census data to examine the distribution and changing concentration of social housing from 2001 to 2011. As defined in Chapter 1, the six groups capture varying degrees of area-based concentrations of social housing that range from none-very low through to very high percentages of households in social housing.

The distribution of Statistical Local Areas (SLAs) across the six categories is shown for the 2001 and 2011 Census years in Table 9 below. As expected, the average

percentage of social housing dwellings was essentially none (0.1% in 2001 and 0.2% in 2011) in the group with the lowest concentration of social housing. Areas with 'moderate-to-high' concentrations of social housing reflect the national concentration of social housing of over 4 per cent. In general, in both years, we witness an exponential increase in the concentration of social housing as we move from low to high social housing concentrations. On average, the proportion of social housing in areas with 'very high' concentrations of social housing is over twice the proportion of social housing in areas with 'high' concentrations of social housing. Furthermore, social housing comprised on average 16.3 per cent of private dwellings in SLAs with 'very high' social housing concentrations, almost four times the national percentage of social dwellings in 2001, and similar figures apply to 2011.

In both 2001 and 2011 there were 1278 SLAS, after excluding those SLAs with missing data in the Census. During 2001 there were 248 or 19.4 per cent of SLAs in the lowest social housing concentration group and 159 or 12.4 per cent in the highest concentration group. Between 2001 and 2011, the average percentage of SLAs with social housing in the 'very high' concentration category dropped from 12.4 per cent to 9.5 per cent, but the proportion of SLAS with lowest concentrations of social housing also fell from 19.4 per cent to 15.6 per cent. This may reflect the implementation of micro social mix policies specifically aimed at breaking up concentrated social housing areas that were largely implemented by state and territory governments over the decade.

Table 9: Distribution of SLAs across social housing concentration groups, 2001 and 2011

Concentration of social housing	2001[a]		2011[a]	
	Average % of social housing dwellings	SLA distribution (% by column)	Average % of social housing dwellings	SLA distribution (% by column)
No-very low	0.1%	19.4%	0.2%	15.6%
Low	1.2%	19.6%	1.2%	21.0%
Mod-Low	2.5%	17.8%	2.5%	16.8%
Mod-High	4.2%	16.0%	4.2%	19.5%
High	7.2%	14.8%	7.1%	17.5%
Very High	16.3%	12.4%	15.5%	9.5%
Total	4.5%	100.0%	4.2%	100.0%

Source: Authors' calculations from the 2001 and 2011 Census

Note: [a] In 2001 and 2011, there were 1278 SLAs.

The locations of areas in which social housing is concentrated vary by state and territory. New State Wales has relatively high levels of spatial concentrations of social housing. The 10 SLAs in New South Wales with the state's highest concentrations of social housing in 2001 are listed in Table 10 below. These SLAs are predominantly located in Sydney's south, west and south west inner city and suburban areas. It is noteworthy, however, that while some inner Sydney SLAs had relatively high proportions of social housing in 2001, these SLAs experienced noticeable declines in the proportions of social housing between 2001 and 2011. For example, in Sydney (C)—south, the proportion of dwellings classified as social housing fell steeply from 22.5 per cent to 13.5 per cent over the decade.

For comparative purposes, we list the 10 SLAs in Victoria with the state's highest concentrations of social housing during 2001 in Table 11 below. In comparison to New

South Wales, Victoria has lower concentrations of social housing. The SLA with the highest proportion of social housing in Victoria (Yarra (C)—Richmond) had 13.5 per cent of dwellings classified as social housing in 2001, considerably lower than the 22.5 per cent in the top New South Wales SLA. Also noticeable is that the top four SLAs for social housing in 2001 in Victoria were all located in inner Melbourne. Viewed against the national picture, few Victorian SLAs—only inner Melbourne SLAs—had comparatively high proportions of social housing. These included SLAs in Yarra, Melbourne, and Port Phillip. Melbourne overall has fewer spatial concentrations of social housing than does Sydney, again pointing to general questions of the significance of scale in social mix policies—ranging from neighbourhoods, to areas, to large metropolitan regions.

Table 10: Top 10 New South Wales' SLAs with the highest concentrations of social housing, 2001 and 2011

SLA	Location (Statistical Area 4)	% social housing	
		2001	2011
Sydney (C)—South	Sydney—City and Inner South	22.5%	13.5%
Blacktown (C)—South-West	Sydney—Blacktown	19.0%	15.2%
Campbelltown (C)—North	Sydney—Outer South West	16.5%	11.8%
Sydney (C)—West	Sydney—City and Inner South	14.8%	9.4%*
Parramatta (C)—South	Sydney—Parramatta	13.9%	12.9%
Liverpool (C)—East	Sydney—South West	13.5%	12.1%
Parramatta (C)—North-East	Sydney—Parramatta	13.3%	10.9%
Bankstown (C)—North-West	Sydney—Inner South West	13.0%	11.6%
Campbelltown (C)—South	Sydney—Outer South West	12.9%	11.2%
Botany Bay (C)	Sydney—City and Inner South	12.2%	10.2%
Brewarrina (A)	Far West and Orana (Remote)	7.3%*	11.2%
Central Darling (A)	Far West and Orana (Remote)	1.9%*	12.4%

Source: Authors' calculations from the 2001 and 2011 Census

Note: * Not top 10 for year.

Table 11: Top 10 Victorian SLAs with the highest concentrations of social housing, 2001 and 2011

SLA	Location (Statistical Area 4)	% social housing	
		2001	2011
Yarra (C)—Richmond	Melbourne—Inner	13.5%	10.9%
Melbourne (C)—Remainder	Melbourne—Inner	12.8%	8.7%
Yarra (C)—North	Melbourne—Inner	12.1%	11.1%
Port Phillip (C)—West	Melbourne—Inner	10.5%	7.6%
Campaspe (S)—Echuca	Shepparton (Regional)	9.5%	8.0%
Gr. Bendigo (C)—Eaglehawk	Bendigo (Regional)	9.2%	8.2%
Corio—Inner	Geelong (Regional)	8.9%	7.0%*
Wodonga (RC)	Hume (Regional)	8.8%	7.8%
Moonee Valley (C)—Essendon	Melbourne—Inner	8.7%	7.6%
Benalla (RC)—Benalla	Hume (Regional)	8.5%	7.2%*
Swan Hill (RC)—Central	North West (Regional)	8.3%*	7.3%
Gr. Bendigo (C)—Central	Bendigo (Regional)	6.5%*	7.3%

Source: Authors' calculations from the 2001 and 2011 Census

Note: * Not top 10 for year.

In other states and territories, SLAs with the highest concentrations of social housing, relative to Australia overall, were located in the following areas (in 2001):

- Queensland: Brisbane South, Logan-Beaudesert, coastal regions
- South Australia: Adelaide North and Inner West, Onkaparinga, remote areas
- Western Australia: outback and remote areas (Broome, Derby, Meekatharra), Fremantle
- Tasmania: Glenorchy, Launceston, Burnie, Davenport
- Northern Territory: remote areas (Alice Springs, Tenant Creek), Darwin suburbs
- Australian Capital Territory: several SLAs across Canberra (Braddon, Reid).

Broadly speaking, in the above SLAs, over 9 per cent of private dwellings were classified as social housing in 2001. Clearly, the spatial areas featuring high social housing concentrations can range widely, from inner city to outer suburban areas, and even further out to regional and remote centres. This raises the issue that observed differences between measures of household characteristics may be capturing differences in the amenity and accessibility of the kinds of areas in which social housing is situated, rather than the concentration of social housing *per se*. It is apparent, for example, that most areas of high social housing concentration in New South Wales are in the west and south west suburban areas of Sydney. In Victoria, by contrast, areas with relatively high social housing tend to be either in the inner parts of Melbourne or in regional centres. To help address this variation, deliberate steps have been taken in the multilevel modelling in Chapter 3 to control for major urban, urban, and rural divides.

2.1.2 Tenure diversity

Next, we examine tenure diversity, based on the entropy scores described in Chapter 1, which take into account the level of social housing *as well as* the mix of

other tenures in each SLA. These categories capture six levels of tenure diversity, ranging from no-very low tenure diversity through to very high tenure diversity.

The distribution of the six tenure diversity groups across SLAs is shown for the 2001 and 2011 Census years in Table 12 below. In 2001, the average entropy score increased from 1.04 to 1.52 as we move from the lowest to the highest tenure diversity group. As shown in the table, the relatively tenure-diverse areas have above-average shares of social and private rental housing but owner occupation rates that are below national averages. For instance, in the 'very high' group in 2001, the shares of social (private) rental housing are almost three (1.5) times the national average. In contrast, the owner occupation rate of 50.6 per cent falls well below the national average of 69 per cent. Very similar trends can be observed in the average entropy scores and their underlying tenure distribution in 2011.

However, the distribution of SLAs across tenure diversity groups has changed somewhat between 2001 and 2011. In 2001, the distribution of SLAs was distinctly skewed towards the lower end. The least diverse group was also the largest, comprising over one-quarter of all SLAs. In contrast, less than one in 10 SLAs fell into the 'very high' tenure diversity group. By 2011, the SLA distribution had become more bell-shaped, peaking in the 'moderate-to-low' group at 21 per cent. Once again, the shrinking of the lowest tenure diversity group may reflect deliberate policy attempts aimed at breaking up concentrations of social housing dwellings over the decade and the increasing diversity of private rental properties into home owning areas.

Table 12: Distribution of SLAs across categories of tenure diversity, 2001 and 2011

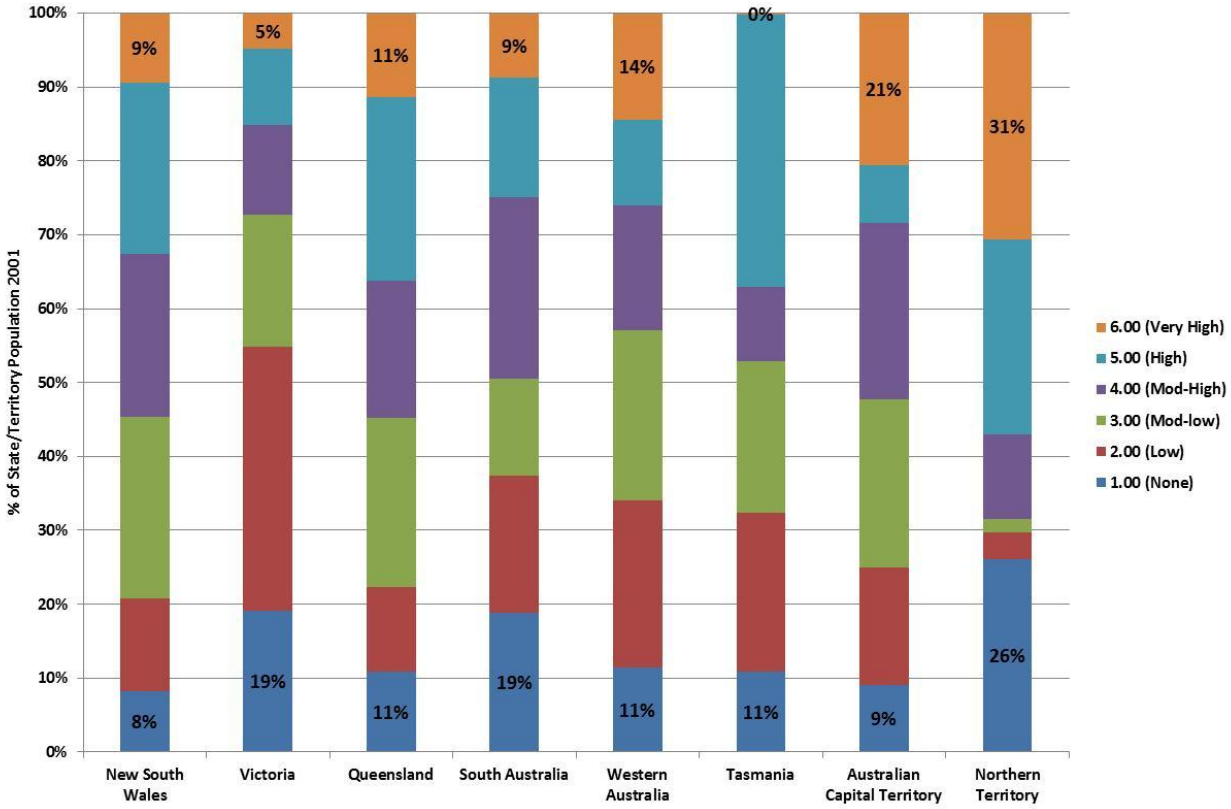
Tenure diversity	2001[a]				2011[a]			
	Average entropy score	% social housing	% owner occupied	SLA distribution (% by column)	Average entropy score	% social housing	% owner occupied	SLA distribution (% by column)
No-very low	1.04	1.5	76.4	26.4	1.07	1.1	81.5	14.6
Low	1.20	2.3	75.2	19.2	1.20	2.7	74.5	20.3
Mod-Low	1.29	3.6	71.4	17.1	1.29	3.0	72.4	21.0
Mod-High	1.37	5.6	64.9	14.4	1.37	4.0	64.8	17.8
High	1.44	7.7	60.3	13.0	1.43	6.4	59.8	15.5
Very High	1.52	12.4	50.6	9.9	1.51	11.0	53.6	10.8
Total	1.26	4.5	69.0	100.0	1.30	4.2	68.8	100.0

Source: Authors' calculations from the 2001 and 2011 Census

Note: [a] In 2001 and 2011, there were 1278 SLAs

As depicted in Figures 1 and 2, some geographical variation exists in tenure diversity at the state and territory level. In 2011, South Australia had the highest proportion (30%) of persons living in 'very high' diversity SLAs, followed by one-quarter in the territories. At the other extreme, only 2 per cent of Victoria's population lived in 'very high' diversity SLAs while almost 40 per cent resided in the two lowest diversity areas.

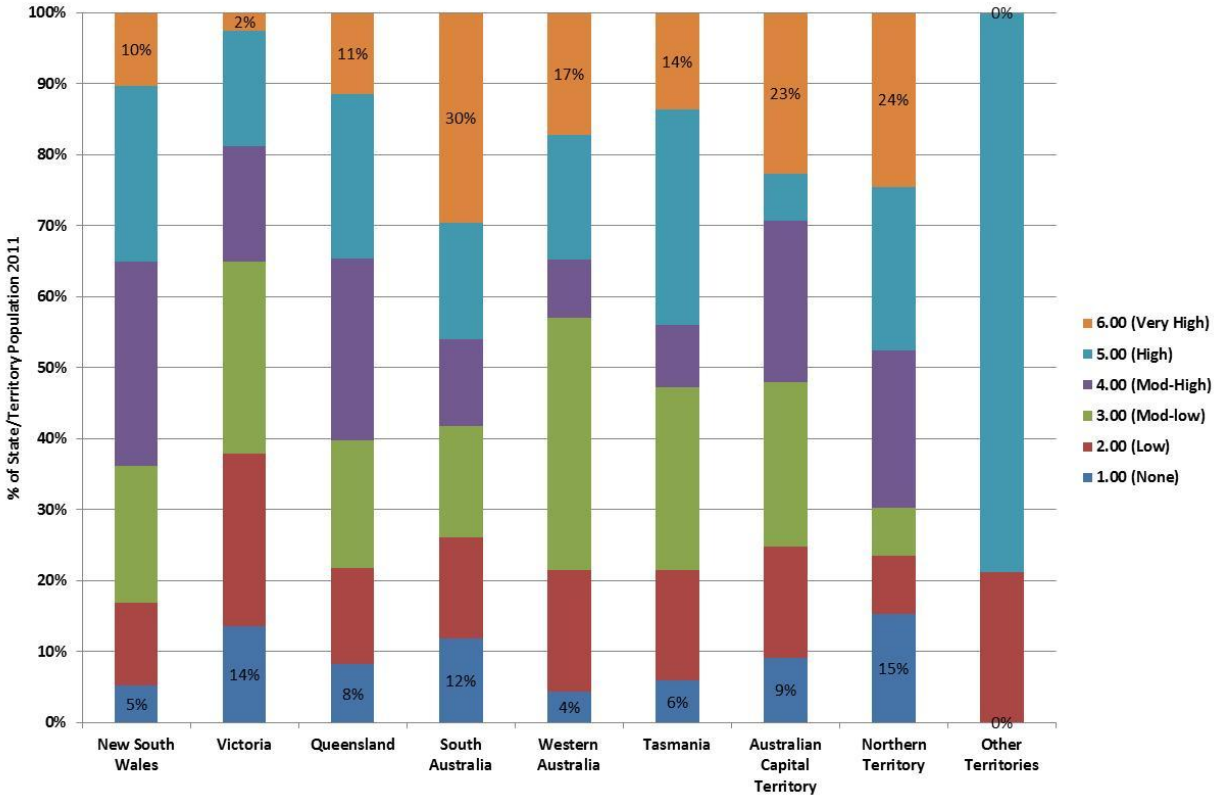
Figure 1: Distribution of tenure diversity groups, by state or territory, 2001[a]



Source: Authors' calculations from the 2011 Census

[a.] The distribution of tenure diversity groups is calculated from population counts.

Figure 2: Distribution of tenure diversity groups, by state or territory, 2011[a]



Source: Authors' calculations from the 2011 Census

[a.] The distribution of tenure diversity groups is calculated from population counts.

Within each state and territory, SLAs with the highest ranked tenure diversity (based on 2001) measures also ranged widely from inner city, to suburban, regional and rural areas, as listed below:

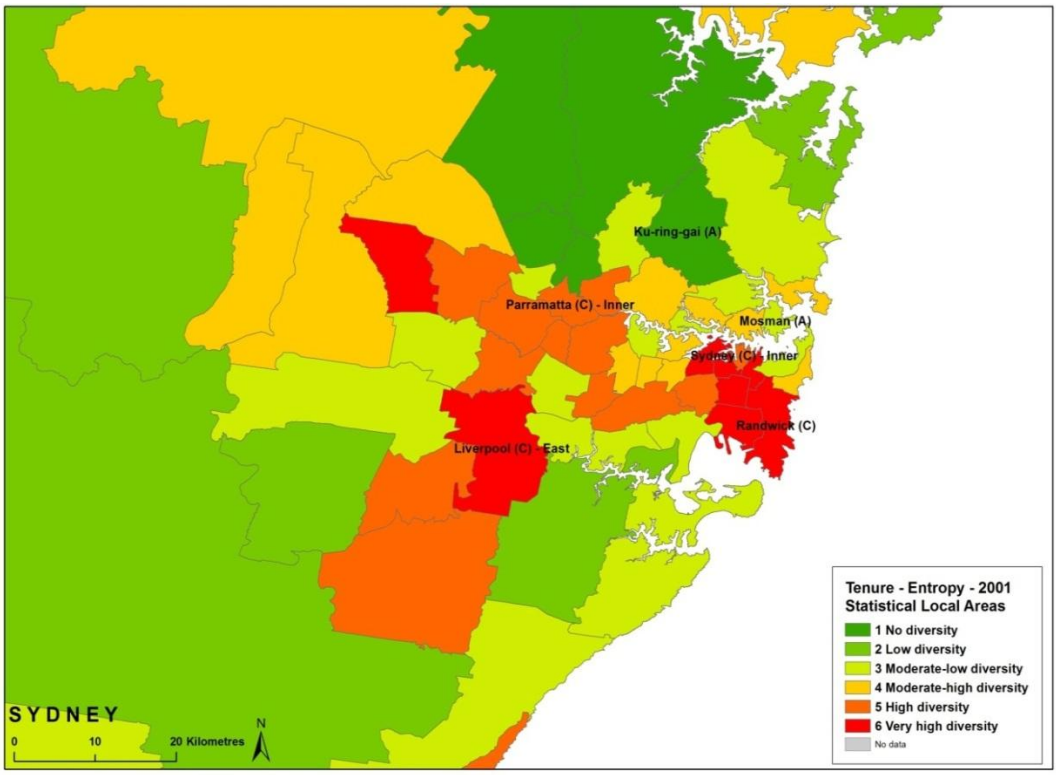
- New South Wales: New England, Newcastle, Blacktown, Sydney City and Inner South, Sydney Inner West and South West
- Victoria: Inner Melbourne, Melbourne South East, Melbourne West
- Queensland: Brisbane South and Inner City, Logan-Beaudesert, coastal regions, Townsville
- South Australia: Adelaide North, Adelaide West
- Western Australia: Inner and South East Perth, Fremantle, Outback (Broome, Geraldton)
- Tasmania: Inner Hobart
- Northern Territory: Darwin suburbs, Alice Springs.

To further illustrate the varying spatial distribution of tenure diversity groups, we report maps showing spatial distributions in the two largest capital cities in Australia, that is Sydney and Melbourne (see Appendix 1 for maps of other states). Figure 3 below shows that in Sydney, 'high' and 'very high' tenure diversity SLAs are distributed across a contiguous area from central Sydney through to the West and South West corridor, from Randwick across to Liverpool. The northern part of Sydney has generally low tenure diversity, but higher than surrounding regional areas. The maps also suggest that the diversity measure decreases in inner Sydney between 2001 and 2011. Figure 4 below shows that in Melbourne, SLAs with very high tenure entropy

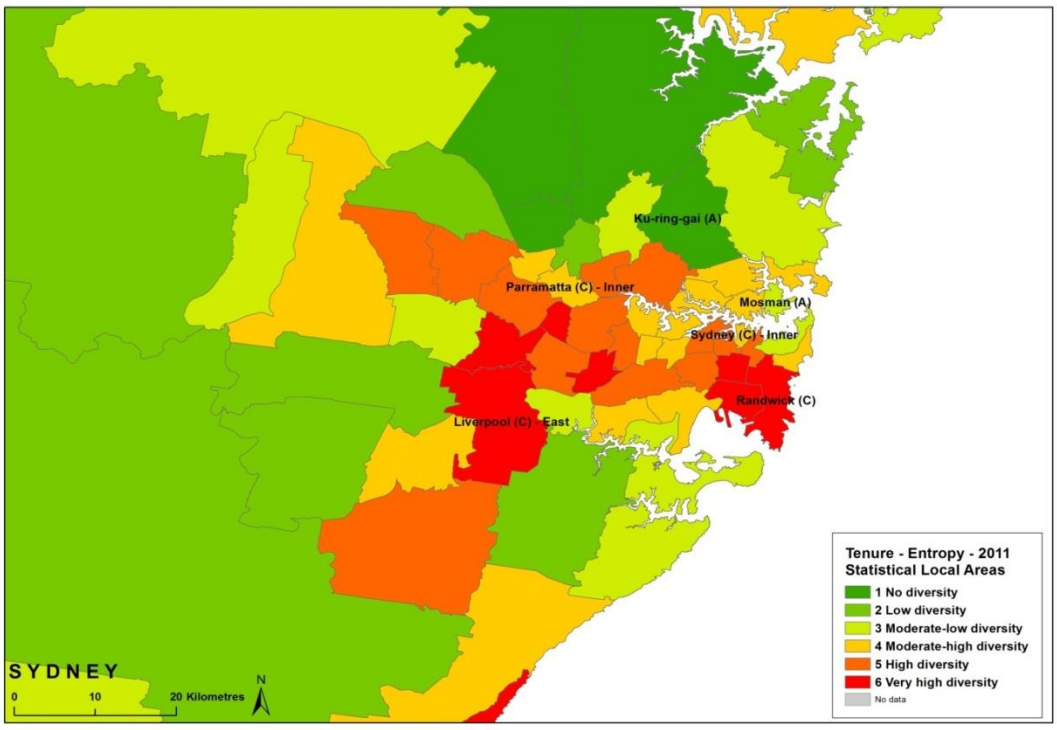
scores are in the inner city including Yarra, Port Phillip, and Melbourne Inner. High diversity SLAs are also in the middle-western suburbs and in the outer south east in Greater Dandenong and Frankston. There is generally low tenure diversity in the outer ring of suburbs, although with some variation.

Figure 3: Tenure diversity groups, Sydney

2001



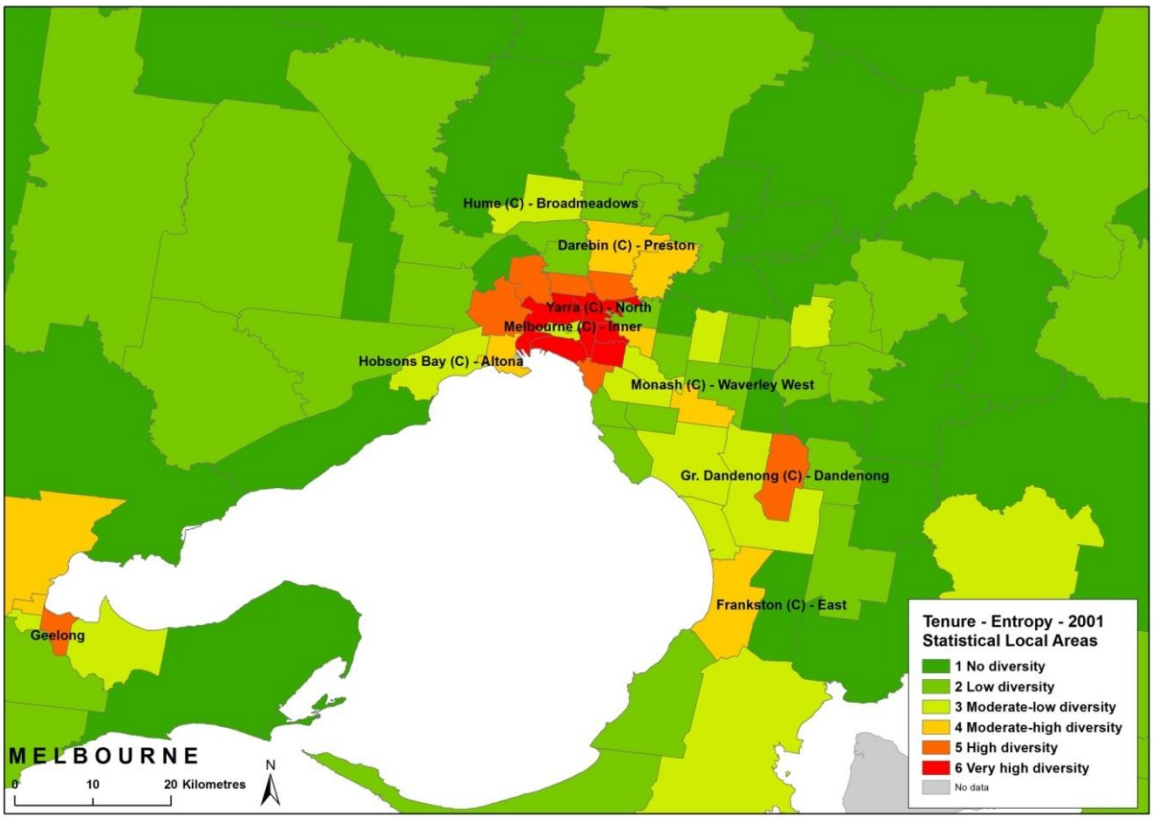
2011



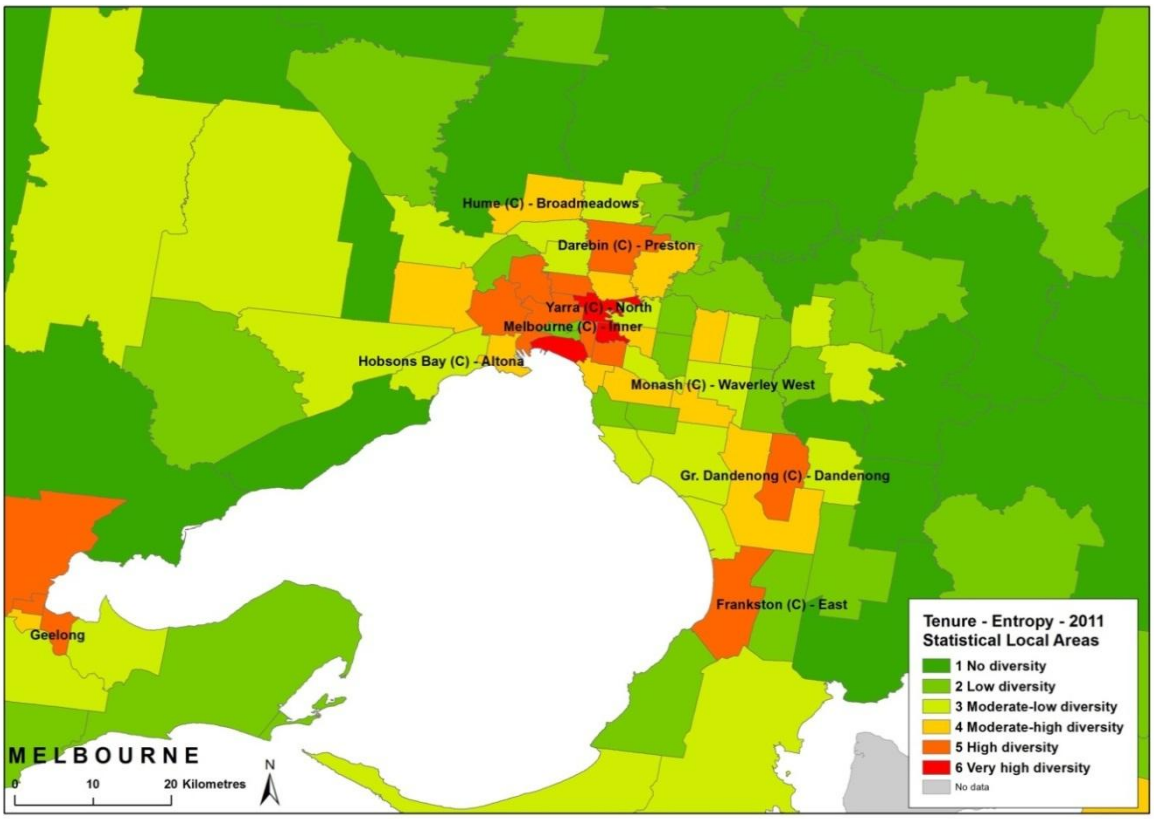
Source: Authors' calculations from the 2001 and 2011 Census

Figure 4: Tenure diversity groups, Melbourne

2001



2011



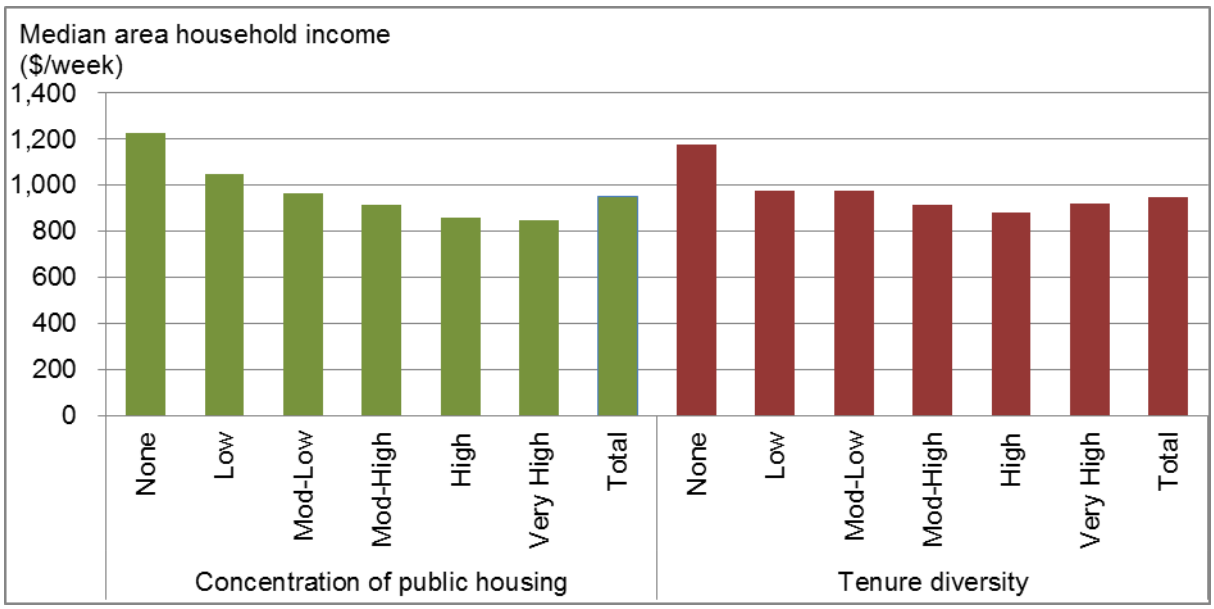
Source: Authors' calculations from the 2001 and 2011 Census

2.1.3 The links between tenure mix and area (dis)advantage

Next we assess whether there are notable overlaps between the tenure mix and level of (dis)advantage of SLAs. Specifically, we are interested in whether socially mixed areas are typically characterised as poorer or better off areas.

