

Housing Affordability, Tenure and Mental Health in Australia and the United Kingdom: A Comparative Panel Analysis

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ABSTRACT

The paper contributes insights into the role of tenure in modifying the relationship between housing affordability and health, using a cross-national comparison of similar post-industrial nations – Australia and the United Kingdom – with different tenure structures. The paper utilises longitudinal data from the Household, Income and Labour Dynamics in Australia Survey (HILDA) and British Household Panel Survey (BHPS) to examine change in the mental health of individuals associated with housing becoming unaffordable and considers modification by tenure. We present evidence that the role of tenure in the relationship between housing and health is context dependent and should not be unthinkingly generalised across nations. These findings suggest that the UK housing context offers a greater level of protection to tenants living in unaffordable housing when compared with Australia, and this finds expression in the mental health of the two populations. We conclude that Australian governments could improve the mental health of their economically vulnerable populations through more supportive housing policies.

Key words

Housing affordability, tenure, mental health, Australia, United Kingdom

Introduction

Housing researchers have often been critiqued for the under-theorisation of their subject (Clapham, 2005; Kemeny, 1992; O'Neill, 2008) but over the past decades many housing researchers have either contributed to wider theoretical debates, or applied these perspectives to the housing field (see, for example, Jacobs & Atkinson, 2008; Jacobs *et al.*, 2004). Through the 1990s the 'risk society' perspective exerted a considerable influence on sociology and related disciplines, with Beck (1992; 2000) and Giddens (1999) key contributors to these debates. The risk perspective continues to offer valuable insights into both the vulnerabilities and life experiences of individuals, as well as the reframing of government policy interventions. This perspective has argued that the reshaping of economic and social structures since the Fordist era has eroded previously unquestioned certainties, resulting in a process of 'individualisation' in which individuals and social groups are confronted by the risks, and opportunities, of a much less predictable environment. Giddens (1999) argued that key social institutions have sought to minimise their exposure to risk and have adopted a range of strategies that reduce the volume of risk faced, and create malleability in the face of uncertainty. One of the primary outcomes has been a shifting of risk away from the institutions of government to individuals (for example Hacker, 2004). In the mid 20th Century the public sector limited the level of risk within society through a comprehensive welfare state, strongly developed social institutions (such as family, stable community structures and religion), as well as widespread wage employment. However, in the latter part of the 20th Century a combination of social, economic and political processes weakened social institutions and traditional roles, and introduced new ways of engaging with wage-labour, including contracting out of work previously performed by employees, that transferred risk to workers.

The impact of risk society on contemporary housing and housing policy is evident across the developed world. Increasingly, housing policies in advanced economies expose vulnerable individuals to increased levels of risk. This can find expression in many ways: through inadequate subsidies to low income households in the private rental market; through the contraction of public or social housing provision thus forcing greater numbers of poorer households into the market; and a 'clawing back' of the advantages associated with social housing, such as the erosion of security of tenure. Home owners and home purchasers are not exempt from risk, with the policies of government contributing to a housing affordability 'crisis' that excludes many younger persons ('generation rent') from buying their home (Beer *et al.*, 2007), while older generations express concern about the cost of maintaining their increasingly valuable homes. Importantly, the policy expression of 'risk society' can vary across nations; even those that are socially and economically similar. The exposure of financially vulnerable households to higher levels of risk in their accommodation implies greater risk not only of temporary outcomes such as eviction or other forced movement through the housing market (Beer *et al.*, 2006; Slatter & Beer, 2003), but also potentially of longer term, and possibly permanent, outcomes, including impacts on health.

The public health literature acknowledges the importance of the social determinants of health – the range of 'upstream' social and economic conditions that shapes the wellbeing of individuals – and housing occupies an important position within this framework (Braubach, 2011; Commission on Social Determinants of Health, 2008). Housing has been most often conceptualised in terms of its physical (e.g. exposure to toxins, cold, damp and physical

health) rather than its social and economic dimensions (Evans *et al.*, 2000; Free *et al.*, 2010; Lloyd *et al.*, 2008). Importantly, few studies have explored complexity within housing, for example there have been few analyses of the intersections between housing affordability and tenure (Mason *et al.*, 2013). Moreover, only a limited number of studies have made comparisons across countries to examine how social and policy context might shape the dimensions of individual wellbeing, despite the acknowledged importance of context in examining the social determinants of health (Libman *et al.*, 2012).