Figure 5 below reports the median area household income (calculated on an SLA basis) and by the two area tenure mix measures. An unsurprising finding is that median area household income has an inverse relationship with concentrations of social housing in the SLAs. As the concentration of social housing rises from 'none' to 'very high', median area household income steadily declines from over $1200 to $860. Broadly speaking, median area household income also declines as tenure diversity increases from 'none' to 'high'. This can be attributed to the tenure composition in each tenure diversity group. In the lowest tenure diversity group, the owner occupation rate is extremely high while the share of social housing is minimal (refer back to Table 12). Given owner purchasers are typically the highest income earning group in the population, the area income of the lowest tenure diversity group is also the highest at $1200 per week. At the 'high' end, income falls to $880, reflecting the steady rise in the shares of social housing and simultaneous decline in the shares of home ownership as we move from the lowest tenure diversity group to the 'high' tenure diversity group. Interestingly, however, median area household income rises slightly to over $920 in the 'very high' end of tenure diversity.

Figure 5: Median area household income by tenure mix measures, 2001–2010



Source: Authors' calculations from HILDA, Release 10

Overall, Figure 5 supports the proposition that areas with high concentrations of social housing tend to be 'poorer' areas. Tenure diversity, though, does not have a similar clear cut relationship with area (dis)advantage, though it does appear that 'moderate-to-high' and 'high' tenure diversity areas are on average 'poorer'. These areas have relatively high concentrations of households in social housing and lower income private renters.

Table 13 below further confirms the findings unearthed from Figure 4 via the use of a statistical tool called the Spearman's rank correlation coefficient. This coefficient essentially measures the direction and strength of statistical association between two categorical variables. Here, we are interested in correlations between each tenure mix group and the two measures of area (dis)advantage—median area household income

and area unemployment rates categorised into quintiles. Increasing concentrations of social housing is strongly negatively associated with area income and positively associated with high area unemployment rates, further corroborating the results reported in Table 12. Increasing tenure diversity also has a negative statistical correlation with area income though the magnitude of the correlation coefficient is lower (-0.1971) than in the case of concentration of social housing (-0.275). This is not altogether surprising given the slight hike in area income as we move from 'high' to 'very high' tenure diversity areas. There is a statistically significant negative correlation between tenure diversity and area unemployment, indicating that areas that are highly tenure diversified tend to have lower unemployment rates. However, the magnitude of this relationship is very small at -0.0077.

Table 13: Statistical correlation between tenure mix measures and area (dis)advantage, 2001–2010

Tenure mix measures	Spearman's rank correlation coefficient	
	Median area household income quintiles	Area unemployment rate quintiles
Concentration of social housing	-0.2725*	0.0755*
Tenure diversity	-0.1971*	-0.0077*

Source: Authors' calculations using HILDA Release 10.

Note: * Correlation is statistically significant at the 5 per cent level.

2.2 Tenure mix, area (dis)advantage and wellbeing outcomes

This section documents important statistical associations between the wellbeing outcomes of lower income renters and the characteristics of the areas they reside in. The wellbeing outcomes are reported by tenure mix categories for various housing tenures comprising our two key lower income tenure groups of interest—social housing tenants and lower income private renters—as well as moderate-to-high income private renters and home owners that constitute comparison groups against which the wellbeing outcomes of lower income tenants can be assessed. Data from the 2001–2010 HILDA Survey is pooled together into person-period observations for the purposes of this analysis.

We begin by profiling the personal characteristics of the housing tenure groups. The typical social renter is female, older, single or more likely to have undergone marital breakdown (separation, divorce) or bereavement than the general population. They are also less likely to have children than the average Australian and a disproportionately large number (63%) are not in the labour force (NLF). Similarly, females, singles and those who have experienced marital breakdown or bereavement are over-represented among lower income private renters, as are the unemployed and persons NLF. However, they tend to be younger and more likely to have children. The overall profile of moderate-to-high income private renters is that of younger couples (legally married or de facto) with no children, while the home owner group is dominated by older, legally married couples with children.

Table 14: Socio-demographic characteristics by housing tenure, pooled 2001–2010 data, % by column

Characteristics		Social housing tenants	Lower income private renters	Moderate-to-high income private renters	Home owners	Total
Sex	Male	40.0	39.4	53.9	47.3	47.3
	Female	60.0	60.6	46.1	52.7	52.7
Age	Under 25 years	14.6	30.7	24.1	7.4	12.2
	25–34 years	14.2	20.2	36.8	13.5	17.6
	35–44 years	16.5	16.1	21.6	21.5	20.9
	45–54 years	17.4	11.0	12.6	21.6	19.1
	55–64 years	14.7	7.8	4.4	16.6	13.9
	65+ years	22.6	14.3	0.5	19.5	16.3
Marital status	Legally married	24.9	18.8	30.3	64.2	53.4
	De facto	13.4	14.8	29.9	9.6	13.3
	Separated	5.8	7.3	3.9	2.2	3.1
	Divorced	14.6	12.4	6.4	5.1	6.4
	Widowed	10.9	6.0	0.2	6.1	5.5
	Single never married	30.5	40.7	29.2	12.7	18.4
Number of children	Zero	64.6	56.8	67.4	56.8	59.5
	One	13.9	15.5	14.6	15.5	15.4
	Two	12.3	18.1	11.3	18.1	16.2
	Three or more	9.2	9.6	6.7	9.6	8.9
Number of person-periods		5,616	9,759	17,827	84,338	117,540

Source: Authors' calculations from the 2001–2010 HILDA Survey

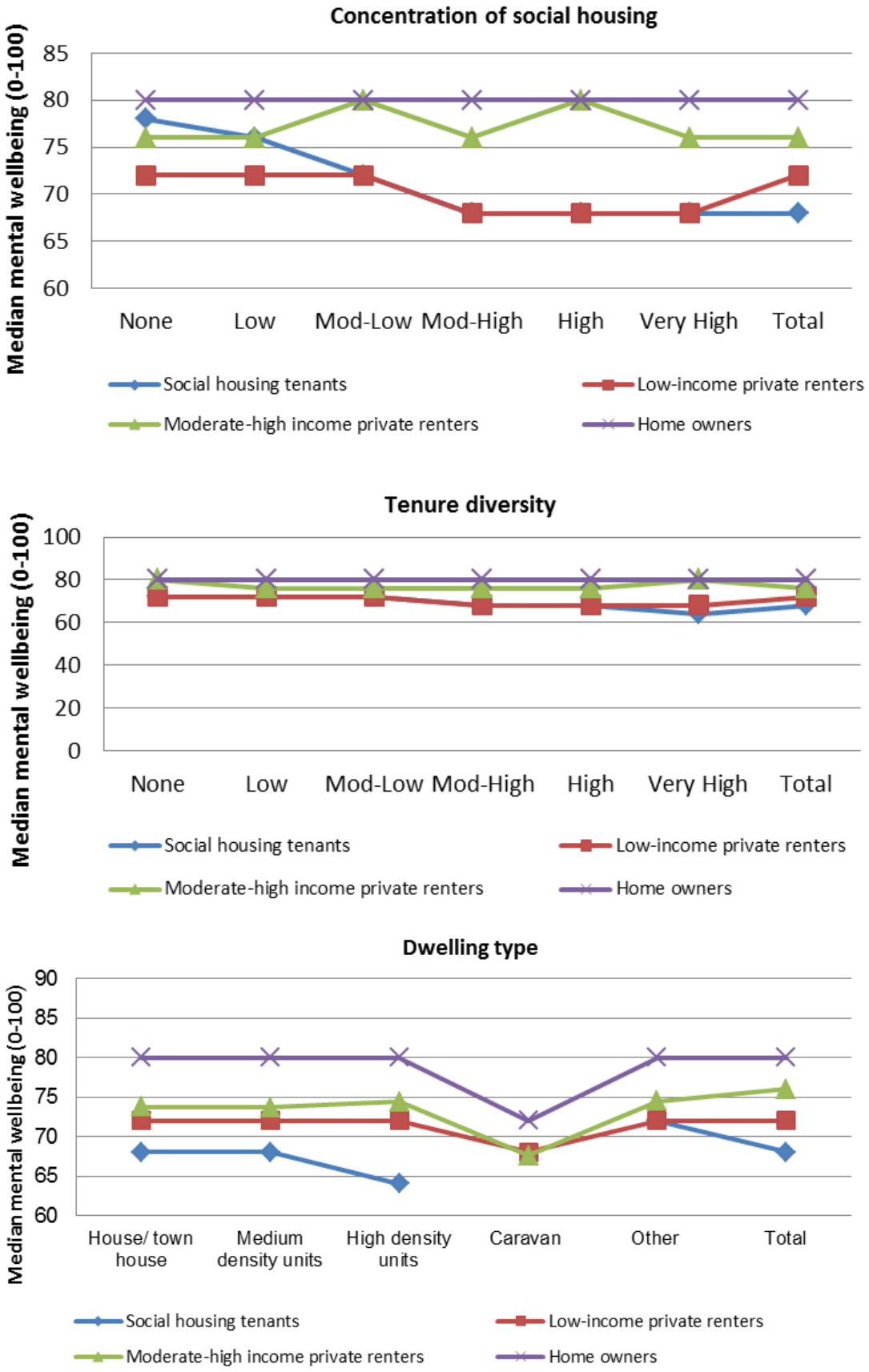
Having established the distinctive characteristics of each housing tenure group, we now begin profiling wellbeing outcomes by housing tenure group and area tenure mix. We focus on the four wellbeing measures introduced in Chapter 1, that include mental wellbeing, satisfaction with feelings of safety, satisfaction with one's neighbourhood and employment outcomes.

Figure 6 below graphically illustrates median mental wellbeing scores using the SF-36 measure. It is clear that home owners have the best mental health outcomes, with median SF-36 scores typically around 80. Moderate-to-high income private renters have slightly lower levels of mental wellbeing than home owners, but the two lower income renter groups stand out as having the lowest median mental wellbeing outcomes. However, there are some further divergent trends in wellbeing by tenure mix that are noteworthy. Social housing tenants' median mental wellbeing drops by 10 points (78 to 68) as we move from areas with the lowest through to the highest concentrations of social housing. Likewise, the observed median mental wellbeing of social housing tenants declines from 72 to 64 as we move from areas with no tenure diversity to areas with 'very high' diversity. These estimates are paralleled by similar observations on social renters' satisfaction with feeling part of their local community.

Social housing tenants living in areas with high concentrations of social housing or high tenure diversity do in fact exhibit lower satisfaction with feeling part of their local community than those living in areas with low concentrations of social housing. On a scale of 0 to 10, social housing tenants living in an area with the lowest concentration of social housing or no tenure diversity report respective high median scores of 9 and 8 for feeling part of their local community. In contrast, social tenants living in areas with the 'very high' concentrations of social housing or 'very high' tenure diversity tend to be less satisfied with feeling part of their community, with both groups reporting a median score of 6. These findings suggest that the concentration of social housing and overall diversity of the area can potentially erode social connectedness for this group of renters.

Similarly, but to a lesser extent, lower income private renters in areas featuring higher social housing concentrations or higher tenure diversity have lower mental wellbeing than those living in less concentrated social housing or less tenure diversified areas. Home owners and moderate-to-high-income private renters are relatively unaffected by social housing concentrations and tenure diversity of the areas they reside in, with comfortably high mental wellbeing scores of over 75 regardless of where they live. For all housing tenures, mental wellbeing does not vary by dwelling density, with the exception of the dip in wellbeing of social renters living in high density dwellings and the minority who live in caravans.

Figure 6: Median mental wellbeing, SF-36 measure, 0–100, by housing tenure and tenure mix, pooled 2001–2010 data



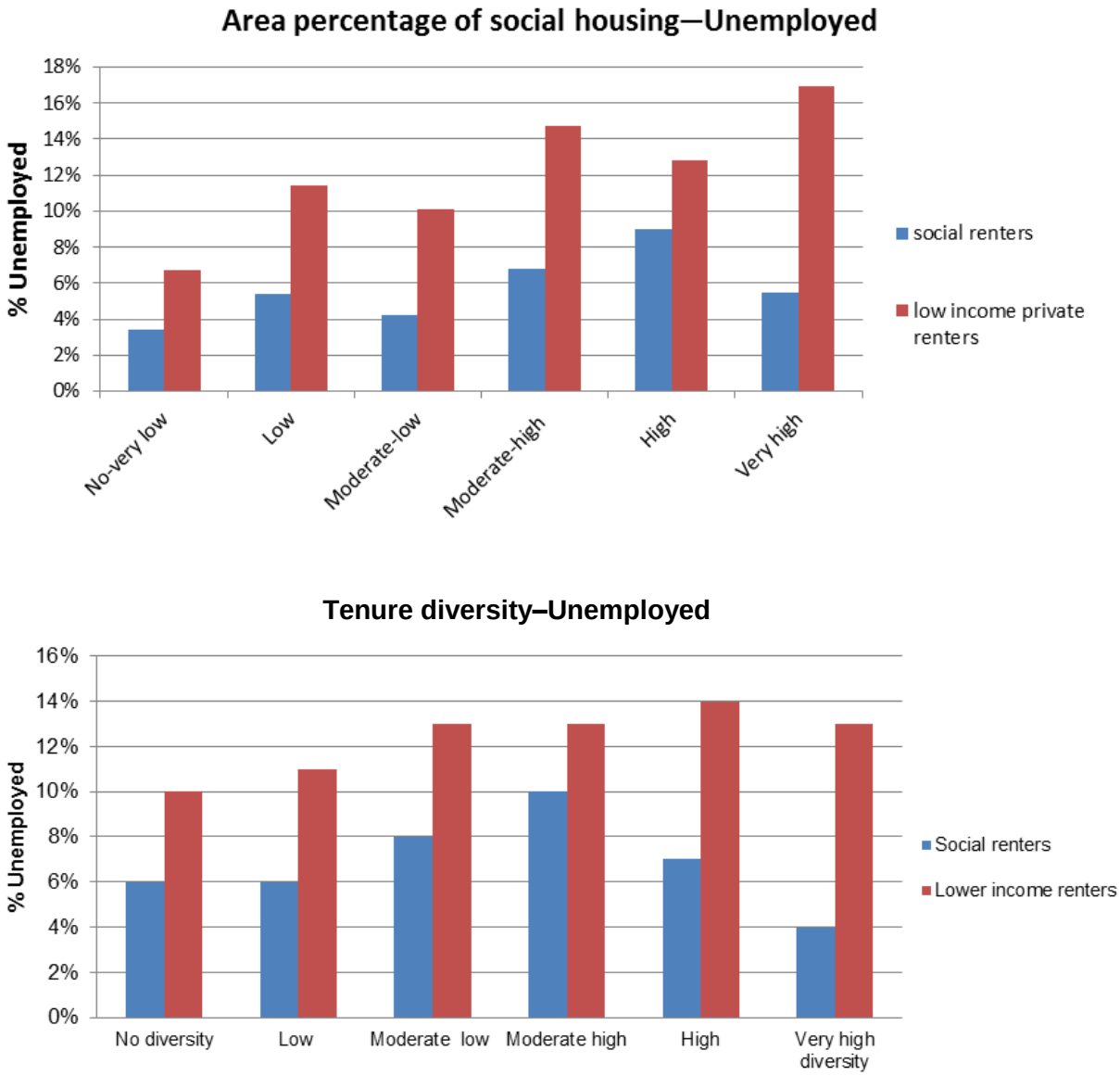
Source: Authors' calculations from the 2001–2010 HILDA Survey

When we turn to satisfaction with feelings of safety and neighbourhood, however, we find that hardly any variation exists in median scores of satisfaction with feelings of safety or neighbourhood either by housing tenure or area tenure mix. Home owners and private renters appear to enjoy relatively high levels of satisfaction with their feelings of safety and neighbourhood, reporting median scores of at least 7 (out of a maximum of 10) regardless of the tenure mix of the area they live in. On the other hand social renters report lower wellbeing as the concentration of social housing and diversity increases both in terms of satisfaction with safety and the neighbourhood.

Finally, we assess the employment outcomes of working age persons that fall within the two lower income renter groups. We draw attention to the lower income renter groups because they exhibit disproportionately high rates of unemployment. Figure 7 and Figure 8 below reports the rates of unemployment and non-participation in the labour force for these two renter groups by their area's tenure mix. A clear trend that can be observed is that regardless of tenure mix, social housing tenants have lower (higher) rates of unemployment (non-participation) than lower income private renters.

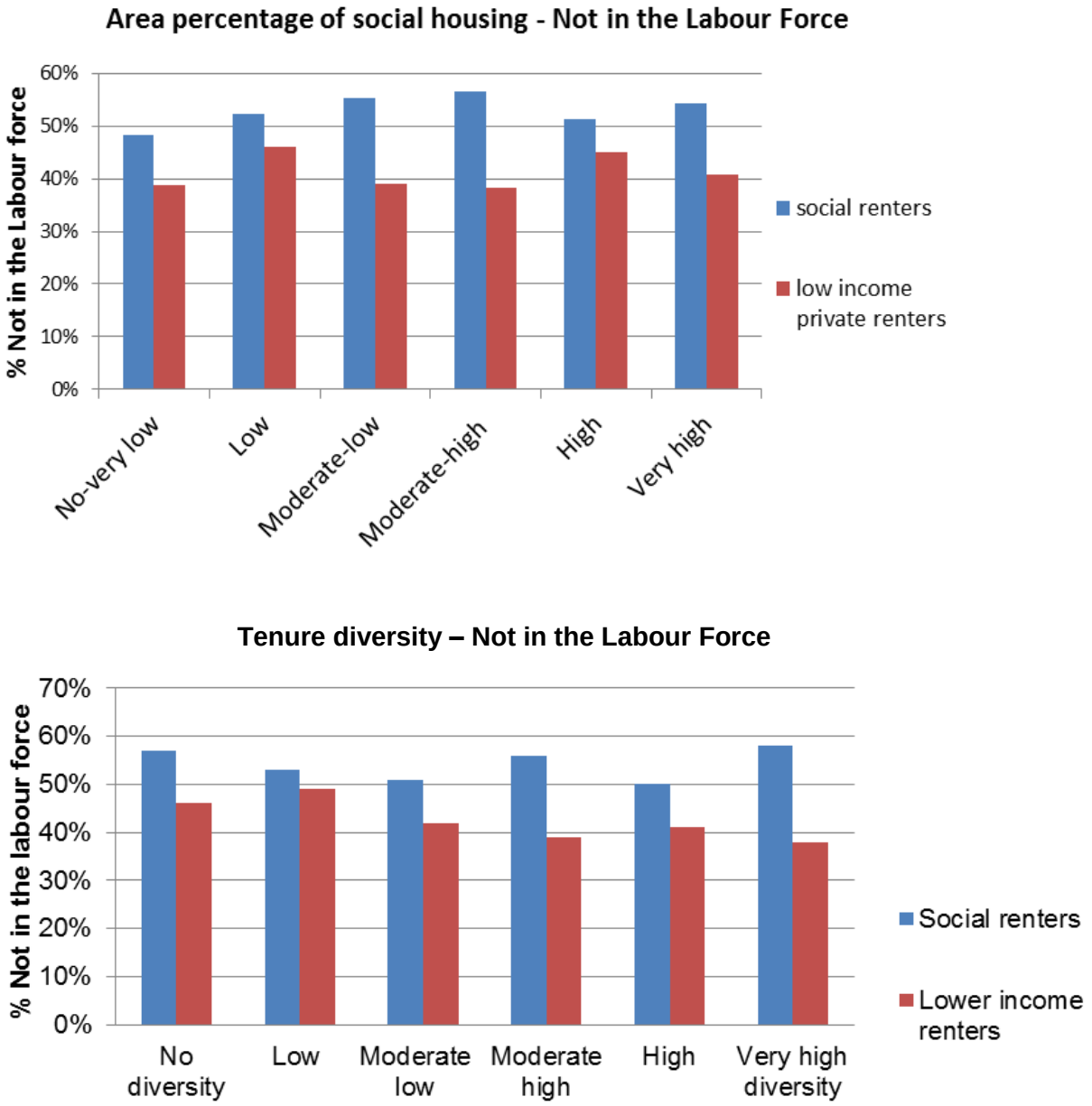
However, within each tenure group, there are distinctive variations in unemployment and NLF rates by tenure mix. A stark observation is that lower income private renters' rates of unemployment generally rise as the social housing concentration and tenure diversity of their areas of residence increase, suggesting that lower income private renters in particular will be worse off in areas with high social housing concentrations or high tenure diversity. On the other hand, social housing tenants' unemployment rates peak in areas with moderate and high concentrations of social housing or tenure diversity. For both renter groups, it can be surmised that lower income renters living in areas with low social housing concentration or tenure diversity will have relatively less difficulty finding work.

Figure 7: Percentage unemployed, lower income renter groups and tenure mix, pooled 2001–2010 data



Source: Authors' calculations from the 2001–2010 HILDA Survey

Figure 8: Percentage not in the labour force, lower income renter groups and tenure mix, pooled 2001–2010 data



Source: Authors' calculations from the 2001–2010 HILDA Survey

2.3 Long-term exposure to disadvantage and wellbeing outcomes

Remaining exposed to disadvantaged areas over the long-term can generate both positive and adverse consequences for wellbeing outcomes (Galster 2008). Section 2.3 will extend the analysis by examining the wellbeing impact of renters remaining in or moving out of areas with high concentrations of social housing and disadvantage. We compare the impact of longer term exposure to areas classified as disadvantaged (using the existing SEIFA measure of relative advantage and disadvantage in HILDA) and those with concentrations of social housing. In doing so, it will address the following research question:

→ Do social and lower income private renters remain exposed to disadvantaged areas and those with high concentrations of social housing for extended periods and what impact does this have on their wellbeing?

We focus on two measures of disadvantage. Firstly, the bottom two deciles of the SEIFA index of relative advantage/disadvantage are deemed to be disadvantaged areas. Secondly, disadvantaged areas are defined as those lying within the top two bands of the concentration of social housing distribution (i.e. the 'high' and 'very high' bands).

Table 15 below provides a matrix of moves between areas of disadvantage and non-disadvantage across adjacent waves of pooled data from the 2001–2010 HILDA survey. The estimates show that social renters and home owners are least likely to make transitions from disadvantaged to non-disadvantaged areas or vice versa. Private renters, on the other hand, are more mobile. A similar pattern is evident when disadvantage is measured based on the concentration of social housing. In particular, moderate-to-high income private renters are almost four times as likely as home owners and two times as likely as social renters to move into areas of disadvantage.

Table 15: Moves between disadvantaged and non-disadvantaged areas between *t* and *t+1*, by housing tenure, pooled 2001–2010 data

(a) SEIFA-based disadvantage measure

		Period t + 1							
		Social housing tenants		**Lower income private renters**		**Moderate-to-high income private renters**		**Home owners**	
		Dis	Adv	Dis	Adv	Dis	Adv	Dis	Adv
Period t	Dis	96.7	3.3	91.6	8.4	95.0	5.0	97.2	2.8
	Adv	11.3	88.7	21.0	79.0	26.6	73.4	12.2	87.8
	Total	58.3	41.7	69.0	31.0	84.6	15.4	81.8	18.2

(b) Social housing concentration based disadvantage measure

		Period t + 1							
		Social housing tenants		**Lower income private renters**		**Moderate-to-high income private renters**		**Home owners**	
		Dis	Adv	Dis	Adv	Dis	Adv	Dis	Adv
Period t	Dis	97.5	2.5	93.7	6.3	94.8	5.2	99.2	0.8
	Adv	8.1	91.9	11.1	88.9	15.2	84.8	4.0	96.0
	Total	71.7	28.3	62.8	37.2	70.3	29.7	74.2	25.8

Source: Authors' calculations from the 2001–2010 HILDA Survey

Next, we restrict the sample to a balanced panel comprising individuals for whom we observe 10 full years of observation during the period 2001–2010 and measure the total number of years between years 2001 to 2010 that each individual is exposed to a disadvantaged area. Cross-tabulations between years of exposure to a (dis)advantaged area and housing tenure are carried out to assess how duration in a (dis)advatanged area varies for individuals living in different housing tenures. As shown in Table 16 below, social renters clearly have the highest long-term exposure

to disadvantaged areas. Over one-third have spent at least eight years in the bottom two deciles of the SEIFA index, and almost half have spent an equivalent amount of time in the top two bands of social housing concentration. At the other extreme, while the previous table shows that moderate-to-high income private renters are most likely to transition from non-disadvantaged into disadvantaged areas, Table 16 indicates that they are also least likely to remain there on a long-term basis. Only 6 per cent of moderate-to-high income private renters have spent eight or more years in disadvantaged areas according to the SEIFA-based disadvantage measure and around 18 per cent have only spent one year in disadvantaged areas.

Table 16: Total number of years spent in a disadvantaged area, by housing tenure, balanced panel from 2001 to 2010

	SEIFA-based measure				Social housing concentration based measure			
Years	**Social housing tenants**	**Lower income private renters**	**Moderate-to-high income private renters**	**Home owners**	**Social housing tenants**	**Lower income private renters**	**Moderate-to-high income private renters**	**Home owners**
0	36.9	37.6	51.8	60.7	30.4	42.4	44.0	63.7
1	11.8	13.3	17.7	16.4	3.0	6.9	8.4	3.3
2	3.7	6.4	5.8	2.0	1.4	6.3	5.4	2.3
3	2.5	7.1	5.2	1.7	1.8	3.9	5.6	1.6
4	1.6	4.8	4.3	1.4	4.7	4.6	5.1	1.9
5	2.1	4.8	3.0	1.3	3.2	5.3	6.1	2.6
6	2.3	4.5	3.4	1.3	2.2	3.7	4.8	1.8
7	2.7	4.6	2.4	1.0	1.9	4.2	3.6	1.5
8	3.6	4.1	2.1	1.2	2.4	3.6	3.9	1.6
9	28.3	10.6	3.4	10.6	4.1	5.1	3.1	1.7
10	4.6	2.3	1.0	2.4	44.7	14.2	10.1	18.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations from the 2001–2010 HILDA Survey

Exposure to disadvantage (D–D) over two consecutive waves appears to be associated with poorer mental health than exposure to advantaged areas (A–A), as depicted in Table 17 below. For example, lower income private renters who remain in disadvantaged areas between time *t* and *t+1* have a median mental wellbeing score of 68 compared to 72 for those who remain in advantaged areas, and similar trends are observable for moderate-to-higher income private renters. Among social renters and home owners, those who remain in advantaged areas have a median mental wellbeing score of 80 compared to 76 for those who remain in disadvantaged areas.

There is also some indication that mental wellbeing declines with moves from advantaged into disadvantaged areas (D–A), especially when the social housing concentration based measure is used. For all housing tenure groups, median mental wellbeing drops below 80 when moves from advantage into disadvantage are made. However, moves out of disadvantage (D–A) do not appear to be significantly associated with an improvement in mental wellbeing. Overall, satisfaction with feelings of safety and neighbourhood appears to be largely unrelated to moves or exposure to either advantage or disadvantage across the two measures.

Table 17: Median mental wellbeing score, 0–100, by housing tenure and whether one remained in a disadvantaged area) or moved to an advantaged area, pooled 2001–2010 data[a]

Housing tenure	SEIFA-based measure				Social housing concentration based measure			
	A–A	A–D	D–D	D–A	A–A	A–D	D–D	D–A
Social housing tenants	68	70	68	68	80	72	76	68
Lower income private renters	72	68	68	70	80	72	78	68
Moderate-to-high income private renters	80	76	76	76	80	68	80	68
Home owners	80	80	80	80	80	72	76	72

Source: Authors' calculations from the 2001–2010 HILDA Survey

[a].A–A = remained in an advantaged area; A–D = moved from advantage to disadvantage; D–D = remained in disadvantaged area; D–A = moved from disadvantage to advantage.

We also test for whether the wellbeing of individuals who have been exposed to area disadvantage differ by the length of time they have been exposed to area disadvantage. Overall, there appears to be no association between the time spent in a disadvantaged area and wellbeing levels, regardless of housing tenure. However, a caveat is that the 'beginning of time' has been measured at the first year of the HILDA panel, that is 2001. It is not possible to observe how long each individual has in fact lived in a disadvantaged area prior to 2001.

2.4 Summary

This chapter has documented key descriptive statistics that highlight some interesting interplays between tenure mix, area (dis)advantage and wellbeing outcomes. On analysing the spatial distribution of areas with varying degrees of tenure mix (i.e. concentration of social housing and tenure diversity), we find that between 2001 and 2011, the average percentage of social housing dropped in the 'very high' concentration category, as well as in the lowest concentration category. Over the same period, the proportion of SLAs in undiversified areas fell from 26 to 16 per cent.

These trends may potentially reflect the implementation of micro social mix policies specifically aimed at breaking up concentrated social housing areas that were largely implemented by state and territory government over the decade.

There is significant geographical variation in the types of areas in which social housing is concentrated and where tenure is highly diversified. These range from inner city to outer suburban areas, and even further out to regional and remote centres. We are mindful that differences between measures of household characteristics may therefore be capturing differences in the amenity and accessibility of the kinds of areas in which social housing is situated, rather than the concentration of social housing per se. Hence, in the next chapter, we employ specific steps in the multilevel modelling to control for major urban, urban, and rural divides. The potential importance of place-based rather than social mix policies is also suggested.

We find some noticeable overlaps between tenure mix and area (dis)advantage. Areas with high concentrations of social housing tend to be 'poorer' areas. Tenure diversity, though, does not have a similar clear cut relationship with area (dis)advantage, though it does appear 'moderate-to-high' and 'high' tenure diversity areas are on average 'poorer', these being areas with relatively high concentrations of social housing.

Importantly, there are some divergent trends in wellbeing by tenure mix. Social housing tenants' median mental wellbeing outcomes decline as the concentration of social housing and tenure diversity rises and when they reside in high density dwellings. These findings are paralleled by similar observations on social renters' satisfaction with feeling part of their local community, suggesting that the concentration of social housing and overall diversity of the area erodes social connectedness for this group of renters. To a lesser extent, lower income private renters exhibit similar mental wellbeing trends as social renters, though home owners and moderate-to-higher income private renters are relatively unaffected by the tenure mix of the areas they reside in.

Little variation exists in median scores of satisfaction with feelings of safety and neighbourhood satisfaction across tenure mix categories. Social housing tenants are an exception; their median neighbourhood satisfaction levels drop from 9 to 7 when social housing concentration rises. In relation to employment outcomes, we find that lower income private renters in particular have more difficulty finding jobs in areas with high social housing concentrations or high tenure diversity.

Social renters and home owners are also least likely to make transitions from disadvantage to non-disadvantage or vice versa while lower income private renters are clearly more mobile and moderate-to-higher income private renters in particular are able to relocate from areas of disadvantage more quickly than other groups. Those who are unable to move from disadvantaged areas have poorer mental health than those who live in advantaged areas. There is also some indication that mental wellbeing declines with moves from advantaged into disadvantaged areas, but the descriptive statistics indicate that moves out of disadvantaged areas do not appear to be significantly associated with an improvement in mental wellbeing. Overall, satisfaction with feelings of safety and neighbourhood satisfaction are not strongly related to moves into or out of disadvantage.

In summary, the descriptive statistics presented in this chapter offer *prima facie* evidence of the potential importance of tenure mix and area disadvantage for wellbeing outcomes. Lower income renters appear to be more affected by area characteristics than moderate-to-higher income private renters and home owners on various fronts. For example, both social renters and lower income private renters

suffer a decline in mental wellbeing levels when the concentration of social housing or tenure diversity increases. Furthermore, for social housing tenants, greater degrees of social housing concentration are paralleled by lower neighbourhood satisfaction levels. Finally, lower income private renters exhibit some difficulty in finding jobs in areas with high social housing concentrations or tenure diversity. In the following chapter, we shall test for the importance of area effects after controlling for individual characteristics via the use of multilevel modelling methods.

3 MODELLING WELLBEING OUTCOMES

Chapter 2 provided descriptive evidence of the associations between our measures for tenure diversity, concentrations of social housing, and density of the dwelling on selected wellbeing outcomes. However, such descriptive analysis is not able to identify whether the area effects shown for different measures are a result of the individuals who may occupy those areas in higher numbers or whether the area itself contributes to the differences in wellbeing outcomes observed among tenure groups. In this chapter we make use of multilevel modelling techniques to isolate area effects from individual effects. Specifically we aim to answer the following research question:

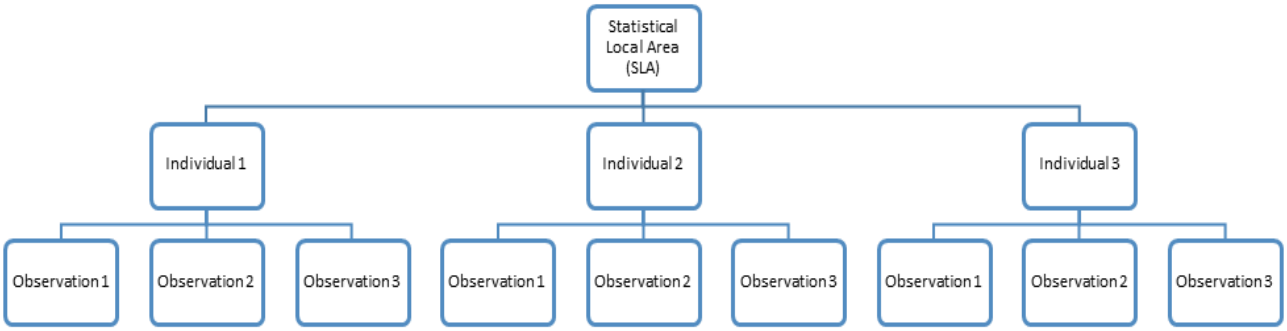
→ Is there evidence of any area level effects on wellbeing outcomes once statistically controlling for individual and household level characteristics?

This chapter is divided into two main sections. Section 3.1 outlines the three level multilevel model and set of equations to be estimated. Section 3.2 presents the results from the 'null' and 'full' models with predictors for individual and areas as well as the cross level interactions between renter groups and areas.

3.1 Three level multilevel model

The HILDA data design is hierarchical in structure as we have 10 waves of data with repeated observations for individuals over time that are in turn nested within an area. In controlling for the nested structure of the dataset, we estimate a three-level multilevel model. The diagram below depicts the multilevel structure of the extended HILDA dataset.

Figure 9: Multilevel model structure



In Figure 9 above, data respondents' repeated observations across the sample frame represent the first level of the data hierarchy. As these repeated observations are nested within individuals, the respondent forms the second level of the hierarchy; at the highest level we include the SLA, which comprises a cluster of different individuals residing within it. We estimate the level three clustering on the SLA. The first stage in the multilevel modelling process is to fit unconditional variance components models, otherwise referred to as 'empty' or null models, using the clustering identifiers for the individual and SLA for the four outcomes without any additional variables added into the models. This is simply an extension of ordinary regression but with the addition of random intercepts for area and for the individual with repeated observations. By introducing separate intercepts for each neighbourhood, and also intercepts for each individual with repeated observations, multilevel models deal with the issue of individuals clustering within the same neighbourhood and within the individual observations. The null model allows any area variation (herein referred to as level 3) to be determined before controlling for effects at the individual level (herein referred to as level 2). Otherwise referred to as the 'three-level variance components model' or

the 'intercept only model', the first level of the null multilevel model can be summarised mathematically as follows:

$$Y_{ijk} = \beta_{0jk} + R_{ijk} \quad (1)$$

Using a variant of the notation adopted by Rabe-Hesketh and Skrondal (2008), the dependent variable, Y_{ijk}, is a log[5] of the self-reported life satisfaction measurement of individuals with repeated observations living within different SLAs across Australia. The subscripts, *i, j* and *k* represent the hierarchical nature of the dataset, where level 1, represented by *i*, denotes the repeated measurement, level two, *j*, represents the individual, and level three, k, represents the area, that is the SLA. The intercept, β_{0jk}, is a *group-specific intercept* for individuals, *j*, with repeated observations as well as for different SLAs, *k*. The error term, R_{ijk}, is assumed to be independent and normally distributed with a mean of 0. The inclusion of multiple intercepts in a regression model is one of the distinguishing features of the multilevel model as compared to a simple least squares regression model, as the former takes into account the correlations induced by groups or repeated observations by introducing a random intercept, β_{0jk} for different groups; the least squares regression model, on the other hand, assumes that all observations are independent and are therefore represented by a single fixed intercept, β_0. To allow the intercept to vary from individual to individual, we can regress on the β_{0jk} term in equation 1 by introducing a random intercept at the second level of the model. We can express this using a separate regression model:

$$\beta_{0jk} = \delta_{00k} + U_{0jk} \quad (2)$$

Where δ_{00k} denotes mean satisfaction of all individuals within SLA *k* and U_{0jk} represents the random deviation of individual *j*'s mean from that of SLA *k*; it is measured by the difference in mean life satisfaction between individual *j* and SLA *k*. Similarly, a separate regression equation can be expressed to control for deviations at the third level, that is SLA from the overall grand mean of satisfaction:

$$\delta_{00k} = \gamma_{000} + V_{00k} \quad (3)$$

Where γ_{000} represents the grand mean life satisfaction across all SLAs for all individuals and all repeated observations in the sample, and V_{00k} represents deviations in mean life satisfaction for SLA *k* from the overall mean. Substituting equations (2) and (3) into the level-1 regression equation, we obtain the following mixed-model expression for a random-intercepts model:

$$Y_{ijk} = \gamma_{000} + (V_{00k} + U_{0jk} + R_{ijk}). \quad (4)$$

Equation (4) shows how the residual terms are divided into three components, V_{00k}, U_{0jk} and R_{ijk}, to estimate the average variability or deviation at each level of the data hierarchy. It should be mentioned that the modelling approach adopted in this report allows for randomness only in the intercept and not in the slopes. This means that while we allow different trajectories for the repeated observations of different individuals and different SLAs, the regression lines are assumed to progress at the same rate for all groups.

Next, we extend the model by adding a series of level 1 covariates to the variance components model to control for individual factors that we deem could potentially

[5] Tests for skewness of the dependent variables revealed a substantially negatively skewed distribution in the subjective wellbeing measures. To reduce the problem of skewness we used logarithmic transformations. This is a common approach to dealing with problems of skewness in the wellbeing literature (for examples, see Welsch (2006) and Rojas (2006).

influence individuals' assessment of wellbeing. The extended level 1 model can be expressed as follows:

$$Y_{ijk} = \beta_{0jk} + \beta_{1jk}SES_{ijk} + \beta_{2jk}DEM_{ijk} + \beta_{3jk}FIN_{ijk} + \beta_{4jk}TEN_{ijk} + \beta_{5jk}HEAL_{ijk} + R_{ijk} \quad (5)$$

As before, separate intercepts at levels 2 and 3 are incorporated to factor in the different trajectories for SLA and individuals with repeated observations. The coefficient on SES, β_{1jk} for individual *j* within SLA *k* captures socio-economic characteristics such as education level, equivalised income and employment status; the coefficient on *DEM* represents demographic predictors including gender, age, marital status and so on; coefficients on *FIN* represent an individual's financial situation and includes controls for financial stress; *TEN* represents the tenure type of the respondent (e.g. social renter, lower income private renter, moderate-to-high income private renter and home owner) and variable *HEAL* represents individuals' health status and incorporates controls for variables such as health condition and membership in a sporting club.

We augment equation (5) further by including the Mundlak (1978) corrections through the use of individual means for select variables that are averaged over time for each respondent. This allows us to correct for any unobserved heterogeneity that may occur when the lower level predictors (i.e. repeated observations or individuals) are correlated with the higher level predictors (i.e. SLA). For instance, the background characteristics of individuals may prompt persons to self-select into particular neighbourhoods, leading to correlation between the individual-level error terms with the area-level error terms. To control for this, we include an additional set of individual-level means to the regression model. Variables for which we include cluster means include the age variables (including the age of child as well as the age of the respondent), marital status, employment status, equivalised household income, educational attainment and tenure type (i.e. social renters, lower income private renters and moderate-to-higher income private renters etc.). We can express the extended regression model with the Mundlak correction as follows:

$$Y_{ijk} = \beta_{0jk} + \beta_{1jk}SES_{ijk} + \beta_{2jk}\overline{SES_{jk}} + \beta_{3jk}DEM_{ijk} + \beta_{4jk}\overline{DEM_{jk}} + \beta_{5jk}FIN_{ijk} + \beta_{6jk}TEN_{ijk} + \beta_{7jk}\overline{TEN_{ijk}} + \beta_{8jk}HEAL_{ijk} + R_{ijk} \quad (6)$$

Where $\overline{SES}$ denotes individual-level mean values for socio-economic status variables (income, employment status etc.), $\overline{DEM}$ denotes individual means for demographic characteristics such as age and marital status, and $\overline{TEN}$ denotes individual means on the tenure status variables.

Equation (6) enables us to determine whether there are any area-level effects on wellbeing outcomes once statistically controlling for individual household-level characteristics, thereby answering the first research question.

Here we add our area measures including dummy variables for percentage of social housing, tenure diversity measure, area income, and unemployment rates. These variables will capture differences in individual *i*'s quality of life between advantaged and disadvantaged neighbourhoods:

$$Y_{ijk} = \beta_{0jk} + \beta_{1jk}SES_{ijk} + \beta_{2jk}\overline{SES_{jk}} + \beta_{3jk}DEM_{ijk} + \beta_{4jk}\overline{DEM_{jk}} + \beta_{5jk}FIN_{ijk} + \beta_{6jk}TEN_{ijk} + \beta_{7jk}\overline{TEN_{ijk}} + \beta_{8jk}HEAL_{ijk} + \beta_{9jk}NSES_k + \beta_{10jk}NSES_k * DRenter_{ijk} + R_{ijk} \quad (7)$$

Where equation (7) incorporates all of the explanatory variables from equation (6) with the addition of neighbourhood socio-economic status variables (NSES) aggregated at the Statistical Local Area (SLA) level. These level 3 neighbourhood-wide

characteristics—absorbed in the variable NSES—include variables to control for the proportion of households in an area residing in social housing (represented by a series of indicator variables to denote areas with no households in social housing, low proportion in social housing, moderate-to-low proportion in social housing, moderate-to-high proportion in social housing, higher proportion in social housing and very high proportion in social housing), degree of area mix based on the tenure entropy score (also represented through indicator variables to denote areas with no tenure diversity, low diversity, moderate to low diversity, moderate to high diversity, high diversity and very high diversity), median household income (divided into quintiles) and rates of unemployment (divided into quintiles). To gain an understanding of how wellbeing varies for individuals living in different tenures by the degree of advantage/disadvantage in the wider neighbourhood (as measured by the NSES variables) we interact the NSES variables with the tenure type variable, *DRENTER*, the coefficient of which will measure the percentage difference in wellbeing outcomes for each renter group by neighbourhood SES compared to home owners (the omitted category).

We estimate separate multilevel models for the following measures of wellbeing:

- Log of SF-36 mental health—transformed, which is a generic subjective measure for Quality of Life which ranges from a Likert scale of 0 to 100.
- Log of Satisfaction with how safe the respondent feels, which ranges on a Likert scale of 0 to 10.
- Log of Satisfaction with the neighbourhood in which the respondent resides, which ranges on a Likert scale of 0 to 10.
- Binary measure of employed and not employed (includes unemployed and not in the labour force).

3.2 Model findings

3.2.1 The null model

Consistent with our model specification we first present results for the unconditional variance components model. The effects of area on an 'empty' model is captured by the intraclass correlation coefficient (ICC) which represents the amount of variance observed in the wellbeing outcome variables across area 'clusters' or groups, which for the main modelling, for reasons stated earlier equate to statistical local areas. The ICC statistic measures the expected degree of similarity (or homogeneity) between responses within given areas. The greater the variation in wellbeing scores across areas the greater the ICC will be (Rabe-Hesketh & Skrondal 2008). In three level models the intraclass correlation ICC can be estimated for the area level and the individual level. In Table 18 below we present the ICC for the SLA level compared to the CD level. As shown the variation at the smaller area level is more discernible suggesting that measures collected at this level would yield much stronger area effects. Our analysis on tenure mix and concentrations of social housing, as stated earlier, is confined to the SLA level resulting in a loss of some of the precision. However, an advantage of the SLA is that the size of the clusters or area groups are larger allowing the smaller group mean variance of the area level to be calculated from several more observations including neighbouring areas. Table 18 shows that the ICC is highest at the collection district for satisfaction with the neighbourhood at 19 per cent compared with 5 per cent for the statistical local area. This suggests that the findings based on the SLA measures of tenure mix will be somewhat 'diluted'. Employment participation on the other hand is less sensitive to cluster level of the CD or SLA suggesting the importance of neighbouring boundaries.

Table 18: Intraclass correlation coefficients for CD and SLA

	Mental health	Satisfaction with safety	Satisfaction with neighbourhood	Employment participation
Collection district ICC	.052 (5%)	.092 (9%)	.190 (19%)	.053 (5%)
Statistical local area ICC	.013 (1%)	.030 (3%)	.047 (5%)	.051 (5%)

The models we estimate next extend the initial null model to examine the extent to which the variance identified for each area still holds once we control for individual and area level predictors. For each model we commence our discussion with the findings for tenure followed by area effects determined by the level 3 predictors and then discuss cross level interactions with tenure groups by areas to answer our broad research questions. We then highlight significant individual characteristics most strongly associated with each of the outcomes that we control for in the models but are not shown in the tables presented. More detailed tables showing the results for individual predictors in the models are presented in Appendix 3. As outlined the models control for unobserved heterogeneity bias or endogeneity by including individual cluster means (see Appendix 3). The cluster means represent the non-time varying average score for a given predictor over the number of years of observation in the pooled panel dataset. The findings for each outcome of mental health, satisfaction with neighbourhood and safety and employment participation will be discussed in three separate sections. We then conclude the chapter by drawing together the key observations with respect to area-based effects for renter groups across the different wellbeing outcomes.

3.2.2 Mental health

The relationship between location, lower income and mental wellbeing has been examined extensively yet has often resulted in contradictory or inconclusive findings.[6] While those living in poorer areas have lower mental wellbeing, the international and Australian research drawing on multilevel approaches has found little area-based variation once controlling for individual characteristics (Propper et al. 2005; Ballas & Tranmer 2011, Butterworth et al. 2006; Bolster et al. 2004). This had led researchers to conclude that differences observed across communities are more likely to be influenced by the groups who select into those areas rather than the area itself 'causing' mental health to be worse.

At the same time Australian research by Butterworth et al. (2006) found highly significant household variation in mental health outcomes. The authors conclude that the presence of high household variation suggests that area effects on mental health may still be present but at a much 'smaller ecological context or neighbourhood' that is not easily detectable at the spatial scale of the administrative boundary.[7] Research focusing on a smaller ecological context of the quality of the surrounding built environment and the dwelling itself has identified a strong and harmful impact on

[6] One notable study by Buck (2001) identifies a significant (albeit small) neighbourhood effect using alternative regression models. Buck (2001) applies ordinary least squares (OLS) and logistic regression models to test associations between individuals' life chances and neighbourhood deprivation and finds a significant neighbourhood impact after controlling for individual characteristics.

[7] Their conjecture is consistent with findings by Andersson and Musterd (2010) in the context of neighbourhood effects and its relationship with average income from work in Sweden. The authors report that the proportion of low-income residents in an area have the greatest impact on social outcomes at the smallest geographical scale but find that unemployment rates have a significant bearing on income at the larger municipal scale.

mental wellbeing (Guite et al. 2006; Evans et al. 2003). However, housing tenure, in terms of whether a household rents privately or socially or is a home owner, has not been found to be significantly harmful to mental wellbeing in and of itself once correcting for the compositional characteristics of those who live or 'select' into different tenures (Baker et al. 2013). This suggests that the locational impact on mental health will be most strongly felt from the immediate neighbourhood quality and surroundings.

In addition to the physical attributes of dwellings and the built environment, researchers have focused on the psychosocial factors of how the neighbourhood and surrounding area can facilitate social inclusion and a positive view of oneself in relation to others who occupy an area. Much of the earlier research on the area effects of mental health focused on the impact that inequality or the absolute deprivation within a location might have on exacerbating mental illness and poor mental wellbeing. The causal pathways, as touched upon in the Positioning Paper, are thought to link to mechanisms such as poor external reputation or the stigma attached to disadvantaged areas that can influence how individuals view themselves and their future opportunities as well as internal factors including the existence of both positive and negative social bonds and ties, isolation, social contagion, conflict, and relative comparisons made with those who live around you.

The importance of social cohesion and capital in enhancing wellbeing in both rich and poor areas is well established although the area-based processes facilitating its formation within different locations remain less clear. It is known that the extent to which local networks versus those formed outside neighbourhoods matter more for wellbeing will vary across the life course and among socio-economic groups. However, the extent to which the overall deprivation of an area or the total mix of groups or a combination of both influences social cohesion and thus overall wellbeing still remains unanswered, particularly in Australia. Alongside area deprivation studies, researchers have sought to examine the impact of low and high social cohesion through area-based measures capturing social diversity or area-based 'fragmentation'. The emerging research evidence suggests that area-based diversity or highly mixed areas may actually result in lower subjective wellbeing for some groups. For instance recent research by Ivory et al. (2011) drawing on the New Zealand index of neighbourhood fragmentation,[8] found a significant negative association between area fragmentation and mental wellbeing as measured by the SF-36 based on a multilevel analysis and after controlling for the overall deprivation of the area. The impact of fragmentation was found to be particularly significant for females and those who are unemployed where the opportunities for meaningful bonds may be fewer, although the adverse consequences for males were less apparent.

One further pathway in which an area may be harmful to mental health that is less well understood is the idea of relative deprivation linked to the comparative assessments that those living in both deprived and advantaged areas make of their home and neighbourhood in relation to others. Relative deprivation is associated with both upward and downward comparisons. The extent to which downward or upward comparisons matter is likely to be influenced by one's positional location in 'social space'. Support for the relative deprivation hypothesis is evident in recent research by Kearns et al. 2012 who found that the internal perceptions of those living in the immediate area was more influential for mental wellbeing than the perceived external reputation from those living outside the area. Moreover, Kearns et al. 2012 found that

[8] Area-based fragmentation in the index was measured by the proportion of single person households, non family households, recent immigrants, non New Zealand language speakers, residential mobility, fewer school aged children, home owners, long-term residents and married adults.

those who resided in deprived areas reported higher mental wellbeing when they perceived that there were those with higher incomes than themselves also residing in the area. The authors attribute this finding to the idea that upwards not downward comparisons may be more influential in disadvantaged areas where residents' wellbeing is lifted if they sense their area is 'normal' and not in decline.

The research reviewed suggests that diversity and the micro conditions of the neighbourhoods and dwellings of an area are equally important as the overall area deprivation in shaping mental wellbeing. At the same time research suggests that some degree of mix may be desirable, particularly in the poorest areas, to cultivate a communal sense of area progress rather than decline. Our analysis extends existing multilevel research on the area effects of mental health by examining a 'smaller ecological context' of the density of the dwelling, which for social renters living in high rise accommodation is likely to act as a proxy indicator for a micro concentration of disadvantage. We also examine the extent to which tenure mix and the overall concentration of social housing is correlated with mental wellbeing once controlling for area-based income and unemployment as well as major urban, urban, and rural distinctions. We estimate a linear mixed model based on the log of SF-36 mental health in Stata using the xtmixed command. The variables included in the model and their definition is listed in Appendix 2. The models in Table 19 below explore whether area effects can be detected for different measures when cross level interactions are included for renters and the three tenure diversity measures introduced earlier.

Modelling results on tenure and area effects

The results for the first set of models on mental health are shown in Table 19. We commence with observations on the effect of tenure on wellbeing across the three models comparing social and private renters to the omitted reference group of home owners. In descriptive analysis shown in Chapter 2 and models that do not control for unobserved heterogeneity, private renters and social renters have significantly lower mental health compared with owners. However, our results on associations between tenure and mental health are consistent with Baker et al. 2013, who find that the negative relationship disappears once controlling for the fixed effects or unobservable characteristics of the individuals who select into those tenures. We control for tenure selection effects through the inclusion of cluster means or a Mundlak (1978) correction used within a mixed model. Our findings suggest, along with Baker et al.'s (2013), that tenure itself does not contribute to lower levels of mental health rather the relationship reflects the compositional effects of those who select into the tenure.

A distinction we find here from Baker et al. 2013 is that the density of the dwelling does continue to remain to be negatively associated with mental health after models are adjusted. Mental wellbeing is typically lower for those in medium and high density dwellings compared with the omitted group living in detached housing although these main effects are not strong. Moving down the table, model 1 shows the cross-level interactions between renter groups and density of the dwelling. Perhaps the most important finding is the significance of the density of the dwelling for the mental health of social renters. Living in high-density housing is detrimental to the mental wellbeing of social renters, though dwelling density does not negatively affect other renter groups. The strength of the effect of living in a high density dwelling for social renters is moderately strong, with the size of the coefficient more than two times as high as the standard error. As we are controlling for the selection effects by adding in cluster means or fixed effects for selected individual characteristics including the existence of a chronic health condition this provides robust evidence that living in a high density dwelling itself and/or the immediate surroundings is somewhat harmful for social renters. There are likely to be several explanations as to why living in high density

social housing may have an adverse impact on mental health that link to relative deprivation explanations and opportunities for social cohesion as well as the overall quality of the living environment. This suggests that it is not necessarily the overall tenure that matters most for mental wellbeing but the quality, size of the dwelling and potentially who the renter is living in close proximity to that may be most important.

Moving onto the income disadvantage, unemployment and urban area level variables, we find that the pervasiveness of unemployment in an area and lower income do not significantly affect individuals' mental wellbeing. The controls for median household weekly area income and the area rate of unemployment appear in quintile groups. We omit the highest earning area and the area with the lowest unemployment rate as our reference groups. Across the three models mental wellbeing is higher, albeit insignificant, in the least well off area once we control for the compositional characteristics of those who live there. Those in the second richest area have significantly lower wellbeing than the very richest area indicating that wellbeing is highest at both extremes of the area income distribution. Similarly, wellbeing typically increases as the percentage of unemployed in an area increases suggesting it is not the area, but rather the personal unemployed state that is most harmful to wellbeing. It should be noted that these findings do not necessarily indicate that those who live in more deprived areas do not have poor mental health and therefore need for supports, rather that the area in and of itself, measured at the broad SLA, is not associated with exacerbating poorer mental health. While the increasing area unemployment rates do not appear to directly harm mental health, living in a major urban area is strongly and significantly associated with poorer mental wellbeing compared with those living in regional areas and rural areas. The size of the coefficient is more than three times the standard error suggesting that the effect is somewhat large. This suggests that factors specific to urban metropolitan areas depress wellbeing—potentially emerging from a combination of hazards associated with the built environment and opportunities for social cohesion.

Examining both the first and third model variables confirm that living in an area with very low to low tenure diversity results in improved mental wellbeing. Tenure diversity is highest when the mix of social renters, private renters and owners is highest. The tenure diversity measures based on the entropy score cut offs have been divided into the six groups discussed in Chapter 1. The first two groups which represent very low through to low diversity are the omitted reference groups. The remaining groups in the model include the moderately low through to very high tenure diversity. Wellbeing is typically lowest in the very highest mixed areas. In the main effects, the diversity measures are most significant for those in the third group of moderately low diversity. However, the interaction terms in the third model reveal that mental health declines significantly for lower income private renters and to a lesser extent for social renters as the tenure diversity increases. Conversely, moderate-to-higher income private renters tend to be 'happier' in the more mixed areas.

Model 2 includes area measures for the percentage of social housing as well as interactions with the tenure groups. The percentage of social housing as defined earlier is divided into six broad groups with the first two groups with the lowest concentration of social housing representing the omitted group. We include this model to compare the direct impact of the concentration of social housing relative to the tenure diversity of the area. While model 2 shows that the mental health of both social and lower income private renters is negatively associated with highest concentrations of social housing, it is particularly significant for lower income private renters living in these areas. Again, moderate-to-higher income private renters tend have better mental health when they reside in areas with higher concentrations of social housing, with the exception of the most highly concentrated area.

Although the tenure mix measure used in this study differ from Ivory et al.'s 2011 fragmentation index, our findings are broadly consistent and suggest that mechanisms of social cohesion and inclusion may underpin such findings given the generally lower social bonds between tenure groups at the neighbourhood level as outlined in the Positioning Paper. The use of a smaller area cluster would result in a stronger effect. Detecting the effect at the SLA level is suggestive of its overall importance. The descriptive and mapping analysis in Chapter 2 revealed that the most mixed areas are those closest to major urban centres or economic hubs that may comprise more transient groups with less meaningful community engagement and support and where less localised networks can be formed. The descriptive analysis showed that the social networks in particular for social renters decline as the mix of the area increases although the social networks of renters remain low regardless of the area in which they live. It is likely that as social renters are more embedded in place or exposed to such areas in the longer term mental health could deteriorate without social supports. It is likely that relative comparisons and quality of the immediate surroundings play a more influential role on the impact of wellbeing as related to area effects. The positive relationship between mental wellbeing and the diversity and concentration measures for moderate-to-higher income renters could relate to the greater proximity to valued resources and employment associated with these areas without the negative impact associated with the quality of the dwelling or residing directly near large estates. As housing is more likely to be less affordable close to social housing estates lower income private renters may be 'exposed' to more disadvantaged pockets with poorer amenities. In areas where social housing is not located close to inner job rich city areas major centres relative advantage explanations of downward comparison may also be influential for moderate-to-higher income renters who might compare themselves more favourably to their less well-off neighbours thereby lifting their overall wellbeing.

Table 19: Multilevel model results mental health SF-36 and area tenure measures

Mental health adjusted	Density of the dwelling		Concentration of social housing		Tenure diversity	
Social renters	.018[.009]	*	.029[.018]	+	.028[.016]	+
Lower income private renters	.005[.005]		.016[.008]	*	.017[.009]	*
Moderate-to-higher income renters	.006[.005]		-.001[.007]		.003[.007]	
Duration of residence	.002[.001]	**	.002[.001]	**	.002[.001]	**
Medium density units	-.004[.006]		-.005[.004]		-.005[.004]	
High density units	.001[.014]		-.012[.009]		-.011[.009]	
Caravan	-.014[.014]		-.015[.015]		-.014[.014]	
Other type of dwelling	-.001[.010]		-.002[.010]		.001[.010]	
Interactions dwelling						
Social renters * medium density	-.007[.012]					
Social renters * high density	-.077[.033]	*				
Lower income private renters * medium density	.003[.009]					
Lower income private renters * high density	-.012[.027]					
Moderate-to-higher income private renters * medium density	-.001[.008]					
Moderate-to-higher income private renters * high density	-.010[.018]					
Level 3						
Major urban area	-.016[.005]	***	-.017[.005]	***	-.015[.005]	***
Other urban	-.005[.005]		-.005[.005]		-.003[.005]	
Area level median household income 1st quintile	.003[.005]		.003[.005]		.003[.005]	
Area level median household income 2nd quintile	-.003[.004]		-.004[.004]		-.003[.004]	
Area level median household income 3rd quintile	-.003[.004]		-.005[.004]		-.004[.004]	
Area level median household income 4th quintile	-.008[.003]	*	-.008[.003]	*	-.008[.003]	*
Area rate of unemployment 2nd quintile	-.001[.002]		-.001[.002]		-.001[.002]	
Area rate of unemployment 3rd quintile	-.003[.002]		-.003[.002]		-.003[.002]	
Area rate of unemployment 4th quintile	.002[.002]		.002[.002]		.002[.002]	
Area rate of unemployment 5th quintile	-.000[.003]		-8.740[.003]		-.001[.003]	

Mental health adjusted	Density of the dwelling		Concentration of social housing		Tenure diversity	
Moderate low tenure diversity	-.007[.003]	*			-.008[.004]	*
Moderate high tenure diversity	-.005[.004]				-.004[.004]	
High tenure diversity	-.003[.004]				.001[.005]	
Very high tenure diversity	-.010[.005]	+			-.005[.006]	
Moderate low % social housing			-.002[.005]			
Moderate high % social housing			-.004[.005]			
High % social housing			.001[.005]			
Very high % social housing			-.003[.006]			
Interactions area percentage social housing						
Social renter * % social housing 3			-.017[.022]			
Social renter * % social housing 4			-.014[.021]			
Social renter * % social housing 5			-.022[.021]			
Social renter * % social housing 6			-.018[.022]			
Lower income private rent * % social housing 3			-.011[.011]			
Lower income private rent * % social housing 4			-.001[.011]			
Lower income private rent * % social housing 5			-.014[.011]			
Lower income private rent * % social housing 6			-.040[.013]	***		
High-income private rent * % social housing 3			.017[.008]	*		
High-income private rent * % social housing 4			.005[.009]			
High-income private rent * % social housing 5			.012[.008]			
High-income private rent * % social housing 6			-.002[.011]			
Interactions with tenure mix						
Social renter * ten diversity 3					-.017[.019]	
Social renter * ten diversity 4					-.004[.020]	
Social renter * ten diversity 5					-.017[.018]	
Social renter * ten diversity 6					-.032[.020]	
Lower income private rent * ten diversity 3					.001[.011]	

Mental health adjusted	Density of the dwelling		Concentration of social housing		Tenure diversity	
Lower income private rent * ten diversity 4					-.019[.011]	+
Lower income private rent * ten diversity 5					-.021[.011]	*
Lower income private rent * ten diversity 6					-.020[.011]	+
High-income private rent * ten diversity 3					.009[.008]	
High-income private rent * ten diversity 4					.002[.008]	
High-income private rent * ten diversity 5					-.004[.008]	
High-income private rent * ten diversity 6					.003[.010]	
Constant	3.911[.038]	***	3.912[.037]	***	3.911[.038]	***
Area—level						
No of groups 1,031						
Average no of groups 95.2						
Max 1162						
Min 1						
var(_cons)	.00013		.00013		.00013	
Individual—level						
No of groups 25,858						
Average no of groups 3.8						
Min 1						
Max 10						
var(cons)	.0367		.0367		.0367	
var (Residual)	.036		.0350		.036	
ICC SLA	.002				.002	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, bill difficulties, seeking financial help, equivalent disposable income, marital status, country of birth, chronic health condition, member of a sporting club, labour market status, age, education, and social support. See appendix for full model tables.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing; and 6.Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Tenure and the effects of area exposure

The second set of models on area and mental health seek to measure the impact of exposure to, as well as transitions in and out of areas with high concentrations of social housing and disadvantage. Variables measuring long-term exposure as measured by cut offs for those who reside in either area for a consecutive period of two to three years, four to five years and six or more years at any time in the panel are also included in the model. As per the first set of models we include cross level interactions with our renter groups and level three area measures for transitions to determine whether there is any area-based variation according to tenure position. The sample for the exposure measures is based on a balanced panel for those who have observations every year over 10 years of data. We compare concentrations of social housing as an absolute measure with the relative disadvantage/advantage measure derived from the ABS SEIFA contained within the HILDA dataset. The purpose of the comparison is to determine whether the concentration of social housing in and of itself is detrimental or whether the overall disadvantage of the area matters more for mental wellbeing in the longer term. Given that large estates can also be located in better off inner urban areas, high concentrations of social housing do not necessarily indicate area disadvantage. As with the first set of models, we include the main effects as well as interaction effects. The main effects for tenure as shown in the previous table were included in the models but are not shown in Table 20 below. We also include the same set of individual and household level controls and cluster means as the first set of models. The results for the individual characteristics are broadly similar to models shown in Table 19 above and can be seen in more detail in Appendix 3.