This study compares the relationship between affordability and mental health relationship by tenure, in two nations: Australia and the United Kingdom. Evidence suggests that unaffordable housing is related to poorer mental health across a range of post-industrialised countries, including the United Kingdom and Australia. In an analysis of the British Household Panel Survey, Taylor *et al.* (2007) found that increases in anxiety could be attributed to the inability to meet ongoing housing costs, and this impact was independent of the effects of financial hardship more generally for both male and female heads of household. Curl & Kearns (2015) found a strong association between increased affordability difficulties and declining mental health across fifteen deprived neighbourhoods in the United Kingdom. Similarly, in a recent Australian study it was found that individuals living in low- to moderate-income households experienced poorer mental health and wellbeing when their housing was unaffordable compared to when it was affordable (Bentley *et al.*, 2011). Like Taylor *et al.* (2007), both these studies also provided evidence that unaffordable housing appears to have an impact on mental health over and above the effects of financial hardship.

Tenure (home ownership, or private or public rental) is also frequently placed at the center of the housing and health relationship. Perhaps the most useful conceptualization of this is via the material and meaningful roles of housing. Dunn (2002) separates these two influences, such that the material dimensions are represented for example by the costs of housing, the physical location and conditions, and the wealth created or stored, the meaningful dimensions capture housing's role across status, security, and control. Tenure operates across both of these dimensions within the housing and health relationship, influencing, for example, the quality of dwellings as well as the ontological security provided.

Indeed tenure is most commonly cited within the housing and health relationship through its transmission of ontological security (Clapham, 2005; Dupuis & Thorns, 1998; Nettleton & Burrows, 1998). Shaw (2004) suggests that 'owning rather than renting a home confers ontological security – a sense of control and mastery' (p. 408). Shaw relates this to general wellbeing and mental health.

Average mental health appears to differ across the three main tenure types (ownership, private rental, social housing/public housing), in Australia (Baker *et al.*, 2013), and the United Kingdom (Searle *et al.*, 2009). Though there is evidence that tenure is part of the housing and health relationship, the extent to which it generates poor health, in and of itself, is uncertain. While UK studies have shown that renters report poorer health than home owners or purchasers (e.g. Gibson *et al.*, 2011; Macintyre *et al.*, 2003), a recent examination of the relationship between housing tenure and mental health in Australia found that differences in mental health between tenures were most likely a product of the characteristics of people by tenure rather than the result of any causal effect of tenure (Baker *et al.*, 2013). There is evidence in Australia, however, that suggests that tenure modifies the effect of the

relationship between housing affordability and mental health in that country. Recently, Mason *et al.* (2013) found that tenure may be an important factor in determining how individuals experience and respond to housing affordability problems in Australia. This study used fixed effects, longitudinal regression analysis to test the impact of housing becoming unaffordable for home purchasers and private renters. The analysis observed change amongst individuals in mental health associated with shifts in housing affordability. This analytic technique controls for all time-invariant confounding factors (e.g. sex, early life socioeconomic position, personality, or ethnicity). The authors concluded that private renters appear to be more vulnerable to negative mental health effects of unaffordable housing when compared to home purchasers. This observation, may in part, underlie what many identify as ontological security and identity benefits of home ownership – that the mental health of individuals is enhanced by the capacity of homeownership to instil a sense of belonging and a sense of personal worth (Clapham, 2005). However, it is difficult to generalise these findings to other nations with any confidence given structural conditions within the Australian housing system – including tax arrangements, metropolitan primacy, tenure history and the legislative foundation of the private rental market – that distinguish it from other countries.

A comparison of the housing systems

There are distinct contextual differences in between the UK and Australian housing markets. In Australia, there is a long history of a preference for homeownership (Paris, 1993; Williams, 1984), while private rental is widely regarded as a tenure of transition towards homeownership (Beer & Faulkner, 2011), and social housing is solidly seen as a welfare ‘safety net’ for those unable to own or rent in the private market (Beer *et al.*, 2011). By contrast, in the UK private rental housing occupies a different niche within the national housing system: private rental housing is occupied by just 17 per cent of all households (compared with 25 per cent in Australia) in 2011/12 (Table 1). Further, compared to Australia’s small proportion of social housing (4 per cent) the UK has a substantially larger social housing stock (17 per cent), with approximately 9 per cent of the housing provided by governments – councils – and a similar proportion provided by other social landlords – the housing associations (Pawson & Mullins, 2010). Government-provided housing assistance in the United Kingdom is also far more generous than in Australia, with Housing Benefit providing up to three times the assistance available in Australia (Jacobs *et al.*, 2004).