The main effects for both transitions and exposure on mental wellbeing of living in areas with highest concentrations of social housing versus an area of highest disadvantage differ in both the strength and direction of the relationship. This suggests that high concentrations of social housing in and of themselves are not detrimental; rather it is the overall disadvantage of an area that matters most for wellbeing over time. In fact, remaining in an area of highest social housing between two consecutive years is associated with higher wellbeing compared with those who remain in an area with a low to moderate concentration of social housing. Conversely, remaining in a disadvantaged area between consecutive years lowers wellbeing. The main effects for exposure show little variation across the years and are not significant, indicating that longer term exposure to areas of high concentration of social housing or disadvantage is not detrimental to self-reported mental wellbeing for the general population.

In the cross level interactions, the move from a disadvantaged to a better off area significantly lifts the wellbeing of lower income private renters and, to a lesser extent, moderate-to-higher income renters. These findings potentially point to the importance of relative downward comparisons among private renters living in more deprived areas, thus increasing their desire to move to a better off area. While the wellbeing of all renter groups declines with a downwards move to a more disadvantaged area, it is again particularly significant for lower income private renters. The wellbeing of lower income private renters is also significantly lower when they move to or remain in an area with the highest concentration of social housing. Such a move could signal discontentment with a downward trajectory that may have also been accompanied by other adverse life events. The increase in wellbeing for private renters that comes with ‘moving up’ is in contrast to social renters whose ‘happiness’ actually declines with a move away from an area with the highest concentration of social housing or from the most disadvantaged areas. All moves for social renters lower wellbeing relative to remaining in a less concentrated area of social housing. This suggests that any mobility may be detrimental for social renters as a group. As social renters are likely to be as attached to their neighbourhoods as home owners, moving could signal the loss of valued networks that are vital for getting by as well as feelings of displacement and relative deprivation that could be triggered by upward comparisons in more advantaged areas. Moreover, social renters may have had less choice in the areas and type of housing that they moved into. These findings were consistent with the dip in wellbeing in the ‘moving to opportunity’ initiative (Clark 2008).

Table 20: Multilevel model results mental health SF-36 and exposure and transitions from area concentration from social housing and SEIFA advantage/disadvantage

Move from social housing			**Move from disadvantage**		
Move from high social housing area	.003[.008]		Move from disadvantaged area	-.011[.008]	+
Move from low/moderate to high social housing area	.024[.011]	*	Move advantage to disadvantage	.005[.006]	
Remain in high social housing area	.013[.005]	**	Remain in disadvantaged area	-.006[.007]	
High social housing area 2–3 years	.002[.004]		Exposure disadvantaged area 2–3 years	-.005[.006]	
High social housing area 4–5 years	.002[.003]		Exposure disadvantage area 4–5 years	.003[.005]	
High social housing area 6 or more years	-.002[.004]		Exposure disadvantage area 6 or more years	-.002[.005]	
Move from high to low/moderate social housing * social renters	-.053[.032]	+	Move from disadvantage to advantage * social renters	-.029[.021]	
Move from low/moderate to high social housing * social renters	-.012[.039]		Move from advantage to disadvantage * social renters	-.004[.026]	
Remain in high social housing * social renters	-.011[.012]		Remain in disadvantaged area * social renters	-.010[.013]	
Move from high to low/moderate social housing * lower income private renters	-.012[.018]		Move from disadvantage to advantage * lower income private renters	.024[.015]	+
Move from low/moderate to high social housing * lower income private renters	-.057[.019]	**	Move from advantage to disadvantage * lower income private renters	-.035[.016]	*
Remain in high social housing * lower income private renters	-.021[.010]	*	Remain in disadvantaged area * lower income private renters	-.001[.011]	
Move from high to low/moderate social housing * mod/high private renters	-.010[.014]		Move from disadvantage to advantage * moderate/high income private renters	.020[.014]	
Move from low/moderate to high social housing * mod/high private renters	-.007[.017]		Move from advantage to disadvantage * moderate/high-income private renters	-.008[.013]	
Remain in high social housing * mod/high income private renters	-.007[.008]		Remain in disadvantaged area *	.001[.011]	
Constant	4.08		Constant	4.069	
Area—level			***Area—level***		
No of groups	969		No of groups	952	
Average no of groups	71 (Max 952 min 1)		Average no of groups	70.3 (max 952 min 1)	
var(_cons)	.0002		var(_cons)	.0002	
Individual—level			***Individual—level***		
No of groups	13,827		No of groups	13847	
Average no of groups	4.9 (Max 10 min 1)		Average no of groups	4.9 (Max 10 min 1)	
var(cons)	.0322		var(cons)	.0334	
var (Residual)	.034		var (Residual)	.0334	
Number of observations	68,430			68,470	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, bill difficulties, seeking financial help, equivalent disposable income, marital status, country of birth, chronic health condition, member of a sporting club, labour market status, age, education, and social support. See appendix for full model tables.

Mental health and individual effects

While area effects, particularly those relating to housing are detectable and have been the main focus of this inquiry, individual characteristics remain the most influential predictors of mental wellbeing across all three model variants (see Appendix 3). The intraclass correlations across the models are all below 1 per cent once adjusting for individual variables indicating that, at the broad area level, most of the variance observed across locations will be explained by the types of individuals living in them.

While we have been able to isolate the impact of the area-based measures from individual characteristics, the mental health issues to address among renters are still unevenly dispersed across locations and area-based policies remain relevant to meeting high needs communities. In particular, being able to isolate the impact of high density dwellings suggests specifically localised effects on wellbeing, particularly for social renters warranting more detailed analysis. In terms of the individual correlates of poor mental wellbeing, there are several important avenues where housing policies will be vital in lifting overall wellbeing. Individual measures of socio-economic insecurity and social connection in line with a social quality of life framework are strong predictors of mental wellbeing. These findings are also consistent with other research using similar measures such Crosier, Butterworth and Rogers 2007 and Baker et al. 2013. This suggests that policies seeking to relieve the burdens of financial stress and to foster opportunities for social engagement will have likely benefits in lifting wellbeing as well.

Not surprisingly, we find that adverse life events such as experiences of financial distress, unemployment, the persistence of chronic health conditions, marital breakdown and bereavement that pose threats to one's overall socio-economic security are all correlated with poor mental health. While being in an ongoing relationship boosts mental wellbeing raising both very young children and adolescents places significant strains on wellbeing that does not seem to dissipate until children are in their mid-20s, which perhaps also explains why we find that the oldest age groups are the 'happiest'. Moreover, the longer one has been resident in the same home, the better one's mental state is. This is perhaps associated with the beneficial effects derived from a sense of tenure security and being able to develop stronger attachments to place and form social networks. Those with English as a second language experience poorer mental wellbeing than those born in Australian or from English-speaking backgrounds, which may indicate a greater sense of social isolation and difficulties engaging in the broader community. Indeed, community participation and involvement, as proxied by the sporting club membership and social support variables, boost mental wellbeing significantly.

3.2.3 Satisfaction with safety and the neighbourhood

Improving the quality and safety of neighbourhoods underpins the key goals of both neighbourhood renewal and social mix policies. Considerable resources and attention have been directed towards the renewal of amenities and surrounding areas of social housing estates with several smaller case studies indicating significant enhancements and overall improvement in dwellings, physical surroundings and reductions in area-based stigma although less substantial impact in addressing issues of social cohesion (Kleinhans 2004; Arthurson 2002). The literature on residential satisfaction identifies a reciprocal relationship between an individual's assessment of their satisfaction with the neighbourhood in which they live and feelings of safety, with improvements in the former often leading to improvements in later (Austin et al. 2002). The quality of the built environment and surrounding areas, particularly the deterioration of neighbourhood conditions and the quality of the dwelling, are important area-based determinants of both satisfaction with the neighbourhood and feelings of safety, as are individual characteristics such as age, type of tenure and social mix (Austin et al. 2002; Baum et al. 2009).

Viewing satisfaction and subjective wellbeing within a broader social quality of life framework suggests that many of the mechanisms identified for area-based mental health and happiness

also apply to satisfaction with the neighbourhood and safety. Ideas of social cohesion, capital as well as relative upward and downward comparisons, apply to how one feels about their immediate area and how they rate neighbourhoods and in turn their propensity to remain in a given area (Mohan & Twigg 2007; Sirgy & Cornwell 2002). How an individual perceives the specific attributes of their neighbourhood internally is found to be more important in explaining satisfaction than how they think their area is perceived externally (Permentier et al. 2010). These findings build on the ideas of Kearns et al.'s 2012 study on mental wellbeing suggesting that immediate assessments by those living in the area is more important for wellbeing than the external reputation of an area. However, unlike mental health, satisfaction with the neighbourhood and safety are more likely to capture the direct effect of the localised environment that is typically assessed against the type of housing lived in and is thus subject to greater area-based variations. This idea is supported by the generally larger detection of area variation in the empty null model in Table 18 for both satisfaction with the neighbourhood and safety. It suggests that localised strategies will be particularly important in lifting wellbeing in these two life satisfaction domains.

However, as indicated in the Positioning Paper, little is known about how the perceptions of the neighbourhood and the safety of lower income private renters compare to their social renting counterparts when living in similar areas or the extent to which location may impact on their overall satisfaction. Australian research by Baum et al. (2009) is particularly informative for the current study. Drawing on the first wave of HILDA, the authors examine the relationship between neighbourhood satisfaction and measures of social mix as determined by income, ethnicity and tenure, finding that satisfaction with the neighbourhood declines as the mix of the area increases. Building on Baum et al.'s 2009 study, we examine the impact of the density of the dwelling and cross level interactions to isolate the impact of tenure mix across renter groups and we extend the analysis to 10 years of data allowing for unobserved characteristics to be controlled for. While HILDA collects some measures on personal assessments of the quality of the neighbourhood, these have not been collected in every wave and so have not been included in the pooled models. In this section we examine how satisfaction with the neighbourhood and safety vary across renter groups and area measures. As with mental health, we add in the same area-based controls and cross level interactions. The models we estimate are three level linear regressions using xtmixed in Stata 13.[9]

Tenure and area effects

The results for satisfaction with the neighbourhood and safety are presented in Tables 21 and 22 below. Unlike mental health in the previous section tenure remains a highly significant predictor of satisfaction with the neighbourhood and safety. Compared with all renter groups home owners are more likely to be satisfied with the type of neighbourhood they live in and with their overall safety. Perhaps closely linked to this finding is that satisfaction with the neighbourhood and safety significantly increases along with duration of residence. The strong link identified in the literature between the quality of dwellings, surrounding built environment and satisfaction, suggests that home owners may benefit from their increased ability to exert more control over their immediate living space that is able to translate into higher overall satisfaction. Satisfaction with safety and the neighbourhood typically regress across the housing tenure continuum—social renters feel less satisfied than lower income private renters, who in turn feel less safe than moderate-to-higher income private renters. However, interestingly when we control for the absolute concentration of social housing in model 2, social renters' satisfaction with both their neighbourhood and safety lifts dramatically and is no longer

[9] It should be noted that models were initially trialled for three level ordered logistic regression using the new meologit command in Stata 13. These models only converged using the collection district as the cluster variable and as our measures and cross level interactions are collected at the SLA would have resulted in the problem of spurious precision.

significant. A similar effect for social renters is observed in model 1 when we control for the density of dwellings lived in by social renters.

Unsurprisingly, all model variations show that those living in caravans are the least satisfied with neighbourhoods and safety compared with those living in other types of housing. While the main effects for the dwelling type suggest that those who live in high density housing feel safer, they are typically less satisfied with their neighbourhood compared with those who live in detached and medium density dwellings. The effects of living in medium density housing change in direction for both satisfaction with safety and the neighbourhood across the different models, suggesting that those living in this type of housing are more strongly influenced by the immediate surroundings rather than the actual dwelling itself. For instance, once the concentration of social housing is controlled for, those living in medium density housing are significantly more satisfied with their neighbourhoods. However, when controlling for the overall tenure diversity they are significantly less satisfied. In the cross level interactions social renters living in high density dwellings have significantly lower satisfaction with safety. They also rate their satisfaction with their neighboured the lowest when residing in both medium and high density dwellings compared with other dwelling types.

Similar to mental health, the more highly urbanised an area the lower the satisfaction with both the neighbourhood and perceptions of safety. This finding is highly significant across all models. Perhaps linked to this divide is the striking finding that satisfaction with safety declines as the wealth of the area increases. Similarly, satisfaction with safety is lower among those living in areas with fewer unemployed. Lower perceptions of safety in better off more highly urbanised areas could be capturing the effects of living in more densely populated areas and while becoming increasingly gentrified attract a high degree of non-local residents into the area, that may potentially erode feelings of trust and social cohesion. However, satisfaction with the neighbourhood does not appear to be influenced by area income in the same way as safety with those in the very rich areas being most satisfied with their neighbourhoods. It is likely that the quality of the built environment, dwellings and overall maintenance in these more affluent areas combined with the existence of relative downward social comparisons influence the more positive perceptions that the ‘very rich’ have of their neighbourhoods.

Rather unsurprisingly, residents’ satisfaction with safety and neighbourhood increases with declining concentrations of social housing, which could potentially reflect to some extent the stigma placed on social housing tenants. The cross level interactions with renter groups and concentrations of social housing are rarely significant for satisfaction with safety suggesting that these area effects do not differ across tenures, with the exception of moderate-to-higher income renters who are significantly less satisfied when they reside in higher concentrated areas of social housing. Social renters do report greater satisfaction with their safety and neighbourhood in the moderately concentrated areas of social housing. While the significance of this finding is not able to be detected based on the broad area measure, it does point to a potentially important effect that social renters typically feel more content in the moderately concentrated areas that are neither homogenous nor highly concentrated and this is somewhat supported in the cross level interactions with the tenure diversity measures discussed next.

A further key finding along the same vein is that satisfaction with both safety and the neighbourhood decline noticeably as tenures become more diversified in an area. This suggests that the general perceptions of the quality of the neighbourhood are higher in more homogenous to low diverse areas which are typically characterised by higher than average rates of home ownership. The cross level interactions are generally insignificant across renter groups for satisfaction with safety and the neighbourhood. With the exception of social renters who feel significantly more safe in the moderately low mixed areas and to lesser extent more satisfied with their neighbourhoods in these areas. At the other extreme, moderate-to-higher income renters are the most satisfied with their neighbourhoods when they live in the very highest diverse areas.

Table 21: Multilevel model results: satisfaction with safety and area tenure measures

Satisfaction with safety	Density of the dwelling		Concentration of social housing		Tenure diversity	
Social renters	-.061[.061]		-.017[.061]		-.139[.102]	*
Lower income private renters	-.080[.035]	*	-.068[.053]		-.105[.056]	*
Moderate-to-higher income renters	-.074[.027]	**	-.070[.027]	+	-.102[.042]	*
Medium density units	.022[.037]		-.006[.023]		-.004[.023]	
High density units	.176[.094]	+	.109[.056]	*	.118[.056]	*
Caravan	-.151[.092]	+	-.156[.092]	+	-.149[.092]	
Other type of dwelling	.088[.064]		.089[.064]		.094[.065]	
Duration of residence	.014[.005]	**	.014[.005]	**	.014[.005]	**
Interactions						
Social renters * medium density	-.066[.075]					
Social renters * high density	-.412[.209]	*				
Lower income private renters * medium density	-.065[.059]					
Lower income private renters * high density	-.047[.179]					
Higher income private renters * medium density	-.022[.051]					
Higher income private renters * high density	-.057[.119]					
Level 3						
Major urban	-.304[.030]	***	-.298[.029]	***	-.306[.030]	***
Other urban	-.105[.029]	***	-.102[.029]	***	-.105[.029]	***
Area level median household income 1st quintile	.054[.034]		.066[.034]	*	.051[.033]	
Area level median household income 2nd quintile	.010[.031]		.016[.031]		.006[.031]	
Area level median household income 3rd quintile	-.005[.028]		-.003[.028]		-.009[.028]	
Area level median household income 4th quintile	-.006[.024]		-.006[.024]	+	-.008[.024]	
Area rate of unemployment 2nd quintile	-.008[.015]		-.009[.015]		-.008[.015]	
Area rate of unemployment 3rd quintile	-.017[.015]		-.018[.016]		-.017[.016]	
Area rate of unemployment 4th quintile	.012[.016]		.012[.016]		.012[.016]	
Area rate of unemployment 5th quintile	.036[.017]	*	.038[.017]	*	.035[.017]	*
Moderate low tenure diversity	-.010[.022]				-.025[.024]	
Moderate high tenure diversity	-.040[.026]				-.029[.029]	
High tenure diversity	-.040[.027]				-.042[.031]	
Very high tenure diversity	-.095[.033]	**			-.118[.039]	**
Moderate low % social housing			-.024[.030]			
Moderate high % social housing			-.041[.032]			
High tenure high % social housing			-.026[.033]			
Very high social % housing			-.181[.041]	***		
Interactions percentage social housing						
Social renter * % social housing 3			.131[.138]			
Social renter * % social housing 4			-.162[.130]			
Social renter * % social housing 5			-.097[.125]			
Social renter * % social housing 6			-.114[.131]			
Lower income private rent * % social housing 3			.046[.071]			
Lower income private rent * % social housing 4			-.129[.066]	*		

Satisfaction with safety	Density of the dwelling		Concentration of social housing		Tenure diversity	
Lower income private rent * % social housing 5			-.030[.065]			
Lower income private rent * % social housing 6			.038[.080]			
High-income private rent * % social housing 3			-.003[.052]			
High-income private rent * % social housing 4			-.029[.050]			
High-income private rent * % social housing 5			-.039[.051]			
High-income private rent * % social housing 6			.068[.063]			
Interactions with tenure mix						
Social renter * ten diversity 3					.328[.119]	**
Social renter * ten diversity 4					.129[.121]	
Social renter * ten diversity 5					-.049[.114]	
Social renter * ten diversity 6					-.103[.121]	
Lower income private rent * ten diversity 3					.004[.068]	
Lower income private rent * ten diversity 4					-.029[.069]	
Lower income private rent * ten diversity 5					.052[.067]	
Lower income private rent * ten diversity 6					.059[.079]	
High-income private rent * ten diversity 3					.060[.052]	
High-income private rent * ten diversity4					-.040[.052]	
High-income private rent * ten diversity 5					.021[.052]	
High-income private rent * ten diversity 6					.124[.061]	*
Constant	5.894[.220]	***	5.899[.220]	***	5.896[.220]	***
Area—level						
No of groups 1030						
Average no of groups 94.3						
Max 1148						
Min 1						
var(_cons)	.032		.176		.032	
Individual—level						
No of groups 25,504						
Average no of groups 3.8						
Min 1						
Max 10						
var(cons)	.895		.946		.894	
Residual	1.707		1.306		1.707	
ICC SLA	.012		.012		.012	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, bill difficulties, seeking financial help, equivalent disposable income, marital status, country of birth, chronic health condition, member of a sporting club, labour market status, age, education, and social support. See appendix for full model tables.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing; and 6. Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Table 22: Multilevel model results: satisfaction with neighbourhood and area tenure measures

Satisfaction with the neighbourhood	Density of the dwelling		Concentration of social housing		Tenure diversity	
Social renters	-.052[.063]		-.002[.119]		.021[.106]	
Lower income private renters	-.055[.037]		-.042[.055]		-.012[.057]	
Moderate-to-higher income renters	-.093[.028]	**	-.065[.028]		-.128[.044]	**
Medium density units	.013[.039]	*	.051[.023]	*	-.049[.023]	*
High density units	-.002[.098]		-.061[.059]		-.052[.059]	
Caravan	-.167[.096]	+	-.170[.096]	+	-.168[.096]	+
Other type of dwelling	.002[.067]		.008[.067]		.013[.067]	
Duration of residence	.057[.005]	***	.056[.005]	***	.056[.005]	***
Interactions dwelling						
Social renters * medium density	-.142[.078]	+				
Social renters * high density	-.711[.226]	**				
Lower income private renters * medium density	-.138[.063]	*				
Lower income private renters * high density	.238[.186]					
Moderate-to-higher income private renters * medium density	-.068[.053]					
Moderate-to-higher income private renters * high density	-.064[.124]					
Level 3						
Major urban	-.302[.036]	***	-.299[.035]	***	-.302[.036]	***
Other urban	-.156[.033]	***	-.149[.033]	***	-.156[.033]	***
Area level median household income 1st quintile	-.073[.040]	+	-.058[.040]	+	-.075[.040]	+
Area level median household income 2nd quintile	-.057[.036]		-.057[.036]		-.059[.036]	+
Area level median household income 3rd quintile	-.087[.032]	**	-.078[.032]	*	-.089[.032]	**
Area level median household income 4th quintile	-.047[.027]	+	-.046[.027]	+	-.049[.027]	+
Area rate of unemployment 2nd quintile	.039[.016]	**	.039[.016]	**	.039[.016]	**
Area rate of unemployment 3rd quintile	-.006[.016]		-.007[.016]		-.006[.016]	
Area rate of unemployment 4th quintile	.026[.017]		.026[.017]		.026[.017]	
Area rate of unemployment 5th quintile	-.032[.018]	+	-.029[.018]	+	-.032[.018]	+
Moderate low tenure diversity	.007[.025]				-.004[.026]	
Moderate high tenure diversity	-.004[.030]				.016[.033]	
High tenure diversity	-.045[.033]				-.026[.036]	
Very high tenure diversity	-.127[.040]	***			-.131[.045]	**
Moderate low % social housing			-.028[.036]			
Moderate high % social housing			-.070[.038]	+		
High % social housing			-.073[.039]	+		
Very high % social housing			-.108[.048]	*		
Interactions percentage social housing						
Social renter * % social housing 3			.098[.144]			
Social renter * % social housing 4			-.072[.136]			
Social renter * % social housing 5			-.197[.130]			
Social renter * % social housing 6			-.219[.137]			
Lower income private rent * % social housing 3			.047[.073]			
Lower income private rent * % social housing 4			-.065[.069]			

Satisfaction with the neighbourhood	Density of the dwelling		Concentration of social housing		Tenure diversity	
Lower income private rent * % social housing 5			-.065[.068]			
Lower income private rent * % social housing 6			-.096[.084]			
Moderate-to-higher income private rent * % social housing 3			-.039[.054]			
Moderate-to-higher income private rent * % social housing 4			-.017[.053]			
Moderate-to-higher income private rent * % social housing 5			-.106[.054]	*		
Moderate-to-higher income private rent * % social housing 6			-.032[.067]			
Interactions with tenure mix						
Social renter * ten diversity 3					.028[.125]	
Social renter * ten diversity 4					-.008[.127]	
Social renter * ten diversity 5					-.300[.119]	*
Social renter * ten diversity 6					-.172[.127]	
Lower income private rent * ten diversity 3					-.012[.071]	
Lower income private rent * ten diversity 4					-.137[.072]	*
Lower income private rent * ten diversity 5					-.089[.070]	
Lower income private rent * ten diversity 6					-.050[.082]	
Moderate-to-high income private rent * ten diversity 3					.090[.054]	+
Moderate-to-high income private rent * ten diversity 4					-.032[.055]	
Moderate-to-high income private rent * ten diversity 5					.017[.054]	
Moderate-to-high income private rent * ten diversity 6					.065[.063]	
Constant	7.201[.232]	***	7.213[.232]	***	7.211[.232]	***
Area—level						
No of groups 1,030						
Average no of groups 94.3 (Max 1148 Min 1)						
var(_cons)	.091		.298		.092	
Individual—level						
No of groups 25,496						
Average no of groups 3.8 (Max 10 Min 1)						
var(cons)	.998		.999		.999	
var (Residual)	1.811		1.346		1.811	
ICC SLA	.032		.031		.032	
Observations	97,091		97,091		97,091	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, bill difficulties, seeking financial help, equivalent disposable income, marital status, country of birth, chronic health condition, member of a sporting club, labour market status, age, education, and social support. See appendix for full model tables.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing; and 6. Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

The exposure models 1 to 4 in Tables 23 and 24 below indicate the extent to which satisfaction with safety and the neighbourhood improves or declines with transitions into and out of areas with highest concentrations of social housing and disadvantage between consecutive years as well as the impact of longer-term exposure to these areas over time. Generally, the models indicate that remaining in areas with high concentrations of social housing and disadvantage between consecutive years significantly decreases satisfaction with safety and the neighbourhood. However, remaining in both types of areas for a shorter number of years between two and five actually increases perceptions of safety. Satisfaction with safety only begins to significantly decline in a disadvantaged area after remaining for a period longer than five years. Satisfaction with the neighbourhood is lower for each year of exposure to areas with high concentrations of social housing. Dissatisfaction with the neighbourhood is only apparent after remaining in a disadvantaged area for longer than five years. This suggests that the concentration of social housing may be more influential in residents' perceptions of the neighbourhood than the overall disadvantage of the area, potentially tapping into the stigmatised view of social housing even when it is located in better off areas.

For social renters remaining in a more advantaged area or one with a lower concentration of social housing lifts their feelings of safety and satisfaction with the neighbourhood. This confirms earlier findings that social renters' wellbeing is 'better' in areas with lower overall concentrations of social housing. Lower income private renters perceptions of safety appear to be less influenced by the concentration of social housing but more so by the overall disadvantage of an area, with satisfaction declining with a move or remaining in the area and increasing with a move out of it. Moderate-to-higher income renters generally have lowest satisfaction with safety when remaining in a disadvantaged area but not for areas of concentrated social housing. Both lower and moderate-to-higher income private renters are the least satisfied with their neighbourhoods when they live in a disadvantaged area, with the effect being strong and significant. This suggests that both groups of renters will be less 'tolerant' of living among 'poorer' households and will move from such neighbourhoods if they have the means to do so (Clark & Morrison 2012).

Table 23: Multilevel model results satisfaction with safety and exposure and transitions from area social housing concentration and SEIFA advantage/disadvantage

Satisfaction with safety					
Move from social housing			**Move from disadvantage**		
Social renters	-.037[.074]		Social renters	-.051[.073]	
Lower income private renters	-.102[.044]	*	Lower income private renters	-.103[.044]	*
Moderate-to-higher income renters	-.088[.034]	**	Moderate-to-higher income renters	-.067[.032]	*
Level 3			***Level 3***		
Move from high social housing area	-.269[.055]	***	Move from disadvantaged area	-.266[.050]	***
Move from low/moderate to high social housing area	-.136[.072]	*	Move advantage to disadvantage	-.023[.040]	
Remain in high social housing area	-.162[.032]	***	Remain in disadvantaged area	-.224[.043]	***
High social housing area 2–3 years	.018[.029]		Exposure disadvantaged area 2–3 years	.128[.039]	***
High social housing area 4–5 years	.060[.026]	*	Exposure disadvantage area 4–5 years	.089[.031]	**
High social housing area 6+ years	-.032[.026]		Exposure disadvantage area 6+ years	-.104[.031]	***
Move from high to low/moderate social housing * social renters	-.985[.207]	***	Move from disadvantage to advantage * social renters	-.085[.137]	
Move from low/moderate to high social housing * social renters	-.508[.250]	*	Move from advantage to disadvantage * social renters	-.295[.171]	+
Remain in high social housing * social renters	-.135[.076]	+	Remain in disadvantaged area * social renters	-.292[.085]	**
Move from high to low/moderate social housing * lower income private renters	-.195[.115]	+	Move from disadvantage to advantage * lower income private renters	.116[.094]	
Move from low/moderate to high social housing * lower income private renters	.030[.122]		Move from advantage to disadvantage * lower income private renters	-.211[.098]	*
Remain in high social housing * lower income private renters	-.064[.061]		Remain in disadvantaged area * lower income private renters	-.129[.067]	*
Move from high to low/moderate social housing * mod/high private renters	.009[.091]		Move from disadvantage to advantage * moderate/high-income private renters	.060[.088]	
Move from low/moderate to high social housing * mod/high private renters	.160[.105]		Move from advantage to disadvantage * moderate/high-income private renters	-.131[.086]	
Remain in high social housing * mod/high income private renters	-.007[.050]		Remain in disadvantaged area *	-.111[.065]	+
Area—level			***Area—level***		
No of groups	969		No of groups	974	
Average no within groups	70.3 (Max 944 and min 1)		Average no of groups	69.9 (Max 944 and min 1)	
var(_cons)	.191		var(_cons)	.188	
Individual—level			***Individual—level***		
No of groups	13,767		No of groups	13787	
Average no of groups	4.9 (Max 10 min 1		Average no of groups	4.9 (Max 10 and min 1)	
var(cons)	.921		var(cons)	.922	
ICC SLA	.015			.014	
Residual	1.255			1.255	
Number of observations	68,706			68,746	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, bill difficulties, seeking financial help, equivalent disposable income, marital status, country of birth, chronic health condition, member of a sporting club, labour market status, age, education, and social support. See appendix for full model tables.

Table 24: Multilevel model results satisfaction with neighbourhood, exposure and transitions from area social housing concentration and SEIFA advantage/disadvantage

Satisfaction with neighbourhood					
Move from social housing			**Move from disadvantage**		
Social renters	-.006[.076]		Social renters	-.079[.075]	
Lower income private renters	-.030[.046]		Lower income private renters	-.002[.045]	
Moderate-to-higher income renters	-.060[.035]	+	Moderate-to-higher income renters	-.031[.033]	
Level 3			***Level 3***		
Move from high social housing area	-.470[.057]	***	Move from disadvantaged area	-.624[.052]	***
Move from low/moderate to high social housing area	-.168[.074]	*	Move advantage to disadvantage	.002[.041]	
Remain in high social housing area	-.014[.033]		Remain in disadvantaged area	-.342[.044]	***
High social housing area 2–3 years	-.052[.030]	+	Exposure disadvantaged area 2–3 years	.172[.041]	***
High social housing area 4–5 years	-.012[.027]		Exposure disadvantage area 4–5 years	.044[.032]	
High social housing area 6 or more years	-.071[.027]	**	Exposure disadvantage area 6+ years	-.115[.032]	***
Move from high to low/moderate social housing * social renters	-.244[.213]		Move from disadvantage to advantage * social renters	-.181[.141]	
Move from low/moderate to high social housing * social renters	-.063[.257]		Move from advantage to disadvantage * social renters	-.092[.175]	
Remain in high social housing * social renters	-.309[.079]	***	Remain in disadvantaged area * social renters	-.182[.088]	*
Move from high to low/moderate social housing * lower income private renters	-.063[.119]		Move from disadvantage to advantage * lower income private renters	-.250[.097]	**
Move from low/moderate to high social housing * lower income private renters	.085[.125]		Move from advantage to disadvantage * lower income private renters	-.040[.100]	
Remain in high social housing * lower income private renters	-.183[.064]	**	Remain in disadvantaged area * lower income private renters	-.371[.069]	***
Move from high to low/moderate social housing * mod/high private renters	-.042[.094]		Move from disadvantage to advantage * moderate/high-income private renters	-.271[.090]	**
Move from low/moderate to high social housing * mod/high private renters	-.331[.108]	**	Move from advantage to disadvantage * moderate/high-income private renters	-.036[.088]	
Remain in high social housing * mod/high income private renters	-.125[.052]	**	Remain in disadvantaged area * high-income private renter	-.306[.067]	***
Area—level			***Area—level***		
No of groups	969		No of groups	974	
Average no of groups	70.3 (Max 944 min 1)		Average no of groups	69.9(Max 944 min 1)	
var(_cons)	.320		var(_cons)	.311	
Individual—level			***Individual—level***		
No of groups	13,764		No of groups	13784	
Average no of groups	4.9 (Max 10 min 1)		Average no of groups	4.9(Max 10 min 1)	
var(cons)	.966		var(cons)	.966	
Residual	1.285			1.283	
ICC SLA	.038			.036	
Observations	68,074			68,114	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, bill difficulties, seeking financial help, equivalent disposable income, marital status, country of birth, chronic health condition, member of a sporting club, labour market status, age, education, and social support. See appendix for full model tables.

Individual effects for safety and neighbourhood

Perceptions of safety and of the neighbourhood are also strongly shaped by individual characteristics and experiences. Although there is some overlap in the type of predictors of satisfaction and mental wellbeing across all models, there are some important distinctions. Particularly noteworthy are differences across gender and age groups. Compared with males, women typically express lower overall satisfaction with their safety but higher satisfaction with the neighbourhoods in which they live in. Despite old age being associated with greater physical frailty, it seems that the young and those with small children typically feel less safe than the over 65s and those with older children. While feeling more safe, the over 65s and those with adult aged children are less satisfied with their own neighbourhood than the younger age groups. Given that older age groups have greater attachments to an area, an increase in dissatisfaction could reflect the loss of local networks and opportunities for social inclusion as neighbourhoods change overtime. It could also reflect an empty nest syndrome where older couples and individuals are looking to downsize to a different area.

Indicators of higher socio-economic insecurity including financial stress, being divorced or separated, having a health condition and a lower level of education are all significantly associated with decreased satisfaction with both safety and the neighbourhood lived in. Household income significantly lifts perceptions of safety but is not influential for satisfaction with the neighbourhood. Individual measures indicative of greater social inclusion, such as being a member of a sporting club, being in a relationship, coming from an English-speaking background and having higher social networks lift satisfaction with safety and the neighbourhood. While singles are more satisfied with their neighbourhood they tend to feel less safe.

3.2.4 Employment outcomes

The first set of models focus on the associations between tenure area and subjective measures of wellbeing. In this final model section we examine the extent to which tenure and area matter for an objective measure of wellbeing—employment participation. As with the previous models, it seeks to examine associations between tenure and area effects using measures of tenure diversity and concentration as well as relative disadvantage of an area. Again we examine the influence of transitions into and out of areas and longer term exposure to areas with high concentrations of social housing and disadvantage.

Access to employment opportunities and participation in paid work is uneven across geographical locations. New forms of ‘spatial patterning’ of cities and regional areas associated with processes of economic restructuring and demographic shifts have intensified patterns of social exclusion between advantaged areas with access to rich labour markets and those with multiple disadvantages with limited opportunities for work (Baum & Mitchell 2008; Baum et al. 2008; Baum & Gleeson 2010). Housing is considered a central vehicle in the creation of this unevenness of employment opportunities by influencing the way different households are able to select into and remain in areas (Berry 2006; Bill & Mitchell 2005). Better off households are able to move into more desirable neighbourhoods with more buoyant labour markets while lower income households, who also have higher risks of unemployment, will be typically sorted into the least well off areas. However, arguably the allocation of social housing is less dependent on issues of individual neighbourhood selection in the same way with some housing stock remaining in areas with relatively good access to large labour markets while other estates are located in former manufacturing post-war working class suburbs.

The main challenge for area effects research, as was discussed with mental health and other indicators of wellbeing, is being able to isolate the individual compositional effects of an area from the effect of the area itself. This requires establishing whether locations have differing rates of unemployment because more unemployed live in them or if there is something about the area itself that causes more people to be unemployed. Labour market researchers are

increasingly recognising the need to consider both the individual and social context in explaining and addressing employment outcomes. Increased access to spatial measures in the HILDA dataset have allowed both individual and area-based measures to be examined simultaneously. Baum and Mitchell (2008) and Haynes et al. (2011) are two noted studies that have incorporated spatial measures into their analysis of employment outcomes using HILDA by including local unemployment rates and area social networks. Both authors find a significant interaction between individual and contextual factors in shaping employment outcomes.

Housing has been linked to employment outcomes through its role in constraining labour mobility as advanced in the Oswald thesis and also through the proposition of a geographical spatial mismatch in which affordable housing is located away from job rich areas or those that are available to lower skilled workers (Oswald 1996; Berry 2006). In addition to geographical constraints to labour mobility, the neighbourhood effects literature focuses on both positive and adverse 'social interactive' mechanisms linked to the presence of social capital and bridging ties that can assist in job search through to ideas of 'social contagion' that are thought to occur from the lack of exposure to positive role models (van Ham & Manley 2010; Galster 2012). Galster's comprehensive review of the neighbourhood effects evidence finds limited support for mechanisms linked to social contagion but stronger evidence for the existence of geographical mechanisms associated with spatial mismatch (Galster 2012, pp.23–45).

Although there is a rich labour market literature documenting uneven geographies and employment outcomes, few studies have examined the extent to which employment outcomes vary according to the tenure mix of a location. There is an extensive literature examining the role that housing tenure and assistance itself play in contributing to employment participation through the potential disincentives and poverty traps that may stem from a loss of entitlements and associated increases in housing costs (Feeny et al. 2012). One specific study investigating the impact of housing tenure mix on labour market transitions and the probability of employment is by van Ham and Manley (2010). Drawing on different spatial scales of analysis and comparing employment outcomes of Scottish individuals between 1991 to 2001 the authors found little support that concentrations of social housing adversely impacted upon employment outcomes. From their findings they conclude that there are limited benefits to be gained through social mix policies if the goal is to increase participation in the labour market. A further Swedish study by Musterd and Andersson (2005) who explore the association between housing mix (among other social mix measures) and individual opportunities find weak associations between housing mix and employment opportunities. While the results from the two studies above are particularly informative for the current study, the Australian social housing renter sector is considerably smaller and arguably more residualised with a much greater proportion of high needs residents.

An important question addressed in this current research is whether the employment outcomes for social and private renters vary when they live in different locations characterised by low and high tenure mix and concentrations of social housing. The models shown in Table 25 below simply estimate the probability of being employed versus not being employed or a labour choice model once we control for the individual level factors and the clustering within areas. In the models we include the same set of cross level interactions for tenure groups. We include a similar set of predictors but obviously omit employment status. We remove financial stress variables as well as being a member of a sporting club. The model sample is based on those who are aged 65 years or less, who are considered to be of working age, and we include a control for the presence of a chronic health condition that may inhibit capacity to work. The results are presented as odd ratios where scores above 1 indicate increased odds and for those below they are lower relative to an omitted reference group. We also estimate the predicted probabilities of the cross level interactions to assist in the interpretation. The predicted probabilities represent the likelihood that an individual will be employed and can be interpreted as a percentage score.

Tenure and area effects

In Table 25 we present effects of tenure and area as the main focus of our discussion. The results for individual and household controls added to the models are presented in Appendix 3. In sum, the individual controls are consistent with labour supply models which indicate that females, those who are married and with children are less likely to be employed as are those with a chronic health condition, and not being Australian born. Measures of human capital are also strong predictors of employment participation with those with post-secondary education and qualifications having significantly higher odds compared with those without any formal qualifications. Workforce participation peaks for those aged between 45–55 years and declines thereafter. The presence of high social networks significantly lifts the chances of being employed.

Moving onto the tenure and area measures shown in Table 25 reveals significant variation in the employment outcomes within tenure groups and locations. Lower income private renters are the least likely to be employed followed by social renters. Interestingly the odds of being employed among private renters with moderate to higher incomes are more than twice those of the omitted group of home owners. This is a potentially important finding in the context of the Oswald thesis whereby home ownership is hypothesised to contribute to an increase in the natural rate of unemployment due to its potential constraints on labour mobility. This avenue warrants further exploration but is beyond the scope of the current research. The increased likelihood of private renters with higher incomes being employed relative to home owners could potentially indicate area effects relating to such mobility constraints in following jobs and to the existence of a spatial mismatch. The type of dwelling lived in also appears to be influential although it is likely to be capturing the indirect effect of the location of these properties. Individuals living in medium density dwellings, more characteristic of inner and more densely populated areas, have higher odds of being employed. The duration of residence increases the odds of being employed which could act to increase local area networks as well as provide greater stability facilitating job search in a particular area. It could also reflect the need to seek employment to pay for ongoing housing commitments.

The area-based variables produce some interesting findings. Whether an individual is employed or not seems to be more significantly influenced by the overall income of the area than the rate of unemployment. Individuals living in the poorest areas have significantly lower odds of being employed while those in the fourth highest income quintile—relatively affluent areas—have the highest. Employment participation declines in the richest fifth quintile area, although this is not significant. As we are controlling for the individual effects of income and unemployment and the area level clustering along with individual cluster means, the interpretation of this finding points to a significant area-based effect on employment participation in poorer areas. It is not clear to what extent ideas of ‘social contagion’ or spatial mismatch, as introduced in the Positioning Paper account for these differences.

The odds of being employed peak in the highly diverse increase to 1.27 or 27 per cent higher than the more low to very low diverse areas. A similar pattern is evident for areas with the highest concentrations of social housing where the odds of being employed are significantly increased by around 56 per cent in areas with high concentrations and by 45 per cent in very high concentrated areas. This suggests that on the whole locations of highest concentrated social housing and correspondingly high tenure diversity remain within job rich locations. However, they may not be areas that provide job opportunities for lower income renters effectively contributing to a ‘spatial mismatch’.

The important question raised here is whether the effect of living in areas with high concentrations of social housing or tenure diversity result in the same employment outcomes across renter groups. Table 26 below presents the predicted employment probabilities for renters and shows that the probability of being employed is significantly lower for both social and lower income private renters in areas where the concentration of social housing is

moderately high to very high. The findings suggest that the overall concentration of social housing does matter for the employment participation of social renters although the differences in the probabilities are not large nor linear. Social renters have a significantly lower probability of being employed in areas with moderately high (35%) and high concentrations of social housing (38%) compared with areas with a moderately low concentration (41%). Whereas for lower income private renters, the impact is more pronounced with the probability of being employed declining from 50 per cent in the moderately low concentrated areas to 38 per cent in the very highest concentrated areas. While the participation rates of moderate-to-higher income renters is significantly higher than other renter groups there is less apparent variation across areas where probability of being employed ranges from 90 to 92 per cent. This suggests that areas with high concentrations of social housing favour the employment prospects of moderate-to-higher income renters but not lower income private or social renters. It may be that the moderate-to-higher income renters present as more competitive employees in these areas potentially indicating the existence of labour sub markets for different groups of renters. It is likely that moderate-to-higher income renters benefit from the accessibility that coincides with areas with high concentrations of social housing without directly being exposed to the actual dwellings or immediate neighbourhoods in the same way as those who live in or directly near social housing estates.

The results of the interactions are not as strong or as significant across renter groups for the tenure diversity measures. The pattern for social renters is broadly similar as for area social housing concentrations. Tenure diversity appears to favour the employment prospects of lower income private renters although this is not significant. Moderate-to-higher income earners have the best odds of being employed when they live in the very highest mixed areas. In all, the findings on tenure diversity are broadly consistent with those on the effects of area with concentrated social housing. Diverse areas seem to advantage the more affluent renter groups whose employment prospects are significantly better in these areas over all other tenure groups including home owners.

Table 25: Multilevel model results participation in employment with tenure measures

Employment participation	Density of the dwelling		Concentration of social housing		Tenure Diversity	
	Odds Ratio		Odds Ratio		Odds Ratio	
Social renters	.465[.085]	***	.695[.247]	***	.544[.177]	+
Lower income private renters	.379[.039]	***	.492[.077]	***	.432[.069]	***
Moderate-to-higher income renters	2.356[.221]	***	2.287[.321]	***	1.895[.275]	***
Duration of residence	1.141[.019]	***	1.140[.019]	***	1.141[.019]	***
Medium density units	1.286[.205]		1.206[.101]	*	1.202[.101]	*
High density units	.435[.148]	*	.683[.145]	+	.690[.147]	+
Caravan	.617[.176]	+	.618[.176]	+	.620[.176]	+
Other type of dwelling	2.069[.473]	***	2.102[.480]	***	2.112[.473]	***
Level 3						
Major urban	.690[.066]	***	.690[.066]	***	.675[.065]	***
Other urban	.821[.078]	*	.821[.078]	*	.817[.077]	*
Area level median household income 1st quintile	.662[.070]	***	.639[.068]	***	.656[.070]	***
Area level median household income 2nd quintile	.890[.086]		.857[.085]		.886[.086]	
Area level median household income 3rd quintile	.995[.088]		.957[.086]		.993[.088]	
Area level median household income 4th quintile	1.088[.087]		1.075[.087]		1.084[.087]	
Area rate of unemployment 2nd quintile	.958[.050]		.961[.050]		.961[.050]	
Area rate of unemployment 3rd quintile	.969[.051]		.970[.051]		.972[.051]	
Area rate of unemployment 4th quintile	.899[.049]	*	.896[.049]	*	.900[.049]	*
Area rate of unemployment 5th quintile	1.028[.059]		1.025[.059]		1.028[.059]	
Moderate low tenure diversity	.981[.069]				.965[.075]	
Moderate high tenure diversity	1.162[.096]	+			1.194[.110]	*
High tenure diversity	1.265[.112]	**			1.271[.127]	*
Very high tenure diversity	1.163[.124]				1.034[.133]	
Moderate low % social housing			1.242[.121]	*		
Moderate high % social housing			1.225[.125]	*		
High % social housing			1.566[.165]	***		
Very high % social housing			1.452[.191]	**		
Area—level						
No of groups	1,026		1,026		1,026	
Average no of groups Max Min	84.5 Max 1,032 min 1		84.5 Max 1,032 min 1		84.5 Max 1,032 min 1	
var(_cons)	.142		.149		.149	
Individual—level						
No of groups	23,943		23943		23943	
Average no of groups Min Max	Max 1032 min 1		Max 1032 min 1		Max 1032 min 1	
var(cons)	10.22		10.26		10.26	
ICC SLA	.010		.011		.011	
No observations	86, 692		86, 692		86, 692	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, equivalent disposable income, marital status, country of birth, chronic health condition, age, education, and social support. See appendix for full model tables.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing, and 6. Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Table 26: Multilevel model results participation in employment with neighbourhood and area tenure measures, predicted probabilities

Predicted probabilities employment			
Density of the dwelling		**Pub housing contin**	
Social renters * medium density	.346	High-income private rent * % social housing 5	.909
Social renters * high density	.416	High-income private rent * % social housing 6	.917
Lower income private renters * medium density	.452	**Interactions with tenure mix**	
Lower income private renters * high density	.526**	Social renter* ten diversity 3	.417
Higher income private renters * medium density	.943	Social renter * ten diversity 4	.307
Higher income private renters * high density	.953	Social renter * ten diversity 5	.395
Interactions Percentage Social housing		Social renter * ten diversity 6	.354
Social renter * % social housing 3	.410	Lower income private rent * ten diversity 3	.419
Social renter * % social housing 4	.356	Lower income private rent *ten diversity 4	.463
Social renter * % social housing 5	.376	Lower income private rent * ten diversity 5	.425
Social renter * % social housing 6	.360	Lower income private rent * ten diversity 6	.471
Lower income private rent * % social housing 3	.497	High-income private rent * ten diversity 3	.910
Lower income private rent * % social housing 4	.420*	High-income private rent * ten diversity 4	.914
Lower income private rent * % social housing 5	.423+	High-income private rent * ten diversity 5	.916
Lower income private rent * % social housing 6	.380*	High-income private rent * ten diversity 6	.925**
High-income private rent * % social housing 3	.917		
High-income private rent * % social housing 4	.899		

a. Controls have been added in for gender, number of children, equivalent disposable income, marital status, country of birth, chronic health condition, age, education, and social support. See appendix for full model tables.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing; and 6. Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Consistent with the format of previous outcomes we present a set of models in Tables 27 and 28 below that indicate the extent to which the likelihood of being employed increases or decreases with transitions into and out of areas with highest concentrations of social housing and disadvantage between consecutive years as well the impact of longer term exposure to these areas over time. The omitted group for the transitions are those who remain in the most advantaged areas, equating to the top two SEIFA deciles, while the omitted group for the social housing are those who remain in areas below the top two deciles for concentrations of social

housing. For the exposure measures, a disadvantaged area corresponds with the lowest two SEIFA deciles. While it is recognised that these are crude measures with a somewhat arbitrary cut off point, they nevertheless assist in isolating any potential impact at the most extreme ends of both concentrated disadvantage and social housing, which in general are likely to be the areas of greatest policy concern. In these models we include an additional control indicating whether an individual has moved location for work related reasons, which indicates that the odds of being employed are significantly increased when moving for work.

Moving to or remaining in an area with the highest concentrations of social housing significantly increases the odds of being employed by a respective 88 per cent and 32 per cent relative to remaining in an area where the concentration is lower. However, interestingly long-term exposure within an area with the highest concentrations of social housing for more than five years results in significantly lower odds of being employed. This could potentially point to longer term disincentive effects and requires further exploration.

Conversely, the move from a highly disadvantaged area to a more advantaged area (.724) and the reverse transition (.693) both result in significantly lower odds of being employed compared to remaining in a better off area. It is not clear whether the same mechanisms are operating in both directions. As we control for those who move for work, such findings could suggest that those who move out of disadvantaged areas may not be moving far from their original areas and may still remain constrained in their job search. Clark and Morrison 2012 find that those who move from disadvantaged neighbourhoods tend to also move into similarly disadvantaged pockets within new areas, which may impact upon social networks. Longer term exposure to a disadvantaged area also results in lower odds of being employed although is not significant. The cross level interactions are all insignificant suggesting that there is no significantly detectable differences in the probability of being employed as a result of transitions into or out of areas with high concentrations of social housing or disadvantage.

Table 27: Multilevel model results employment participation, exposure and transitions from area social housing concentration and SEIFA advantage/disadvantage

Move from social housing	Odds ratio		Move from disadvantage	Odds ratio	
Social renters	.587[.142]	*	Social renters	.518[.125]	*
Lower income private renters	.433[.059]	***	Lower income private renters	.428[.059]	***
Moderate-to-higher income renters	2.337[.293]	***	Moderate-to-higher income renters	2.118[.258]	***
Level 3			***Level 3***		
Move from high social housing area	1.148[.223]		Move from disadvantaged area	.724[.126]	+
Move from low/moderate to high social housing area	1.881[.486]	*	Move advantage to disadvantage	.693 [.106]	*
Remain in high social housing area	1.316[.153]	*	Remain in disadvantaged area	1.095[.164]	
High social housing area 2–3 years	.884[.091]		Exposure disadvantaged area 2–3 years	.913[.126]	
High social housing area 4–5 years	1.118[.110]		Exposure disadvantage area 4–5 years	1.060[.116]	
High social housing area 6 or more years	.724[.067]	***	Exposure disadvantage area 6+ years	.861[.096]	
Move for work	3.726[.714]	***	Move for work	3.787[.724]	***
Area—level			***Area—level***		
No of groups	965		No of groups	965	
Average no of groups	62.2 Max 829 min1		Average no of groups	62.2 Max 829 min1	
var(_cons)	.094		var(_cons)	.096	
Individual—level			***Individual—level***		
No of groups	12,851		No of groups	12,851	
Average no of groups	Max 4.7 min 1		Average no of groups	Max 4.7 min1	
var(cons)	10.642		var(cons)	10.653	
ICC SLA	.007			.007	
Observations	60,068		60,109		

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Controls have been added in for gender, number of children, equivalent disposable income, marital status, country of birth, chronic health condition, age, education, and social support. See appendix for full model tables.

Table 28: Multilevel model results employment participation, exposure and transitions from area social housing concentration and SEIFA advantage/disadvantage, predicted probabilities

Predicted probabilities employment			
Move from social housing		**Move from disadvantage**	
Move from high to low/moderate social housing * social renters	.563	Move from disadvantage to advantage * social renters	.334
Move from low/moderate to high social housing * social renters	.312	Move from advantage to disadvantage * social renters	.447
Remain in high social housing * social renters	.406	Remain in disadvantaged area * social renters	.342
Move from high to low/moderate social housing * lower income private renters	.552+	Move from disadvantage to advantage * lower income private renters	.419
Move from low/moderate to high social housing * lower income private renters	.519	Move from advantage to disadvantage * lower income private renters	.456
Remain in high social housing * lower income private renters	.400	Remain in disadvantaged area * lower income private renters	.306
Move from high to low/moderate social housing * mod/high private renters	.900	Move from disadvantage to advantage * moderate/high-income private renters	.906
Move from low/moderate to high social housing * mod/high private renters	.924	Move from advantage to disadvantage * moderate/high-income private renters	.898
Remain in high social housing * mod/high-income private renters	.903	Remain in disadvantaged area * moderate/high-income private renters	.877*

a. Controls have been added in for gender, number of children, equivalent disposable income, marital status, country of birth, chronic health condition, age, education, and social support. See appendix for full model tables.

3.3 Summary

This chapter has presented findings from the multilevel analysis. Many significant relationships between area-based and individual predictors of wellbeing have been identified. In summary, we find that there is evidence of area level effects related to the diversity of tenure and concentration of social housing on wellbeing outcomes once statistically controlling for individual and household level characteristics. In particular, the key findings include the following:

3.3.1 Tenure diversity and concentrations of social housing

- In general, living in areas where there is a lower tenure mix and concentration of social housing is associated with better mental wellbeing, satisfaction with safety and the neighbourhood. At the same time, the chances of being employed typically increase with the increasing tenure diversity and concentration of social housing in an area. However, diversity and concentration of social housing impact tenure groups differently.
- Moderate-to-higher income private renters tend to be 'happier' and more likely to be employed in the more mixed areas but less satisfied with their safety and neighbourhood. Moderate-to-higher income private renters' wellbeing declines in the very highest concentration of social housing and they are less satisfied with their safety and neighbourhoods.
- The mental wellbeing, satisfaction with safety and neighbourhood of lower income private renters typically declines in the more highly diverse areas and areas of concentrated social housing. The chances of being employed significantly decrease in the areas with the highest concentrations of social housing.

- Social renters living in high density dwellings have significantly lower mental wellbeing, satisfaction with safety and the neighbourhood. Mental wellbeing, satisfaction with safety and the neighbourhood and the chances of being employed are typically higher in the more moderately mixed areas.

3.3.2 Exposure

- Overall remaining in an area between consecutive years with high concentrations of social housing does not lower mental wellbeing but remaining in a disadvantaged area does. Satisfaction with safety and the neighbourhood declines for each year of exposure to areas with the highest concentrations of social housing. In contrast dissatisfaction with safety and the neighbourhood in high disadvantaged areas increases after longer term exposure of more than five years. The move from a highly disadvantaged area to a more advantaged area and the reverse transition both result in significantly lower odds of being employed compared to remaining in a better off area.
- Moving to or remaining in an area with the highest concentrations of social housing increases the likelihood of being employed but long-term exposure within an area with the highest concentrations of social housing for more than five years lowers chances.
- Lower income private renters' wellbeing declines significantly when they remain in areas with high a concentration of social housing and disadvantage and is lifted when they move out of these areas.
- All moves for social renters lower wellbeing relative to remaining in a less concentrated area of social housing, suggesting that mobility per se may be detrimental for social renters as a group. However, remaining in a more advantaged area or one with a lower concentration of social housing lifts their mental wellbeing, feelings of safety, and satisfaction with their neighbourhood.

3.3.3 Other area, tenure, and individual findings

- The urban to rural divide is a stronger predictor of mental wellbeing than area income and the rate of unemployment. Those living in major urban areas have significantly lower mental wellbeing, satisfaction with both the neighbourhood and safety than those living in other urban, regional and rural areas.
- There is no area effect on mental health for areas with a high level of unemployment and low income independent of the individuals. However, those living in the lowest income areas are least likely to be employed. While those living in higher income areas feel less safe, they are more satisfied with their neighbourhoods.
- Tenure is not associated with lower wellbeing per se but high density dwellings are negatively associated with lower wellbeing. Moderate-to-higher income private renters are more likely to be employed than all other tenure groups including home owners as a broad group. Duration of residence lifts wellbeing, increases odds of being employed, and satisfaction with safety and the neighbourhood. Compared with all renter groups, home owners are more likely to be satisfied with the type of neighbourhood they live in and with their overall safety.
- Individual measures of social cohesion, social inclusion and socio-economic security are strong predictors of mental wellbeing, satisfaction with safety and the neighbourhood. In particular, having high social networks lifts wellbeing while threats to socio-economic security such as financial stress depress wellbeing mental wellbeing, satisfaction with safety and the neighbourhood.

4 CONCLUSIONS, POLICY IMPLICATIONS AND FUTURE RESEARCH

Increasing the area-based social mix of renting households remains a key policy goal in Australia and abroad. The assumptions underlying social mix policies are that the wellbeing and life chances of social renters will be improved when they live alongside a more mixed group of neighbours as opposed to living in an area with a high concentration of social housing and disadvantage. This report has sought to build on the current limited evidence base, informing the need for policies aiming to increase social mix by seeking to answer the question of whether the social quality of life of lower income renters is 'better' in areas with higher concentrations of social housing and in which the tenure and housing is more socially diverse from those that are less diverse. This research examines the multilevel wellbeing outcomes of lower income renters within a *social quality of life* framework, with a particular emphasis on the interrelatedness of socio-economic, social cohesion and isolation measured at both the individual and social contextual levels. The multilevel methods applied in this research allow for both individual and social contextual measures to be examined simultaneously in order to isolate the compositional characteristics of the individuals living in an area from the effect of the area itself.

A key contribution of this research is its robust longitudinal exploration of the impact of social contextual measures of tenure concentration and diversity on four wellbeing outcomes in the one study, including subjective measures of mental wellbeing, satisfaction with the neighbourhood and safety as well as an objective measure of social inclusion including employment participation. This combined examination allowed for a greater depth of understanding of both the beneficial and detrimental consequences of area effects across different renter groups. While social mix may facilitate improvements in one domain of wellbeing, this research suggests the need to examine the potential trade-offs of social mixing from a more holistic understanding of the benefits and consequences. Viewing wellbeing within a broader social quality of life framework suggests that many of the mechanisms or causes of wellbeing in one area also flow onto and influence others. The research also suggests the need to take into account the impact of social mix at different scales of area-based measurement from the dwelling through to the broader community that one resides in.

Across all tenures, residents' satisfaction with safety and neighbourhood was found to increase with declining concentrations of social housing in the area, which could potentially reflect to some extent the stigma placed on social housing tenants. Generally, the models indicate that remaining in areas with high concentrations of social housing and disadvantage between consecutive years significantly decreases satisfaction with safety and the neighbourhood. The concentration of social housing may be more influential in residents' perceptions than the overall disadvantage of the area.

In comparing wellbeing across the three renter groups examined in this study, the overarching conclusion is that the more highly diverse areas, on the basis of broad area level tenure mix, typically advantage the more affluent renters whose employment prospects are significantly better in these areas over all other tenure groups including home owners. The locations of highest concentrated social housing and correspondingly high tenure diversity often remain within job rich locations. But they are also areas that are more densely populated with the overall satisfaction, with both safety and the neighbourhood declining noticeably for all renter groups with the increase in diversity and concentration of social housing at a small area level. The mental health of both social and especially lower income private renters declines with highest concentrations of social housing and tenure diversity. Conversely, moderate-to-higher income private renters tend have better mental health when they reside in more diverse areas and those with higher concentrations of social housing.

The flow on conclusion is that it is better to live in a more highly diverse area if you are a moderate-to-higher income renter who can exploit the greater employment opportunities that are available in these areas while also being more readily able to move from less desirable neighbourhoods or housing that typically increase as the overall diversity of the area increases. Lower income private renters appear to benefit the least of all groups when they live in areas with highest concentrations of social housing and tenure diversity. The wellbeing of social renters is somewhat 'better' in areas with moderately low area diversity and or concentrations of social housing. This suggests that neither fully homogenous areas, which are occupied predominately by home owners, nor highest diverse areas, are wellbeing enhancing. The significance of the density of the dwelling for the wellbeing of social renters, once controlling for compositional effects and selection effects, associated with chronic health issues is a critical finding. Social renters living in higher density housing have poorer mental health and have lower satisfaction with their safety and neighbourhoods compared with social renters living in detached and medium density dwellings.

In further understanding the effects of social context, the research also examined and controlled for the overall median area income, unemployment rates, the geographical distinctions between major urban and other areas as well as relative measures of disadvantage and advantage on the four wellbeing outcomes. The geographical distinction in terms of major urban, urban and non-urban balance appear to be a stronger predictor of wellbeing than area income and the rate of unemployment. Living in a major urban as opposed to other urban regional and rural areas is associated with lower overall mental health, satisfaction with safety and the neighbourhood as well as lower odds of being employed once controlling for individual characteristics. Moreover, whether an individual is employed or not seems to be more significantly influenced by the overall income of the area than the rate of unemployment.

Including several absolute area-based measures in the analysis has enabled exploration between area tenure diversity and dimensions of disadvantage. In general, the research found that the overall area income declines as the mix of the area increases. However, areas with high concentrations of social housing and diversity do not necessarily equate with areas of overall disadvantage—predominately due to more recent processes of gentrification in the formerly inner urban working class areas. The area-based mapping indicated a reduction in the level of concentrated social housing over the study period, which may reflect the implementation of social mix policies specifically aimed at breaking up concentrated social housing areas. The mapping also revealed that tenure area diversity is spreading away from the inner areas as more home owners occupy these areas and private renters are moving further outwards into the fringes. Increasing the mix of social and private renters into more affluent areas with relatively low diversity will lower the overall area income and therefore its overall socio-economic profile. Such a strategy is likely to be met with strong opposition by existing residents wishing to maintain the status and housing values of their area. Increasing the tenure mix in the very lowest income areas by creating incentives for owners and higher income renters to move to these areas is likely to lift the wellbeing of the existing 'poorer' residents but may serve to lower the wellbeing of the more affluent residents who will be less prepared to remain in an area if they perceive area decline.

Examining the impact of long-term exposure reveals that it is not necessarily the concentration of social housing in and of itself but the overall disadvantage that matters most for wellbeing overtime. Remaining in areas with high social housing between two consecutive years appears to have limited impact on wellbeing but remaining in the most disadvantaged area does lower wellbeing, particularly for private renters. However, longer term exposure of more than five years lowers overall perceptions of safety and satisfaction with the neighbourhood across tenure groups. While private renters move in and out of these areas, social renters are most likely to have long-term exposure. Having said this, the wellbeing of social renters increases with stability and they typically indicate strong attachments to their area, suggesting that mobility will be detrimental for longer term residents.

Consistent with previous research by Baker et al. 2013, we found that the overall tenure of an individual does not impact upon mental wellbeing once controlling for individual compositional factors. However, home owners typically feel more satisfied with their safety and with their neighbourhoods. Closely linked to this finding is the increase in wellbeing gained across all measures of wellbeing including mental health, satisfaction with safety and the neighbourhood and likelihood of being employed as the duration in the one residence increases, confirming the fundamental importance of housing stability for a social quality of life.

Wellbeing remains strongly shaped by individual experiences and opportunities. However, consistent with a social quality of life framework there is a strong overlap between the factors that promote wellbeing in one domain or outcome and those of another. Individual measures indicative of greater social cohesion and inclusion, such as being a member of a sporting club, being in a relationship, coming from an English-speaking background and higher education level and strong social networks lift both subjective and objective wellbeing. Individual factors that threaten overall socio-economic security such as financial stress, separation and divorce, lower levels of education, English as a second language and having a health condition lowers wellbeing.

4.1 Policy implications and directions for future research

This research has identified several implications for both individual and place-based policies as well as the need to pursue further research to build on the emerging evidence base. The research suggests that understanding the impact of and addressing the adverse consequences of tenure diversity, concentration and the micro conditions of the dwellings of an area remain an important policy goal. The emerging consensus from the national and international policy literature is that pursuing micro social mix policies does not deliver anticipated benefits in terms of social networking but may serve to enhance the quality of the living environment for lower income households. The spatial areas featuring high social housing concentrations in Australia vary widely, from inner city to outer suburban areas, and even further out to regional and remote centres. After controlling for this regional variation there is evidence that concentrations and area diversity do impact upon wellbeing. However, the policy solutions in these different areas will be specific to the locations, suggesting the overarching importance of place-based policies as a policy goal. Improving the quality and safety of neighbourhoods underpins the key goals of both neighbourhood renewal and social mix policies. Localised strategies, such as land use planning and investment in local resources, will be particularly important in lifting wellbeing.

The findings from the descriptive, mapping and modelling analysis indicate that wellbeing of lower income private renters remains a critical concern. Lower income private renters are significantly impacted by area disadvantage and have clear improvements in wellbeing from moving to more advantaged areas. Although overseas literature on concentrations of social housing and disadvantage is used to inform Australian policies, given the dominance of home ownership in Australia there are few areas where the number of renters are higher than owners. A high proportion of long-term, lower income, comparatively mobile private renters is perhaps a more defining factor in the Australian housing policy environment and one warranting closer exploration in terms of policies to leverage positive outcomes from area social mix. The presence of private renters in an area typically increases the social mix but it is not clear how the needs of this group are being addressed from an area-based perspective. This report has shown that their wellbeing is lower on indicators related to socio-economic security, social cohesion and inclusion. The initial Positioning Paper and this research showed that lower income private renters and social renters share many similar attributes and needs but that the latter group is predominately seen as the main policy target group for social mix policies.

Private renters are provided with incentives through the system of income support and rental assistance to move to areas where there are greater employment opportunities. However, such

ideas are based on the assumptions that there is no segmentation in the labour market or that they will be able to access and compete for employment opportunities in these more job rich areas. At the same time, housing costs are typically higher in or near areas with strong labour markets placing private renters at greater risk of financial stress. This research suggests that moving to or remaining in more job rich areas does not necessarily benefit lower income private renters if they do not already have a job to go to. Furthermore, the area maps and previous research outlined in the Positioning Paper show that tenure diversity through increasing the mix of private renters is spreading to the outer metropolitan areas moving further away from job centres and potentially to where housing is more affordable. The presence of a spatial mismatch for this group may be likely in both the inner urban and fringe areas but its causes and consequences may differ.

The question remains as to what social mix policies mean for lower income private renters and if and how they should be pursued. Some degree of mix may be desirable, particularly in the poorest areas, to cultivate a communal sense of area progress rather than decline. As with social renters, the findings in this report point to the potential merit of the provision of affordable housing in the moderately diverse areas and aiming for social mix to be more moderated across locations. Moreover, policy interventions need to focus on developing disadvantaged areas in a way that provides 'hope' for those who remain connected to the areas in the longer term. The idea of an optimal mix would be difficult to attain and would warrant further research. However, the findings suggest that policy-makers need to take a longer term view of social mix and monitor its composition at both the localised and broader area level over time. Very high area diversity can lead to increasing fragmentation among the different groups living in the same 'social space' that, despite close proximity, still remain isolated from each other.

The significant area effects for satisfaction with safety and the neighbourhood among areas with higher concentrations of social housing and tenure diversity suggest that localised strategies of urban renewal will be particularly important in lifting wellbeing and should remain an important policy goal for the existing social housing stock and surrounds. This should not be at the cost of losing vital social housing. The findings of this research suggest that the current policy direction of building smaller dwellings and mixed estates will be able to impact upon wellbeing but the overarching aim should not be to engineer greater social mix from these developments but to engineer good quality housing that is safe with attractive surroundings and that is more conducive to better living standards. The allocation of social housing residents to different types of dwellings should take into account the overall functioning of the individual particularly when allocating to highest density dwellings and areas. Moving residents between social housing properties should also be determined by choice of locations. Simply relocating tenants from important social networks is likely to have a significant impact on wellbeing.

While we have been able to isolate the impact of area-based measures from individual characteristics, wellbeing among individuals is still unevenly dispersed across locations and area-based policies remain relevant to meeting high needs communities. Individual measures of socio-economic insecurity and social connection in line with a social quality of life framework are strong predictors of wellbeing. This suggests that policies seeking to relieve the burdens of financial stress and to foster opportunities for social engagement will have likely benefits in lifting wellbeing as well. At the individual level, policies aiming to lift wellbeing should remain focused on alleviating financial stress and facilitating structures of social support through the creation of localised community engagement.

This research has raised many questions and statistical relationships that need to be further investigated. As argued by van Ham et al. 2012, to advance our understanding of area effects we must combine rigorous statistical longitudinal analysis with detailed ethnographies to understand both the potential causes and their magnitude. More detailed qualitative research would be fruitful that compares the experiences and social relations of lower income renters living across areas of higher and lower diversity to better understand the mechanisms that are

both harmful and beneficial to wellbeing. This should also include examination of the quality of the lived environment across different types of social housing stock. Further research is also warranted on the experiences and outcomes of lower income households living in different geographical areas to further explore ideas of spatial mismatch.

While being able to detect associations with area-based tenure measures the research was limited by the existing size of the spatial units that could be examined over time. The findings based on the SLA measures of tenure concentrations and mix are likely to be somewhat 'diluted'. Stronger results may be observed using fine-grained CCD data in combination with larger areas such as SLAs, although achieving this alongside detailed longitudinal data was not achievable in the current project. Finer scale patterns warrant closer attention, as do 'big picture' differences. The scope of area-based research in Australia, while currently evolving (Mazerolle et al. 2007) is in its infancy compared with the collection of small area longitudinal data available in the European and US context. Research can be significantly enhanced with the availability of better measures of the characteristics of neighbourhoods and smaller area data mapping on the quality of neighbourhoods—the idea of ecometrics as developed by Sampson (2012) for instance would allow greater insights into the relationships and the mechanisms underpinning area effects. Future research could also develop spatial variables to explore whether local tenure mix itself matters, or rather, whether the physical and economic attributes of an area are equally or more important (e.g. social housing concentrated in remote or poorly serviced areas). The latter may reinforce the importance of area planning and resources rather than or in conjunction with social mix policies.

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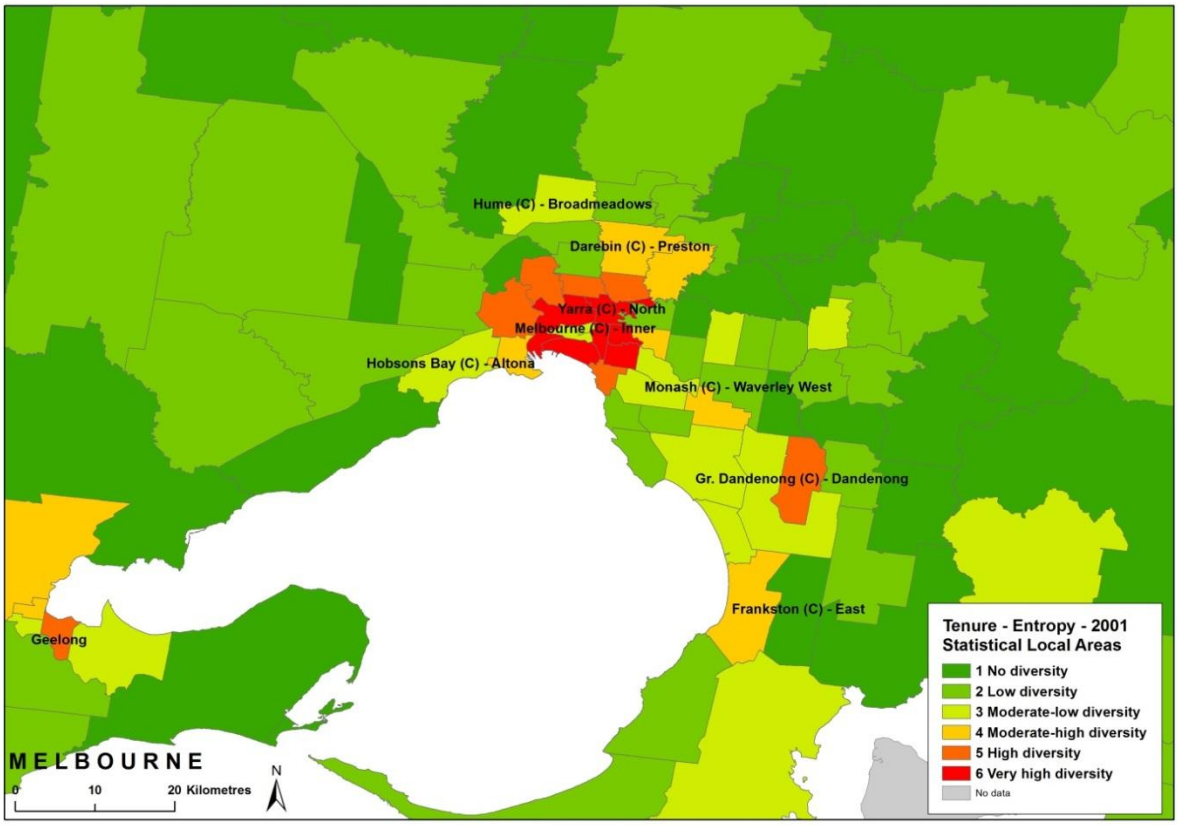
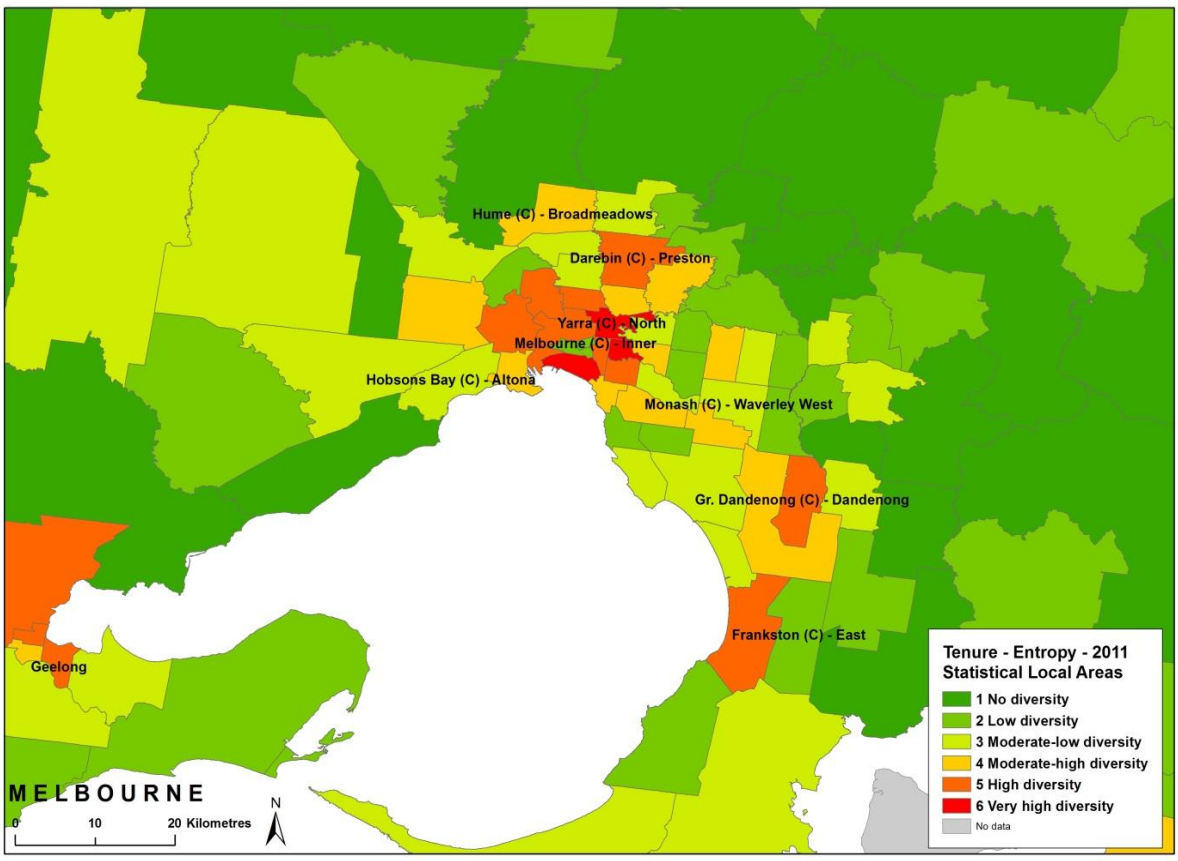
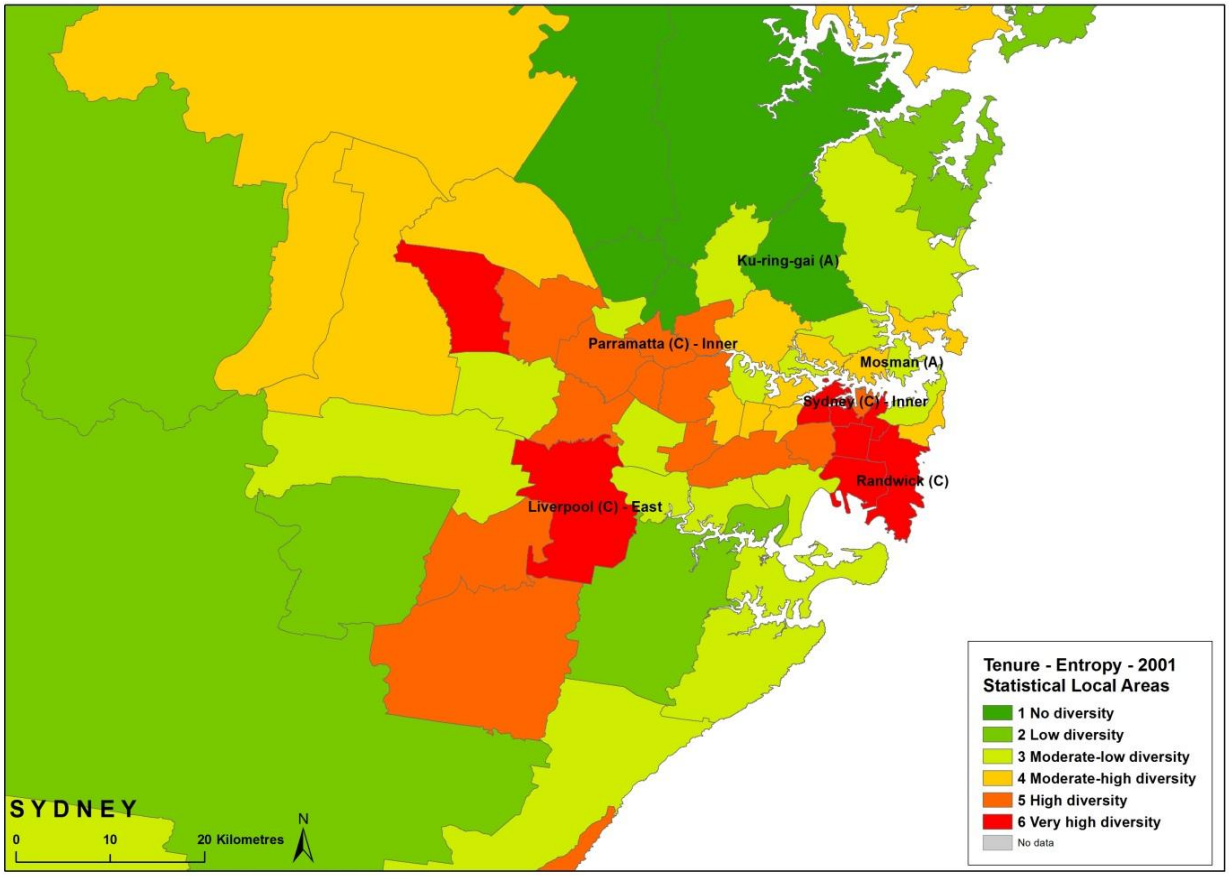
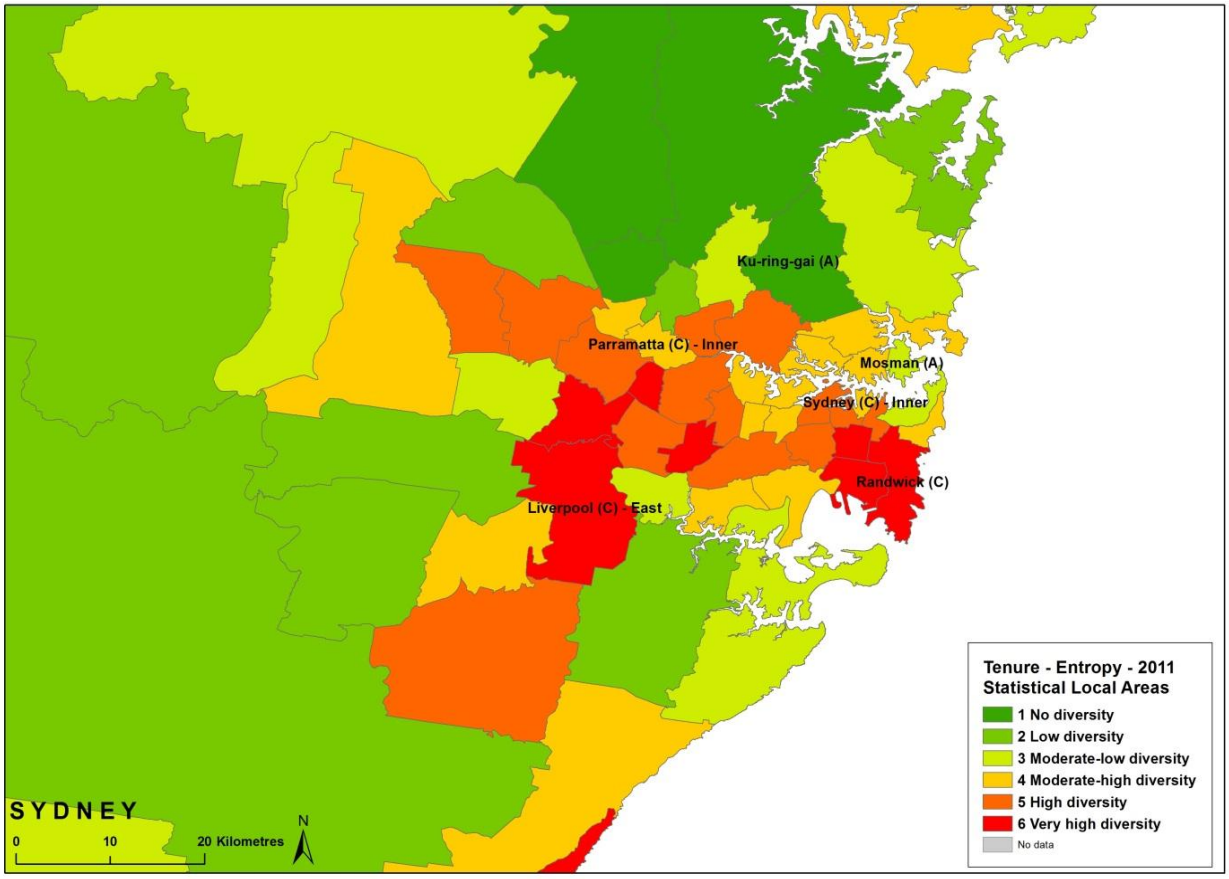
APPENDICES

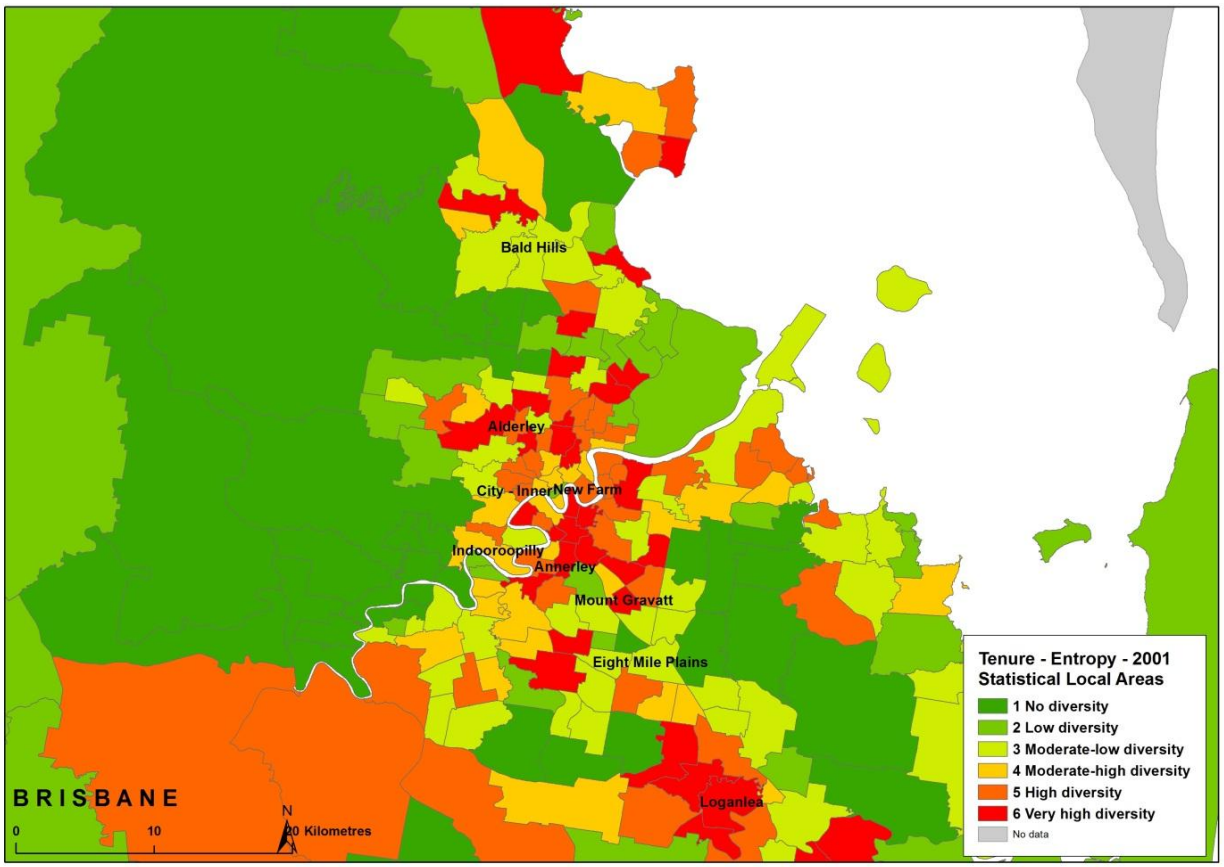
Appendix 1: Area tenure diversity maps

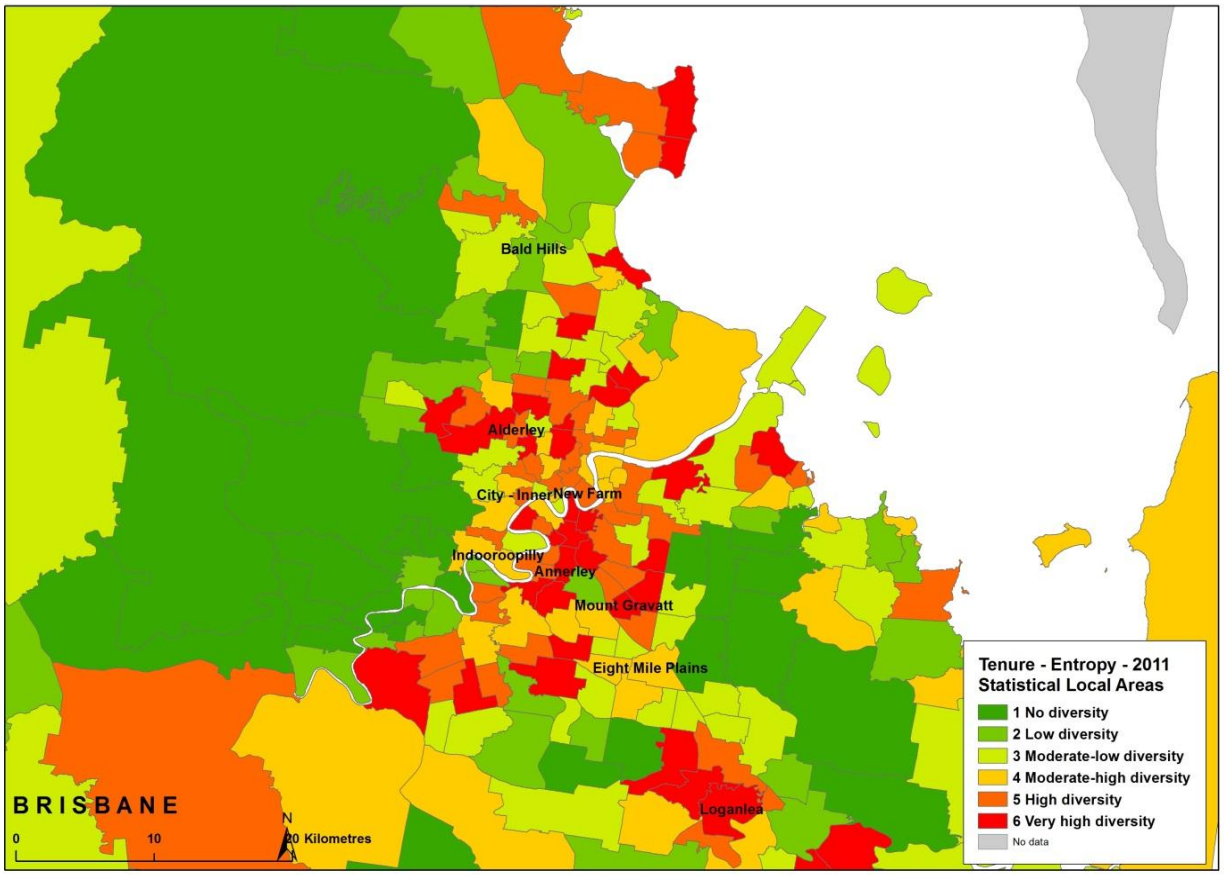


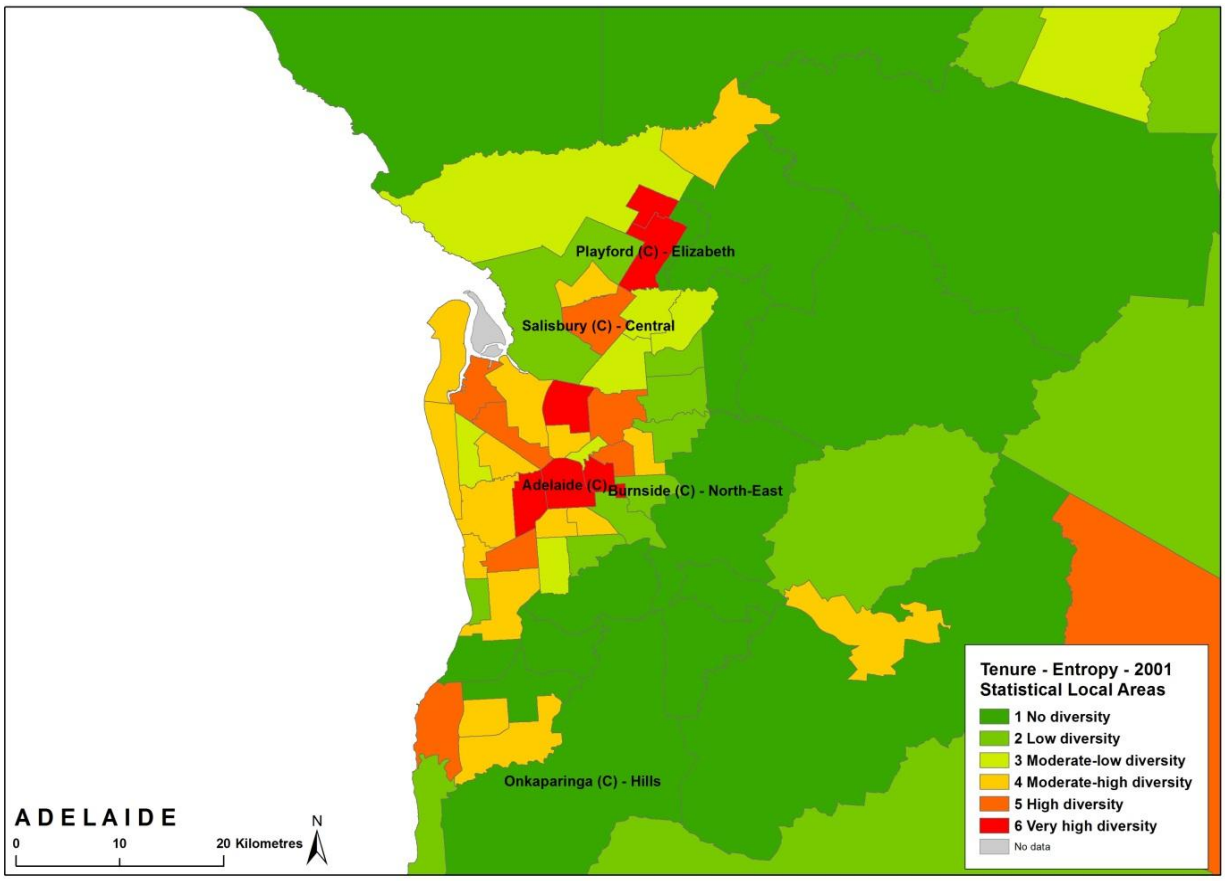


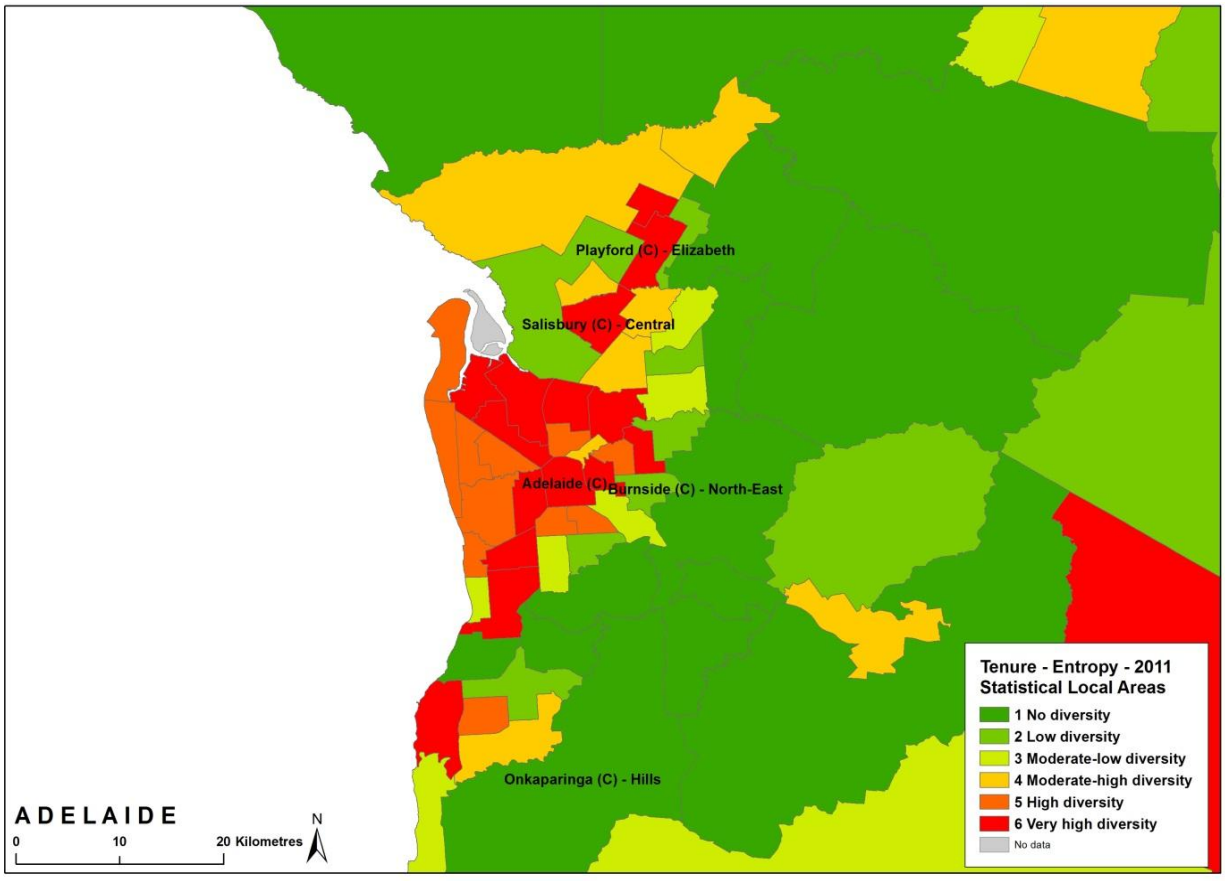

Ku-ring-gai (A)
Parramatta (C) - Inner
Mosman (A)
Sydney (C) - Inner
Randwick (C)
Liverpool (C) - East
Tenure - Entropy - 2001
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data
SYDNEY
0
10
20 Kilometres
N

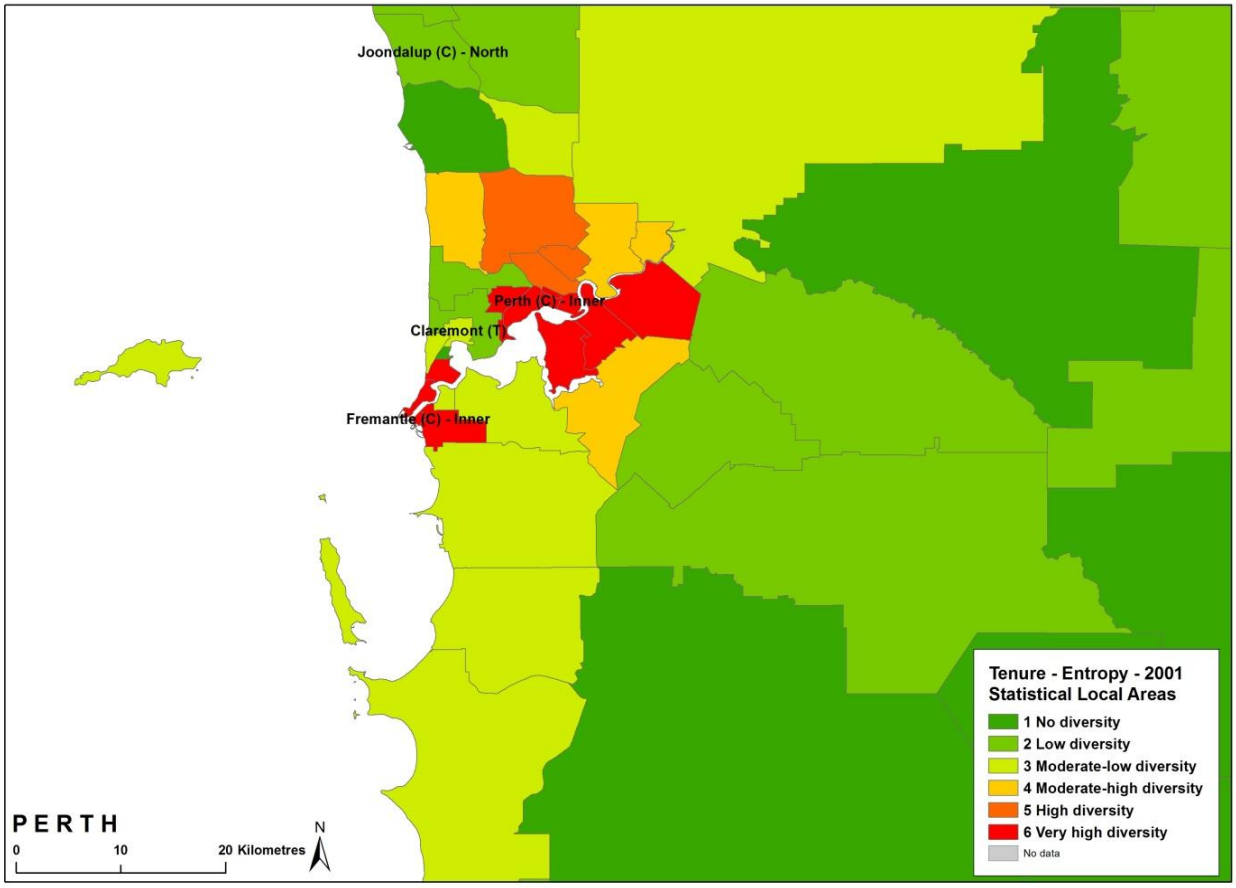

Ku-ring-gai (A)
Parramatta (C) - Inner
Mosman (A)
Sydney (C) - Inner
Randwick (C)
Liverpool (C) - East
Tenure - Entropy - 2011
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data
SYDNEY
0
10
20 Kilometres
N

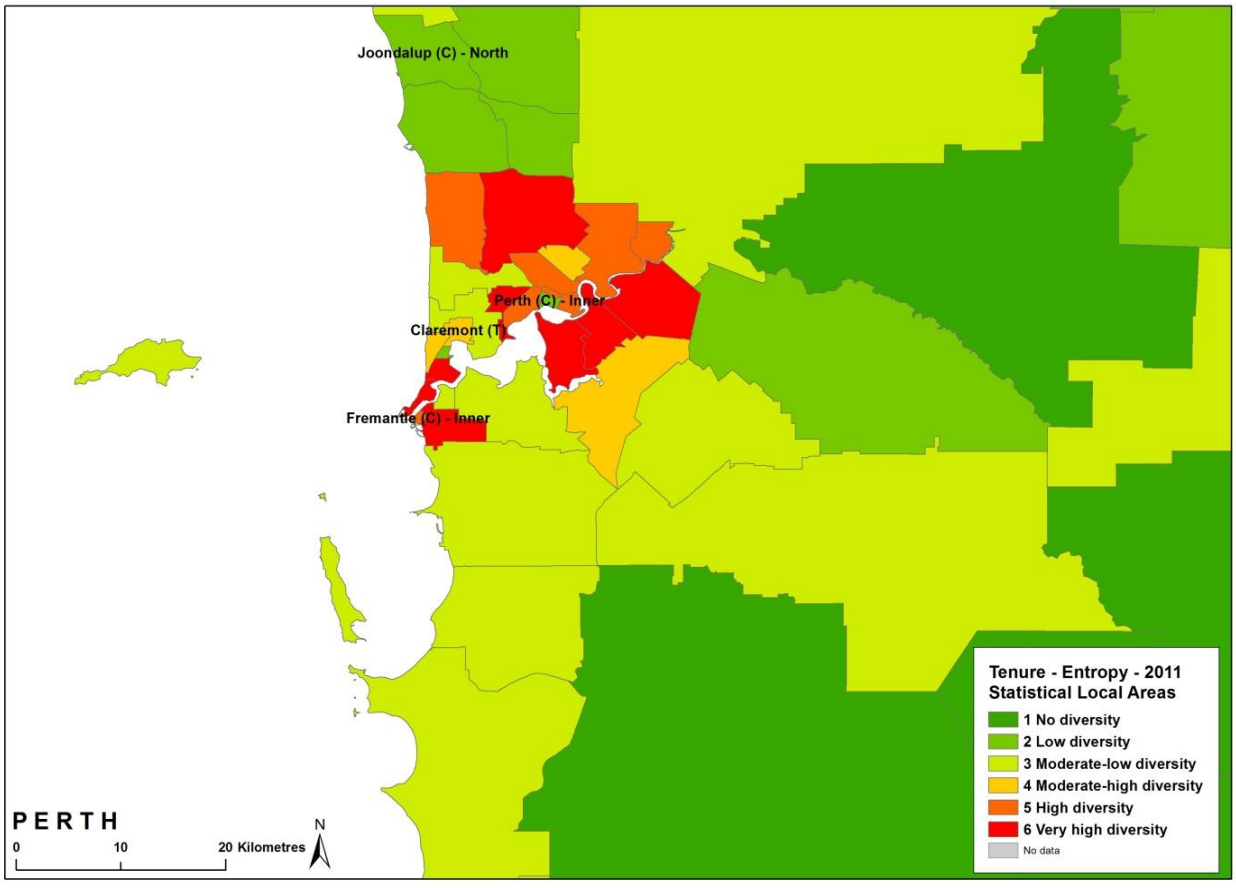

Bald Hills
Alderley
City - Inner
New Farm
Indooroopilly
Annerley
Mount Gravatt
Eight Mile Plains
Loganlea
BRISBANE
0
10
20 Kilometres
N
Tenure - Entropy - 2001
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data


Bald Hills
Alderley
City - Inner
New Farm
Indooroopilly
Annerley
Mount Gravatt
Eight Mile Plains
Loganlea
BRISBANE
0
10
20 Kilometres
N
Tenure - Entropy - 2011
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data


Playford (C) - Elizabeth
Salisbury (C) - Central
Adelaide (C)
Burnside (C) - North-East
Onkaparinga (C) - Hills
Tenure - Entropy - 2001
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data
ADELAIDE
0
10
20 Kilometres
N


Playford (C) - Elizabeth
Salisbury (C) - Central
Adelaide (C)
Burnside (C) - North-East
Onkaparinga (C) - Hills
Tenure - Entropy - 2011
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data
ADELAIDE
0
10
20 Kilometres
N


Joondalup (C) - North
Perth (C) - Inner
Claremont (T)
Fremantle (C) - Inner
Tenure - Entropy - 2001
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data
PERTH
0
10
20 Kilometres
N


Joondalup (C) - North
Perth (C) - Inner
Claremont (T)
Fremantle (C) - Inner
Tenure - Entropy - 2011
Statistical Local Areas
1 No diversity
2 Low diversity
3 Moderate-low diversity
4 Moderate-high diversity
5 High diversity
6 Very high diversity
No data
PERTH
0
10
20 Kilometres
N

Appendix 2: List of variables used in the regression models

List of variables used in models	Variable definition	Measurement
Dependent variables		
SF-36 Mental Health (log)	Continuous variable indicating self-reported mental health, ranging from 0 to 100	Ordinal
Satisfaction with how safe you feel (log)	Continuous variable indicating self-reported satisfaction with safety, ranging from 0 to 10	Ordinal
Satisfaction with the neighbourhood in which you live (log)	Continuous variable indicating self-reported satisfaction with safety, ranging from 0 to 10	Ordinal
Employment participation	Binary variable to denote employment participation	Equal to 1 if employed and 0 if not in the labour force or unemployed
Explanatory variables		
Female	Binary variable to denote female respondents	Equal to 1 if respondent is female; zero if they are male
Male (omitted category)	Binary variable to denote male respondents	Equal to 1 if respondent is male; zero if they are male
Child 0–4 years	Continuous variable to denote the number of children the respondent has that are aged 0 to 4 years	Linear value
Child 5–14 years	Continuous variable to denote the number of children the respondent has that are aged 5 to 14 years	Linear value
Child 15–24 years	Continuous variable to denote the number of children the respondent has that are aged 15 to 24 years	Linear value
Child 25 years	Continuous variable to denote the number of children the respondent has that are aged 25 years or higher	Linear value
Child 0–4 years (mean)	Time invariant across observations to denote the number of children the respondent has that are aged 0 to 4 years, averaged across all data waves in which the respondent appears	Linear value.
Child 5–14 years (mean)	Time invariant across observations to denote the number of children the respondent has that are aged 5 to 14 years, averaged across all data waves in which the respondent appears	Linear value.

List of variables used in models	Variable definition	Measurement
Child 15–24 years (mean)	Time invariant across observations to denote the number of children the respondent has that are aged 15 to 24 years, averaged across all data waves in which the respondent appears	Linear value
Child 25 years (mean)	Time invariant across observations to denote the number of children the respondent has that are aged 25 years or over, averaged across all data waves in which the respondent appears	Linear value
Bill difficulties	Binary variable to denote persons experiencing difficulties paying bills	Equal to 1 if respondent is experiencing bill difficulties; zero otherwise
Seeking financial help	Binary variable to denote persons seeking financial help in the last 12 months	Equal to 1 if respondent has seeked financial help; zero otherwise
Equivalised disposable household income (log)	Continuous variable indicating respondent's equivalised disposable household income	Log value
Equivalised disposable income_mean (log)	Time invariant across observations indicating respondent's equivalised disposable household income, averaged across all data waves in which the respondent appears	Log value
Defacto	Binary variable to denote persons in a de facto relationship	Equal to 1 if respondent is in a de facto relationship; zero otherwise
Defacto_mean	Time invariant across observations to denote persons in a de facto relationship, averaged across all data waves in which the respondent appears	Linear value
Separated	Binary variable to denote persons who are separated	Equal to 1 if respondent is separated; zero otherwise
Separated_mean	Time invariant across observations to denote persons who are separated, averaged across all data waves in which the respondent appears	Linear value
Divorced	Binary variable to denote persons who are divorced	Equal to 1 if respondent is divorced; zero otherwise
Divorced_mean	Time invariant across observations to denote persons who are divorced, averaged across all data waves in which the respondent appears	Linear value

List of variables used in models	Variable definition	Measurement
Widowed	Binary variable to denote persons who are widowed	Equal to 1 if respondent is widowed; zero otherwise
Widowed_mean	Time invariant across observations to denote persons who are widowed, averaged across all data waves in which the respondent appears	Linear value
Single	Binary variable to denote persons who are single	Equal to 1 if respondent is single; zero otherwise
Single_mean	Time invariant across observations to denote persons who are single, averaged across all data waves in which the respondent appears	Linear value
COB main English speaking	Binary variable to denote persons who were born in an English speaking country	Equal to 1 if respondent was born in an English speaking country; zero otherwise
COB other	Binary variable to denote persons who were born in a non-English-speaking country	Equal to 1 if respondent was born in a non-English-speaking country; zero otherwise
Chronic health condition	Binary variable to denote persons with a chronic health condition	Equal to 1 if respondent has a chronic health condition; zero otherwise
Chronic health condition_mean	Time invariant across observations to denote persons with a health condition, averaged across all data waves in which the respondent appears	Linear value
Member of a sporting club	Binary variable to denote persons who are an active member of a sporting/hobby/community-based club or association	Equal to 1 if respondent is member of a club or association; zero otherwise
Employed	Binary variable to denote persons who are in full time or part time employment (persons who are not in the labour force form the omitted category)	Equal to 1 if respondent is employed; zero otherwise
Employed_mean	Time invariant across observations to denote persons who are in full time or part time employment , averaged across all data waves in which the respondent appears	Linear value
Unemployed	Binary variable to denote persons who are unemployed	Equal to 1 if respondent is unemployed; zero otherwise

List of variables used in models	Variable definition	Measurement
Unemployed_mean	Time invariant across observations to denote persons who are unemployed, averaged across all data waves in which the respondent appears	Linear value
Not in the labour force (omitted category)	Binary variable to denote persons who are not in the labour force	Equal to 1 if respondent is not in the labour force; zero otherwise
Age less than 25 years	Binary variable to denote persons who are aged under 25 years	Equal to 1 if respondent is aged under 25 years; zero otherwise
Age less than 25 years_mean	Time invariant across observations to denote persons who are aged under 25 years, averaged across all data waves in which the respondent appears	Linear value
25–34 years	Binary variable to denote persons who are aged between 25 to 34 years	Equal to 1 if respondent is aged between 25 to 34 years; zero otherwise
25–34yrs_mean	Time invariant across observations to denote persons who are aged between 25 to 34 years, averaged across all data waves in which the respondent appears	Linear value
35–44 years	Binary variable to denote persons who are aged between 35 to 44 years	Equal to 1 if respondent is aged between 35 to 44 years; zero otherwise
35–44 years_mean	Time invariant across observations to denote persons who are aged between 35 to 44 years, averaged across all data waves in which the respondent appears	Linear value
45–54 years	Binary variable to denote persons who are aged between 45 to 54 years	Equal to 1 if respondent is aged between 45 to 54 years; zero otherwise
45–54 years_mean	Time invariant across observations to denote persons who are aged between 45 to 54 years, averaged across all data waves in which the respondent appears	Linear value
55–65 years	Binary variable to denote persons who are aged between 55 to 64 years	Equal to 1 if respondent is aged between 55 to 64 years; zero otherwise
55–65 years_mean	Time invariant across observations to denote persons who are aged	Linear value

List of variables used in models	Variable definition	Measurement
	between 55 to 64 years, averaged across all data waves in which the respondent appears	
Bachelor or above	Binary variable to denote persons who hold a Bachelor degree or higher	Equal to 1 if respondent holds a Bachelor degree or higher; zero otherwise
Bachelor or above_mean	Time invariant across observations to denote persons who hold a Bachelor degree or higher, averaged across all data waves in which the respondent appears	Linear value
Diploma/certificate	Binary variable to denote persons who hold a Diploma or Certificate	Equal to 1 if respondent holds a Diploma or Certificate; zero otherwise
Diploma/certificate_mean	Time invariant across observations to denote persons who hold a Diploma or Certificate, averaged across all data waves in which the respondent appears	Linear value
Social support	Index of social support from 0 to 10	Ordinal
Social renter	Binary variable to denote persons renting from a State Housing Authority	Equal to 1 if respondent is a social renter; zero otherwise
Social renters_mean	Time invariant across observations to denote persons renting from a State Housing Authority, averaged across all data waves in which the respondent appears	Linear value
Lower income private renter	Binary variable to denote lower income persons living in a private rental property, where low income is defined as persons whose income falls below the bottom 40 per cent of the income distribution or private renters who are the recipients of government income support including the age pension and family assistance	Equal to 1 if respondent is a lower income private renter; zero otherwise
Lower income private renters_mean	Time invariant across observations to denote lower income persons renting in a private rental property, averaged across all data waves in which the respondent appears	Linear value
Moderate-to-higher income renter	Binary variable to denote moderate-to-high-income persons living in a private rental property, where moderate to high income is defined as persons whose income fall above 40 per cent of the income distribution	Equal to 1 if respondent is a moderate-to-high-income private renter; zero otherwise

List of variables used in models	Variable definition	Measurement
Moderate-to-higher income_mean	Time invariant across observations to denote moderate-to-high-income persons renting in a private rental property, averaged across all data waves in which the respondent appears	Linear value
Home owner	Binary variable to denote persons who are a home owner (omitted category)	Equal to 1 if respondent is a home owner; zero otherwise
Medium density units	Binary variable to denote persons living in medium density unit	Equal to 1 if respondent is living in a medium density unit; zero otherwise
Medium density units_mean	Time invariant across observations to denote persons living in a medium density unit, averaged across all data waves in which the respondent appears	Linear value
High density units	Binary variable to denote persons living in high density unit	Equal to 1 if respondent is living in a high density unit; zero otherwise
High density units_mean	Time invariant across observations to denote persons living in a high density unit, averaged across all data waves in which the respondent appears	Linear value
Caravan	Binary variable to denote persons living in a caravan	Equal to 1 if respondent is living in a caravan; zero otherwise
Caravan_mean	Time invariant across observations to denote persons living in a caravan, averaged across all data waves in which the respondent appears	Linear value
Other type of dwelling	Binary variable to denote persons living in other dwelling types	Equal to 1 if respondent is living in other dwelling type; zero otherwise
Other type of dwelling_mean	Time invariant across observations to denote persons living in other dwelling type, averaged across all data waves in which the respondent appears	Linear value
Duration of residence	Continuous variable to denote number of years the respondent has lived in their current home	Linear value
Level 3		
Area level median household income 1st quintile	Binary variable to denote persons living in an SLA that falls within the lowest quintile of the median household income distribution	Equal to 1 if respondent lives in an SLA in the lowest income quintile;

List of variables used in models	Variable definition	Measurement
		zero otherwise
Area level median household income 2nd quintile	Binary variable to denote persons living in an SLA that falls within the 2nd quintile of the median household income distribution	Equal to 1 if respondent lives in an SLA in the 2nd income quintile; zero otherwise
Area level median household income 3rd quintile	Binary variable to denote persons living in an SLA that falls within the 3rd quintile of the median household income distribution	Equal to 1 if respondent lives in an SLA in the 3rd income quintile; zero otherwise
Area level median household income 4th quintile	Binary variable to denote persons living in an SLA that falls within the 4th quintile of the median household income distribution	Equal to 1 if respondent lives in an SLA in the 4th income quintile; zero otherwise
Area level median household income 5th quintile	Binary variable to denote persons living in an SLA that falls within the highest quintile of the median household income distribution (omitted category)	Equal to 1 if respondent lives in an SLA in the highest income quintile; zero otherwise
Area rate of unemployment 1st quintile	Binary variable to denote persons living in a major statistical region that falls within the lowest quintile of the rate of unemployment distribution. October of interview year	Equal to 1 if respondent lives in an SLA in the lowest unemployment quintile; zero otherwise
Area rate of unemployment 2nd quintile	Binary variable to denote persons living in a major statistical region that falls within the 2nd quintile of the rate of unemployment distribution. October of interview year	Equal to 1 if respondent lives in an SLA in the 2nd unemployment quintile; zero otherwise
Area rate of unemployment 3rd quintile	Binary variable to denote persons living in a major statistical region that falls within the 3rd quintile of the rate of unemployment distribution. October of interview year	Equal to 1 if respondent lives in an SLA in the 3rd unemployment quintile; zero otherwise
Area rate of unemployment 4th quintile	Binary variable to denote persons living in a major statistical region that falls within the 4th quintile of the rate of unemployment distribution. October of interview year	Equal to 1 if respondent lives in an SLA in the 4th unemployment quintile; zero otherwise
Area rate of unemployment 5th uintile	Binary variable to denote persons living in a major statistical region that falls within the 5th quintile of the rate of unemployment distribution. October of interview year	Equal to 1 if respondent lives in an SLA in the 5th unemployment quintile; zero otherwise
No tenure diversity	Binary variable to denote persons living in an SLA with no tenure diversity (omitted category)	Equal to 1 if respondent lives in an SLA with no tenure diveristy; zero otherwise
Moderate to low tenure diversity	Binary variable to denote persons living in an SLA with moderate to low	Equal to 1 if respondent lives in an

List of variables used in models	Variable definition	Measurement
	tenure diversity	SLA with moderate to low tenure diversity; zero otherwise
Moderate high tenure diversity	Binary variable to denote persons living in an SLA with moderate to high tenure diversity	Equal to 1 if respondent lives in an SLA with moderate to high tenure diversity; zero otherwise
High tenure diversity	Binary variable to denote persons living in an SLA with high tenure diversity	Equal to 1 if respondent lives in an SLA with high tenure diversity; zero otherwise
Very high tenure diversity	Binary variable to denote persons living in an SLA with very high tenure diversity	Equal to 1 if respondent lives in an SLA with very high tenure diversity; zero otherwise
No households in social housing	Binary variable to denote persons living in an SLA where there are no households renting from a State Housing Authority	Equal to 1 if respondent lives in an SLA where there are zero households living in social housing; zero otherwise
Moderate % of low households in social housing	Binary variable to denote persons living in an SLA where there are a moderate to low proportion of households renting from a State Housing Authority	Equal to 1 if respondent lives in an SLA where there are moderate to low proportion of households living in social housing; zero otherwise
Moderate to high % of households in social housing	Binary variable to denote persons living in an SLA where there are a moderate to high proportion of households renting from a State Housing Authority	Equal to 1 if respondent lives in an SLA where there are moderate to high proportion of households living in social housing; zero otherwise
High % of households in social housing social housing	Binary variable to denote persons living in an SLA where there are a high proportion of households renting from a State Housing Authority	Equal to 1 if respondent lives in an SLA where there are high proportion of households living in social housing; zero otherwise
Very high social housing	Binary variable to denote persons living in an SLA where there are a very high proportion of households renting from a State Housing Authority	Equal to 1 if respondent lives in an SLA where there are a very high proportion of households living in social housing; zero otherwise

Appendix 3: Model tables

Multilevel model results: mental health static model

Mental health adjusted	Density of the dwelling		Concentration of social housing		Tenure diversity	
Female	-.037[.003]	***	-.038[.003]	***	-.037[.003]	***
Child 0–4years	.005[.003]	*	.005[.003]	*	.005[.003]	*
Child 0–4years_mean	.019[.005]	***	.019 [.005]	***	.019[.005]	***
Child 5–14 years	-.006[.003]	*	-.006[.003]	*	-.006[.003]	*
Child 5–14 years_mean	.009[.004]	*	.009[.004]	*	.009[.004]	*
Child 15-24 years	-.010[.003]	***	-.010[.003]	***	-.010[.003]	***
Child 15–24 years_mean	.010[.004]	*	.010[.004]	*	.010[.004]	*
Child 25 years	-.003[.002]		-.003[.003]		-.003[.002]	
Child 25 years_mean	.002[.004]		.002[.004]		.002[.004]	
Bill difficulties	-.044[.002]	***	-.044[.002]	***	-.044[.002]	***
Seeking financial help	-.049[.003]	***	-.049[.003]	***	-.048[.003]	***
Log equivalent disposable income	.003[.002]	*	.003[.002]	*	.002[.002]	**
Log equivalent disposable income_mean	.016[.005]	***	.016[.004]	***	.016[.004]	***
Defacto	.006[.005]		.004[.005]		.006[.005]	
Defacto_mean	-.024[.007]	***	-.024[.008]	***	-.024[.007]	***
Separated	-.069[.007]	***	-.069[.007]	***	-.069[.007]	***
Separated_mean	-.012[.013]		-.012[.013]		-.012[.013]	
Divorced	-.020[.007]	**	-.020[.007]	**	-.020[.008]	**
Divorced_mean	-.008[.010]		-.008[.010]		-.008[.010]	
Widowed	-.050[.008]	***	-.050[.008]	***	-.050[.008]	***
Widowed_mean	.051[.012]	***	.052[.012]	***	.051[.012]	***
Single	-.021[.007]	***	-.021[.006]	***	-.021[.009]	***
Single_mean	-.003[.009]		-.004[.009]		-.004[.009]	
COB main English speaking	.013[.005]	**	.013[.005]	**	.013[.005]	*
COB other	-.028[.005]	***	-.027[.005]	***	-.027[.005]	***
Chronic health condition	-.064[.002]	***	-.064[.002]	***	-.063[.002]	***
Chronic health condition means	-.089[.006]	***	-.089[.006]	***	-.089[.006]	***
Member of a sporting club	.024[.002]	***	.024[.002]	***	.024[.002]	***
Employed	.022[.003]	***	.022[.003]	***	.022[.003]	***
Employed_mean	.074[.006]	***	.074[.006]	***	.073[.006]	***
Unemployed	-.009[.005]	+	-.009[.005]	+	-.009[.005]	+
Unemployed_mean	.026[.014]	+	.027[.014]	+	.026[.014]	+
Age less than 25 years	-.022[.010]	*	-.021[.010]	*	-.022[.010]	*
Age less than 25 years_mean	-.110 [.015]	***	-.111[.015]	***	-.109[.015]	***
25–34yrs	-.024[.009]	**	-.023[.009]	**	-.024[.009]	**

Mental health adjusted	Density of the dwelling		Concentration of social housing		Tenure diversity	
25–34yrs_mean	-.129[.013]	***	-.129[.013]	***	-.128[.013]	***
35–44 years	-.027[.007]	***	-.026[.008]	***	-.027[.008]	***
35–44 years_mean	-.118[.012]	***	-.118[.012]	***	-.117[.012]	***
45–54 years	-.021[.007]	***	-.020[.007]	***	-.021[.007]	***
45–54 years_mean	-.121[.011]	***	-.121[.011]	***	-.120[.011]	***
55–65 years	-.018[.004]	***	-.018[.005]	***	-.018[.005]	***
55–65 years_mean	-.065[.009]	***	-.065[.009]	***	-.064[.009]	***
Bachelor or above	-.006[.009]		-.006[.009]		-.006[.009]	
Bachelor or above_mean	.015[.010]		.014[.008]		.015[.010]	
Diploma/certificate	.003[.006]		.003[.006]		.003[.006]	
Diploma/certificate_mean	.005[.007]		.006[.007]		.005[.007]	
Social support	.038[.001]	***	.038[.001]	***	.038[.001]	***
Social renters	.018[.009]	*	.029[.018]	+	.028[.016]	+
Social renters_mean	-.048 [.012]	***	-.048[.012]	***	-.047[.013]	***
Lower income private renters	.005[.005]		.016[.008]	*	.017[.009]	*
Lower income private renters_mean	-.044[.009]	***	-.044[.009]	***	-.043[.009]	***
Moderate-to-higher income renters	.006[.005]		-.001[.007]		.003[.007]	
Moderate-to-higher income_mean	-.001[.007]		-.001[.007]		-.001[.007]	
Duration of residence	.002[.001]	**	.002[.001]	**	.002[.001]	**
Medium density units	-.004[.006]		-.005[.004]		-.005[.004]	
High density units	.001[.014]		-.012[.009]		-.011[.009]	
Caravan	-.014[.014]		-.015[.015]		-.014[.014]	
Other type of dwelling	-.001[.010]		-.002[.010]		.001[.010]	
Interactions dwelling						
Social renters * medium density	-.007[.012]					
Social renters * high density	-.077[.033]	*				
Lower income private renters * medium density	.003[.009]					
Lower income private renters * high density	-.012[.027]					
Moderate-to-higher income private renters * medium density	-.001[.008]					
Moderate-to-higher income private renters * high density	-.010[.018]					
Level 3						
Major urban area	-.016[.005]	***	-.017[.005]	***	-.015[.005]	***
Other urban	-.005[.005]		-.005[.005]		-.003[.005]	
Area level median household income 1st quintile	.003[.005]		.003[.005]		.003[.005]	

Mental health adjusted	Density of the dwelling	Concentration of social housing	Tenure diversity
Area level median household income 2nd quintile	-.003[.004]	-.004[.004]	-.003[.004]
Area level median household income 3rd quintile	-.003[.004]	-.005[.004]	-.004[.004]
Area level median household income 4th quintile	-.008[.003] *	-.008[.003] *	-.008[.003] *
Area rate of unemployment 2nd quintile	-.001[.002]	-.001[.002]	-.001[.002]
Area rate of unemployment 3rd quintile	-.003[.002]	-.003[.002]	-.003[.002]
Area rate of unemployment 4th quintile	.002[.002]	.002[.002]	.002[.002]
Area rate of unemployment 5th quintile	-.000[.003]	-8.740[.003]	-.001[.003]
Moderate low tenure diversity	-.007[.003] *		-.008[.004] *
Moderate high tenure diversity	-.005[.004]		-.004[.004]
High tenure diversity	-.003[.004]		.001[.005]
Very high tenure diversity	-.010[.005] +		-.005[.006]
Moderate low % social housing		-.002[.005]	
Moderate high % social housing		-.004[.005]	
High social % housing		.001[.005]	
Very high social % housing		-.003[.006]	
Interactions concentration social housing			
Social renter * % social housing 3		-.017[.022]	
Social renter * % social housing 4		-.014[.021]	
Social renter * % social housing 5		-.022[.021]	
Social renter * % social housing 6		-.018[.022]	
Lower income private rent * % social housing 3		-.011[.011]	
Lower income private rent * % social housing 4		-.001[.011]	
Lower income private rent * % social housing 5		-.014[.011]	
Lower income private rent * % social housing 6		-.040[.013] ***	
High-income private rent * % social housing 3		.017[.008] *	
High-income private rent * % social housing 4		.005[.009]	
High-income private rent * % social housing 5		.012[.008]	
High-income private rent * % social housing 6		-.002[.011]	
Interactions with tenure mix			
Social renter * ten diversity 3			-.017[.019]

Mental health adjusted	Density of the dwelling		Concentration of social housing		Tenure diversity	
Social renter * ten diversity 4					-.004[.020]	
Social renter * ten diversity 5					-.017[.018]	
Social renter * ten diversity 6					-.032[.020]	
Lower income private rent * ten diversity 3					.001[.011]	
Lower income private rent *ten diversity 4					-.019[.011]	+
Lower income private rent * ten diversity 5					-.021[.011]	*
Lower income private rent * ten diversity 6					-.020[.011]	+
High-income private rent * ten diversity 3					.009[.008]	
High-income private rent * ten diversity4					.002[.008]	
High-income private rent * ten diversity 5					-.004[.008]	
High-income private rent * ten diversity 6					.003[.010]	
Constant	3.911[.038]	***	3.912[.037]	***	3.911[.038]	***
Area—level						
No of groups 1,031						
Average no of groups 95.2						
Max 1162						
Min 1						
var(_cons)	.00013		.00013		.00013	
Individual—level						
No of groups 25,858						
Average no of groups 3.8						
Min 1						
Max 10						
var(cons)	.0367		.0367		.0367	
var (Residual)	.036		.0350		.036	
ICC SLA	.002				.002	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Omitted controls include: male, no children, married, country of birth non=English- speaking, out of the labour market, age 65 years or more, no post school qualifications, home owner, detached dwelling, regional/rural area, 5th quintile of area level median income, 1st quintile of area level median income.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing; and 6.Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Multilevel model results: satisfaction with safety and area measures

Satisfaction with safety	Density of the dwelling		Concentration of social housing		Tenure diversity	
Female	-.169[.017]	***	-.170[.017]	***	-.169[.017]	***
Child 0–4 years	.008[.017]		.009[.017]		.007[.017]	
Child 0–4 years_mean	.001[.030]		.001[.030]		.003[.031]	
Child 5–14 years	-.040[.018]	*	-.040[.018]	*	-.040[.017]	*
Child 5–14 years_mean	.008[.023]		.008[.023]		.008[.023]	
Child 15–24 years	.023[.019]		.022[.019]		.023[.019]	
Child 15–24 years_mean	.017[.024]	*	.020[.024]		.017[.024]	
Child 25 years	.026[.021]		.024[.021]		.026[.021]	
Child 25 years_mean	.035[.023]		.037[.023]		.036[.023]	
Bill difficulties	-.118[.016]	***	-.118[.016]	***	-.118[.016]	***
Seeking financial help	-148[.017]	***	-148[.017]	***	-.149[.017]	***
Log equivalent disposable income	.031[.012]	**	.031[.012]	**	.032[.012]	**
Log equivalent disposable income_mean	.167[.024]	***	.166[.024]	***	.167[.024]	***
Defacto	-.011[.031]		-.008[.032]		-.012[.032]	*
Defacto_mean	.019[.045]	***	.019[.045]	***	.023[.045]	
Separated	-.205[.044]	***	-.204[.044]	***	-.204[.045]	***
Separated_mean	-.066[.077]		-.064[.077]		-.063[.077]	
Divorced	-.231[.048]	***	-.230[.048]	***	-.230[.048]	***
Divorced_mean	.030[.062]		.029[.062]		.031[.062]	
Widowed	-.039[.057]		-.039[.057]		-.037[.057]	
Widowed_mean	.064[.074]		.064[.074]		.063[.074]	
Single	-.149[.043]	***	-.148[.043]	***	-.150[.043]	***
Single_mean	.054[.053]		.053[.053]		.057[.053]	
COB main English speaking	.007[.027]		.007[.027]		.006[.027]	
COB other	-.252[.027]	***	-.251[.027]	***	-.251[.027]	***
Chronic health condition	-.098[.014]	***	-.098[.014]	***	-.251[.027]	***
Chronic health condition mean	-.226[.039]	***	-.222[.039]	***	-.226[.039]	***
Member of a sporting club	.057[.012]	***	.057[.012]	***	.057[.012]	***

Satisfaction with safety	Density of the dwelling		Concentration of social housing		Tenure diversity	
Employed	.031[.020]		.031[.020]		.031[.020]	
Employed_mean	-.087[.037]	*	-.089[.037]	*	-.087[.037]	*
Unemployed	.036[.036]		.037[.036]		.036[.036]	
Unemployed_mean	-.362[.085]	***	-.358[.085]	***	-.364[.085]	***
Age less than 25 years	-.170[.072]	*	-.151[.072]	*	-.175[.072]	*
Age less than 25 years_mean	.590[.091]	***	.573[.091]	***	.593[.091]	***
25–34 years	-.215[.061]	***	-.199[.061]	***	-.218[.061]	***
25–34 years_mean	.255[.081]	**	.243[.081]	**	.259[.081]	***
35–44 years	-.207[.053]	***	-.194[.053]	***	-.209[.053]	***
35–44 years_mean	.163[.075]	*	.152[.075]	*	.166[.075]	*
45–54 years	-.175[.045]	***	-.166[.045]	***	-.177[.045]	***
45–54 years_mean	.124[.068]	*	.116[.068]	*	.127[.068]	+
55–65 years	-.074[.033]	*	-.069[.033]	*	-.075[.033]	*
55–65 years_mean	-.004[.055]		-.007[.055]		-.001[.054]	
Bachelor or above	.010[.062]		.008[.062]		.012[.062]	
Bachelor or above_mean	.078[.067]		.079[.067]		.074[.067]	
Diploma/certificate	-.077[.041]	+	-.079[.041]	*	-.077[.041]	+
Diploma/certificate_mean	.040[.046]		.042[.046]		.040[.046]	
Social support	.078[.004]	***	.078[.004]	***	.078[.004]	***
Social renters	-.061[.061]		-.017[.061]		-.139[.102]	*
Social renters_mean	-.099[.075]		-.082[.075]		-.082[.076]	*
Lower income private renters	-.080[.035]	*	-.068[.053]		-.105[.056]	*
Lower income private renters_mean	.077[.052]		.075[.052]		.076[.052]	
Moderate-to-higher income renters	-.074[.027]	**	-.070[.027]	+	-.102[.042]	*
Moderate-to-higher income_mean	-.014[.039]		-.013[.039]		-.011[.039]	*
Medium density units	.022[.037]		-.006[.023]		-.004[.023]	
High density units	.176[.094]	+	.109[.056]	*	.118[.056]	*

Satisfaction with safety	Density of the dwelling		Concentration of social housing		Tenure diversity	
Caravan	-.151[.092]	+	-.156[.092]	+	-.149[.092]	
Other type of dwelling	.088[.064]		.089[.064]		.094[.065]	
Duration of residence	.014[.005]	**	.014[.005]	**	.014[.005]	**
Interactions						
Social renters * medium density	-.066[.075]					
Social renters * high density	-.412[.209]	*				
Lower income private renters * medium density	-.065[.059]					
Lower income private renters * high density	-.047[.179]					
Moderate-to-higher income private renters * medium density	-.022[.051]					
Moderate-to-higher income private renters * high density	-.057[.119]					
Level 3						
Major urban	-.304[.030]	***	-.298[.029]	***	-.306[.030]	***
Other urban	-.105[.029]	***	-.102[.029]	***	-.105[.029]	***
Area level median household income 1st quintile	.054[.034]		.066[.034]	*	.051[.033]	
Area level median household income 2nd quintile	.010[.031]		.016[.031]		.006[.031]	
Area level median household income 3rd quintile	-.005[.028]		-.003[.028]		-.009[.028]	
Area level median household income 4th quintile	-.006[.024]		-.006[.024]	+	-.008[.024]	
Area rate of unemployment 2nd quintile	-.008[.015]		-.009[.015]		-.008[.015]	
Area rate of unemployment 3rd quintile	-.017[.015]		-.018[.016]		-.017[.016]	
Area rate of unemployment 4th quintile	.012[.016]		.012[.016]		.012[.016]	
Area rate of unemployment 5th quintile	.036[.017]	*	.038[.017]	*	.035[.017]	*
Moderate low tenure diversity	-.010[.022]				-.025[.024]	
Moderate high tenure diversity	-.040[.026]				-.029[.029]	
High tenure diversity	-.040[.027]				-.042[.031]	
Very high tenure diversity	-.095[.033]	**			-.118[.039]	**

Satisfaction with safety	Density of the dwelling	Concentration of social housing	Tenure diversity
Moderate low % social housing		-.024[.030]	
Moderate high % social housing		-.041[.032]	
High tenure % social housing		-.026[.033]	
Very high % social housing		-.181[.041] ***	
Interactions percentage social housing			
Social renter * % social housing 3		.131[.138]	
Social renter * % social housing 4		-.162[.130]	
Social renter * % social housing 5		-.097[.125]	
Social renter * % social housing 6		-.114[.131]	
Lower income private rent * % social housing 3		.046[.071]	
Lower income private rent * % social housing 4		-.129[.066] *	
Lower income private rent * % social housing 5		-.030[.065]	
Lower income private rent * % social housing 6		.038[.080]	
Moderate-to-higher income private rent * % social housing 3		-.003[.052]	
Moderate-to-higher income private rent * % social housing 4		-.029[.050]	
Moderate-to-higher income private rent * % social housing 5		-.039[.051]	
Moderate-to-higher income private rent * % social housing 6		.068[.063]	
Interactions with tenure mix			
Social renter * ten diversity 3			.328[.119] **
Social renter * ten diversity 4			.129[.121]
Social renter * ten diversity 5			-.049[.114]
Social renter * ten diversity 6			-.103[.121]
Lower income private rent * ten diversity 3			.004[.068]
Lower income private rent * ten diversity 4			-.029[.069]
Lower income private rent * ten diversity 5			.052[.067]
Lower income private rent * ten diversity 6			.059[.079]
Moderate-to-higher income private rent * ten diversity 3			.060[.052]

Satisfaction with safety	Density of the dwelling		Concentration of social housing		Tenure diversity	
Moderate-to-higher income private rent * ten diversity4					-.040[.052]	
Moderate-to-higher income private rent * ten diversity 5					.021[.052]	
Moderate-to-higher income private rent * ten diversity 6					.124[.061]	*
Constant	5.894[.220]	***	5.899[.220]	***	5.896[.220]	***
Area—level						
No of groups 1,030						
Average no of groups 94.3						
Max 1148						
Min 1						
var(_cons)	.032		.176		.032	
Individual—level						
No of groups 25,504						
Average no of groups 3.8						
Min 1						
Max 10						
var(cons)	.895		.946		.894	
Residual	1.707		1.306		1.707	
ICC SLA	.012		.012		.012	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Omitted controls include: male, no children, married, country of birth non-English-speaking, out of the labour market, age 65 years or more, no post school qualifications, home owner, detached dwelling, regional/rural area, 5th quintile of area level median income, 1st quintile of area level median income.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage of households in social housing; 5. High percentage of households in social housing; and 6.Very high percentage of households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Multilevel model results: Satisfaction with the neighbourhood and area measures

Satisfaction with the neighbourhood	Density of the dwelling		Concentration of social housing		Tenure diversity	
Female	.013[.017]		.013[.018]		.013[.017]	
Child 0–4 years	-.022[.018]		-.022[.018]		-.022[.018]	
Child 0–4 years_mean	-.020[.031]		-.019[.031]		-.020[.031]	
Child 5–14 years	-.020[.018]		-.020[.018]		-.020[.018]	
Child 5–14 years_mean	.014[.024]		.014[.024]		.014[.024]	
Child 15–24 years	-.036[.020]	+	-.037[.020]	+	-.036[.020]	+
Child 15–24 years_mean	.017[.025]		.019[.025]		.017[.025]	
Child 25 years	-.045[.021]	*	-.046[.021]	*	-.045[.021]	*
Child 25 years_mean	.086[.024]	***	.086[.024]	***	.086[.024]	***
Bill difficulties	-.054[.017]	**	-.054[.017]	**	-.054[.017]	**
Seeking financial help	-.043[.017]	*	-.043[.017]	*	-.043[.017]	*
Log equivalent disposable income	-.025[.012]	*	-.025[.012]	*	-.025[.012]	*
Log equivalent disposable income_mean	.093[.025]	***	.093[.025]	***	.092[.025]	***
De facto	.019[.033]		.021[.033]		.020[.033]	
De facto_mean	-.135[.047]	**	-.137[.047]	**	-.135[.047]	**
Separated	.029[.046]	+	.030[.046]		.030[.046]	
Separated_mean	-.274[.080]	***	-.272[.080]	***	-.272[.080]	***
Divorced	-.040[.050]		-.039[.050]		-.038[.050]	
Divorced_mean	-.147[.064]	*	-.149[.064]	*	-.149[.064]	*
Widowed	-.164[.059]	**	-.164[.059]	**	-.162[.059]	**
Widowed_mean	.260[.077]	**	.262[.077]	**	.260[.077]	**
Single	.025[.044]		.026[.044]		.028[.044]	
Single_mean	-.106[.055]	*	-.106[.055]	*	-.106[.055]	*
COB main English speaking	.054[.028]	*	.054[.028]	*	.054[.028]	*
COB other	-.054[.028]	*	-.054[.028]	+	-.054[.028]	+
Chronic health condition	-.104[.015]	***	-.105[.015]	***	-.104[.015]	***
Chronic health condition mean	-.277[.041]	***	-.277[.041]	***	-.280[.041]	***
Member of a sporting club	.059[.012]	***	.060[.012]	***	.060[.012]	***
Employed	-.001[.020]		-.001[.020]		-.002[.020]	
Employed_mean	-.009[.038]	*	-.010[.038]	*	-.010[.038]	*
Unemployed	-.025[.037]		-.026[.037]		-.026[.037]	
Unemployed_mean	-.239[.089]	**	-.238[.089]	**	-.242[.089]	**
Age less than 25 years	.239[.074]	***	.250[.074]	***	.235[.074]	**
Age less than 25 years_mean	-.514[.094]	***	-.524[.094]	***	-.507[.094]	***
25–34 years	.162[.063]	**	.172[.063]	**	.161[.063]	**
25–34 years_mean	-.418[.085]	***	-.426[.085]	***	-.413[.085]	***
35–44 years	.085[.054]		.092[.054]	+	.084[.054]	

Satisfaction with the neighbourhood	Density of the dwelling		Concentration of social housing		Tenure diversity	
35–44 years_mean	-.324[.079]	***	-.331[.079]	***	-.320[.079]	***
45–54 years	.039[.046]		.043[.046]		.038[.046]	
45–54 years_mean	-.257[.071]	***	-.262[.071]	***	-.252[.071]	***
55–65 years	.025[.034]		.028[.034]		.025[.034]	
55–65 years_mean	-.145[.057]	*	-.147[.057]	*	-.139[.057]	*
Bachelor or above	-.044[.064]		-.050[.064]		-.046[.064]	
Bachelor or above_mean	-.030[.069]		-.025[.069]		-.030[.069]	
Diploma/certificate	-.048[.042]	+	-.049[.043]		-.049[.043]	
Diploma/certificate_mean	-.006[.048]		-.006[.048]		-.005[.048]	
Social support	.076[.004]	***	.078[.004]	***	.078[.004]	***
Social renters	-.052[.063]		-.002[.119]		.021[.106]	
Social renters_mean	-.294[.079]	***	-.272[.079]	***	-.289[.079]	***
Lower income private renters	-.055[.037]		-.042[.055]		-.012[.057]	
Lower income private renters_mean	-.080[.054]		-.080[.054]		-.078[.054]	
Moderate- to- higher- income renters	-.093[.028]	**	-.065[.028]		-.128[.044]	**
Moderate- to- higher- income_mean	-.079[.041]	*	-.076[.041]	*	-.076[.041]	+
Medium density units	.013[.039]	*	.051[.023]	*	-.049[.023]	*
High density units	-.002[.098]		-.061[.059]		-.052[.059]	
Caravan	-.167[.096]	+	-.170[.096]	+	-.168[.096]	+
Other type of dwelling	.002[.067]		.008[.067]		.013[.067]	
Duration of residence	.057[.005]	***	.056[.005]	***	.056[.005]	***
Interactions						
Social renters * medium density	-.142[.078]	+				
Social renters * high density	-.711[.226]	**				
Lower income private renters * medium density	-.138[.063]	*				
Lower income private renters * high density	.238[.186]					
Moderate-to-higher income private renters * medium density	-.068[.053]					
Moderate-to-higher income private renters * high density	-.064[.124]					
Level 3						
Major urban	-.302[.036]	***	-.299[.035]	***	-.302[.036]	***
Other urban	-.156[.033]	***	-.149[.033]	***	-.156[.033]	***
Area level median household income 1st quintile	-.073[.040]	+	-.058[.040]	+	-.075[.040]	+
Area level median household income 2nd quintile	-.057[.036]		-.057[.036]		-.059[.036]	+
Area level median household income 3rd	-.087[.032]	**	-.078[.032]	*	-.089[.032]	**

Satisfaction with the neighbourhood	Density of the dwelling		Concentration of social housing		Tenure diversity	
quintile						
Area level median household income 4th quintile	-.047[.027]	+	-.046[.027]	+	-.049[.027]	+
Area rate of unemployment 2nd quintile	.039[.016]	**	.039[.016]	**	.039[.016]	**
Area rate of unemployment 3rd quintile	-.006[.016]		-.007[.016]		-.006[.016]	
Area rate of unemployment 4th quintile	.026[.017]		.026[.017]		.026[.017]	
Area rate of unemployment 5th quintile	-.032[.018]	+	-.029[.018]	+	-.032[.018]	+
Moderate- low tenure diversity	.007[.025]				-.004[.026]	
Moderate high tenure diversity	-.004[.030]				.016[.033]	
High tenure diversity	-.045[.033]				-.026[.036]	
Very high tenure diversity	-.127[.040]	***			-.131[.045]	**
Moderate low % social housing			-.028[.036]			
Moderate high % social housing			-.070[.038]	+		
High % social housing			-.073[.039]	+		
Very high % social housing			-.108[.048]	*		
Interactions concentration social housing						
Social renter * % social housing 3			.098[.144]			
Social renter * % social housing 4			-.072[.136]			
Social renter * % social housing 5			-.197[.130]			
Social renter * % social housing 6			-.219[.137]			
Lower income private rent * % social housing 3			.047[.073]			
Lower income private rent * % social housing 4			-.065[.069]			
Lower income private rent * % social housing 5			-.065[.068]			
Lower income private rent * % social housing 6			-.096[.084]			
Moderate-to-higher income private rent * % social housing 3			-.039[.054]			
Moderate-to-higher income private rent * % social housing 4			-.017[.053]			
Moderate-to-higher income private rent * % social housing 5			-.106[.054]	*		
Moderate-to-higher income private rent * % social housing 6			-.032[.067]			
Interactions with tenure mix						
Social renter * ten diversity 3					.028[.125]	
Social renter * ten diversity 4					-.008[.127]	
Social renter * ten diversity 5					-.300[.119]	*

Satisfaction with the neighbourhood	Density of the dwelling		Concentration of social housing		Tenure diversity	
Social renter * ten diversity 6					-.172[.127]	
Lower income private rent * ten diversity 3					-.012[.071]	
Lower income private rent *ten diversity 4					-.137[.072]	*
Lower income private rent * ten diversity 5					-.089[.070]	
Lower income private rent * ten diversity 6					-.050[.082]	
Moderate-to-higher income private rent * ten diversity 3					.090[.054]	+
Moderate-to-higher income private rent * ten diversity4					-.032[.055]	
Moderate-to-higher income private rent * ten diversity 5					.017[.054]	
Moderate-to-higher income private rent * ten diversity 6					.065[.063]	
Constant	7.201[.232]	***	7.213[.232]	***	7.211[.232]	***
Area—level						
No of groups 1,030						
Average no of groups 94.3 (Max 1148 Min 1)						
var(_cons)	.091		.298		.092	
Individual—level						
No of groups 25,496						
Average no of groups 3.8 (Max 10 Min 1)						
var(cons)	.998		.999		.999	
var (Residual)	1.811		1.346		1.811	
ICC SLA	.032		.031		.032	
Observations	97,091		97,091		97,091	

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Omitted controls include: male, no children, married, country of birth non English-speaking, out of the labour market, age 65 years or more, no post school qualifications, home owner, detached dwelling, regional/rural area, 5th quintile of area level median income, 1st quintile of area level median income.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage households in social housing; 4. Moderate-high percentage households in social housing; 5. High percentage households in social housing; and 6.Very high percentage households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

Multilevel model results: Employment participation and area measures

Employment participation	Density of the dwelling		Concentration of social housing		Tenure Diversity	
Female	.154[.010]	***	.155[.009]	***	.154[.010]	***
Child 0–4 years	.273[.015]	***	.273[.015]	***	.273[.015]	***
Child 0–4 years_mean	.764[.078]	**	.764[.078]	**	.761[.078]	**
Child 5–14 years	.750[.042]	***	.751[.042]	***	.751[.042]	***
Child 5–14 years_mean	1.314[.097]	***	1.314[.097]	***	1.308[.097]	***
Child 15–24 years	1.013[.064]		1.013[.064]		1.013[.064]	
Child 15–24 years_mean	1.011[.081]		1.011[.081]		1.014[.081]	
Child 25 years	.765[.055]	***	.768[.055]	***	.766[.055]	***
Child 25 years_mean	1.081[.090]		1.081[.090]		1.073[.090]	
Log equivalent disposable income	1.646[.065]	***	1.647[.065]	***	1.647[.065]	***
Log equivalent disposable income_mean	8.126[.693]	***	8.126[.693]	***	8.166[.697]	***
Defacto	1.224[.133]	+	1.224[.133]	+	1.228[.133]	+
Defacto_mean	.767[.118]	+	.767[.118]	+	.767[.118]	+
Separated	1.465[.212]	**	1.441[.209]	*	1.457[.212]	**
Separated_mean	1.114[.286]		1.114[.286]		1.128[.290]	
Divorced	1.643[.270]	**	1.639[.266]	**	1.654[.268]	**
Divorced_mean	1.585[.338]	*	1.585[.338]	*	1.598[.340]	*
Widowed	.443[.116]	**	.448[.118]	**	.446[.117]	**
Widowed_mean	2.052[.758]	*	2.052[.758]	*	2.041[.746]	*
Single	1.333[.192]	*	1.328[.192]	*	1.338[.193]	*
Single_mean	.645[.119]	*	.645[.119]	*	.648[.119]	*
COB main English speaking	.730[.072]	***	.730[.072]	**	.727[.072]	***
COB other	.412[.038]	***	.409[.038]	***	.410[.038]	***
Chronic health condition	.579[.030]	***	.579[.030]	***	.579[.030]	***
Chronic health condition mean	.097[.010]	***	.097[.010]	***	.096[.010]	***
Age less than 25 years	1.748[.353]	**	1.713[.346]	**	1.728[.350]	**
Age less than 25 years_mean	14.035[3.720]	***	14.035[3.720]	***	14.246[3.781]	***
25–34yrs	2.318[.373]	***	2.275[.367]	***	2.305[.372]	***
25–34yrs_mean	10.233[2.356]	***	10.233[2.356]	***	10.286[2.352]	***
35–44 years	3.320[.435]	***	3.357[.427]	***	3.310[.435]	***
35–44 years_mean	8.533[1.747]	***	8.533[1.747]	***	8.594[1.761]	***
45–54 years	3.693[.335]	***	3.662[.333]	***	3.689[.335]	***
45-54 years_mean	7.463[1.297]	***	7.463[1.297]	***	7.513[1.307]	***
Bachelor or above	5.041[1.013]	***	5.005[1.007]	***	4.965[.998]	***
Bachelor or above_mean	.426[.093]	***	.426[.093]	***	.435[.095]	***
Diploma/certificate	2.390[.290]	***	2.401[.291]	***	2.399[.291]	***
Diploma/certificate_mean	.890[.125]		.890[.125]		.888[.125]	

Employment participation	Density of the dwelling		Concentration of social housing		Tenure Diversity	
Social support	1.045[.013]	***	1.044[.013]	***	1.044[.013]	***
Social renters	.465[.085]	***	.695[.247]	***	.544[.177]	+
Social renters_mean	.209[.051]	***	.209[.051]	***	.218[.053]	***
Lower income private renters	.379[.039]	***	.492[.077]	***	.432[.069]	***
Lower income private renters_mean	.190[.032]	***	.190[.032]	***	.192[.032]	***
Moderate-to-higher income renters	2.356[.221]	***	2.287[.321]	***	1.895[.275]	***
Moderate-to-higher income_mean	1.714[.240]	***	1.714[.240]	***	1.728[.243]	***
Duration of residence	1.141[.019]	***	1.140[.019]	***	1.141[.019]	***
Major urban	.690[.066]	***	.690[.066]	***	.675[.065]	***
Other urban	.821[.078]	*	.821[.078]	*	.817[.077]	*
Medium density units	1.286[.205]		1.206[.101]	*	1.202[.101]	*
High density units	.435[.148]	*	.683[.145]	+	.690[.147]	+
Caravan	.617[.176]	+	.618[.176]	+	.620[.176]	+
Other type of dwelling	2.069[.473]	***	2.102[.480]	***	2.112[.473]	***
Level 3						
Area level median household income 1st quintile	.662[.070]	***	.639[.068]	***	.656[.070]	***
Area level median household income 2nd quintile	.890[.086]		.857[.085]		.886[.086]	
Area level median household income 3rd quintile	.995[.088]		.957[.086]		.993[.088]	
Area level median household income 4th quintile	1.088[.087]		1.075[.087]		1.084[.087]	
Area rate of unemployment 2nd quintile	.958[.050]		.961[.050]		.961[.050]	
Area rate of unemployment 3rd quintile	.969[.051]		.970[.051]		.972[.051]	
Area rate of unemployment 4th quintile	.899[.049]	*	.896[.049]	*	.900[.049]	*
Area rate of unemployment 5th quintile	1.028[.059]		1.025[.059]		1.028[.059]	
Moderate low tenure diversity	.981[.069]				.965[.075]	
Moderate high tenure diversity	1.162[.096]	+			1.194[.110]	*
High tenure diversity	1.265[.112]	**			1.271[.127]	*
Very high tenure diversity	1.163[.124]				1.034[.133]	
Moderate low % social housing			1.242[.121]	*		
Moderate high % social housing			1.225[.125]	*		
High % social housing			1.566[.165]	***		
Very high % social housing			1.452[.191]	**		
Area—level						
No of groups	1026		1026		1026	
Average no of groups Max Min	84.5 Max 1032 min 1		84.5 Max 1032 min 1		84.5 Max 1032 min 1	

Employment participation	Density of the dwelling	Concentration of social housing	Tenure Diversity
var(_cons)	.142	.149	.149
Individual—level			
No of groups	23,943	23943	23943
Average no of groups Min Max	Max 1032 min 1	Max 1032 min 1	Max 1032 min 1
var(cons)	10.22	10.26	10.26
ICC SLA	.010	.011	.011
No observations	86, 692	86, 692	86, 692

a. +p <0.10, *p <0.05, ** p <0.01, *** p<0.001. Standard errors shown in parenthesis. Based on a sample of those aged 65 years and below. Omitted controls include: male, no children, married, country of birth non-English-speaking, age 55 years or more, no post school qualifications, home owner, detached dwelling, regional/rural area, 5th quintile of area level median income, 1st quintile of area level median income.

b. Area percentage of social housing: 1. No/very low percentage households in social housing (omitted); 2. Low percentage of households in social housing (omitted); 3. Moderate-low percentage of households in social housing; 4. Moderate-high percentage of households in social housing; 5. High percentage of households in social housing; and 6.Very high percentage of households in social housing.

c. Area tenure diversity groups includes: 1. No/very low tenure diversity (omitted); 2. Low tenure diversity (omitted); 3. Moderate-low tenure diversity; 4. Moderate-high tenure diversity; 5. High tenure diversity; and 6. Very high tenure diversity.

d. Cross level interactions are included in the model and are presented as predicted probabilities in the main section of the report

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