Table 1: Tenure type across households in Australia and the United Kingdom

Tenure type	Australia 2011/12 (8,630,428 households)	UK 2011/12 (22,040,000 households)
Outright owner	31%	32%
Purchasing a home	37%	34%
Private rental	25%	17%
Social housing	4%	17%

Sources: Australian Bureau of Statistics cat no 4130.0 and Office for National Statistics (Office for National Statistics 2012)

In fact, the two national rental subsidy schemes differ fundamentally in their application: the UK's Housing Benefit has the capacity to provide up to 100 per cent of a low income households rent, regardless of whether the household lives in social housing or in private rental housing and irrespective of rent paid. By contrast the Australian Government's Commonwealth Rent Assistance (CRA) payment is restricted to private tenants and is a much more modest payment. The magnitude of the difference in these two income support mechanisms is illustrated most clearly by total outlays. In 2013-14 Housing Benefit expenditures by the UK Government totalled £23.8 billion, compared with the \$3.3 billion spent by the Australian Government on CRA. Critically, there is no capacity – or intent – for CRA to meet the full cost of rental (Australian Bureau of Statistics 2012).

Cross-national comparisons of the effect of housing systems on health are important. Literature on the social determinants of health emphasises the political economy of health, and how politics and public policy act together to influence health. Australia and the United Kingdom's housing systems embody different political and policy contexts. Australia's much smaller social housing sector, for example, has a much more residualised level of disadvantage (as described in Baker, 2008). Further, social housing is less common and likely more stigmatised in Australia (as described in Arthurson, 2004). Recipients of social housing in Australia also receive less support than social renters in the UK. Attention to these cross-national differences provides important policy lessons because both jurisdictions are experiencing a change in housing systems. As a case in point, the UK is currently experiencing a transition in the housing market towards less provision of social housing. In 2012, for the first time since records began, the proportion of private renters in the UK housing market was as large as the proportion of social renters. Social renting has been declining in the UK since 1980 and this decline is expected to continue in the context of welfare reform by the new (from May 2015) UK government. In this paper we adopt a comparative approach using two similar longitudinal panel surveys to investigate if the impacts of housing tenure and unaffordable housing on mental health differ between Australia and the UK.

Specifically, we address the following research questions:

- 1) Does the proportion of low to moderate income households in unaffordable housing differ between tenure types in Australia and the United Kingdom?
- 2) Does tenure (being a private renter or mortgagee) modify the effect of housing affordability on mental health in both Australia and the UK?

Method

Australian Data

The Australian component of this study uses data from the Household, Income and Labour Dynamics in Australia (HILDA) survey (Summerfield *et al.*, 2011). HILDA is a nationally representative panel survey of Australian households and individuals, with data collected on a range of topics including income, employment, housing, health and wellbeing. HILDA has been conducted annually since 2001. Information is collected from household members

aged 15 years and over using face-to-face interviews and self-completion questionnaires. All annual waves from 2001 to 2008 were included in these analyses.

British Data

The British component of this survey uses data from the British Household Panel Survey (BHPS). The BHPS sampled households in Great Britain annually between 1991 and 2009. Like HILDA, it is longitudinal and nationally representative sample of private households. Originally, the BHPS consisted of 5000 households, and all eligible adults (aged >16 years at each wave) within them were followed up and interviewed. Annual waves from 2001 to 2008 were included in these analyses in order to achieve comparability with the HILDA sample described above.

Sample

The analysis described in this paper is based upon 8481 responses from 2239 HILDA participants and 9184 responses from 2269 BHPS participants aged between 25 and 64 years. We selected those aged at least 25 years in order to exclude younger adults who may still be living with parents and not directly responsible for housing costs and as well as persons younger than 65 years so as to focus on working-age people. On the basis of previous work (Bentley *et al.*, 2011), we expected any mental health effect of unaffordable housing to be observed only in low-to-moderate income households, due to the greater capacity of higher-income households to absorb changes in housing costs. The samples were therefore restricted to people living in lower-income households, defined as households with an average equivalised disposable income in the lowest 40 per cent of the national distribution (using the national average 40th percentile over the each year from 2001 to 2008 as the cut off). The sample was also restricted to homeowners servicing a mortgage (herein referred to as home purchasers) and private renters. Home owners without a mortgage were excluded because their housing is assumed to be affordable. While social renters are an important group, they exist in the Australian sample only small numbers (less than four per cent of Australian households) and therefore social renters were excluded from the analysis (Australian Bureau of Statistics, 2011).

The sample for each survey year is described in Appendix Table 1.

Predictor variables

Individuals were classified as being in unaffordable housing if their rent or mortgage payments exceeded 30 per cent of their gross household income; an indicator of housing cost burden. As the sample had already been restricted to the lowest 40 per cent of the national income distribution, unaffordable housing defined in this way is equivalent to the simple yet widely used and well-validated '30/40' indicator of housing affordability (Nepal *et al.*, 2010). This measure of housing affordability has been applied widely in North America (Hulchanski, 1995; Linneman & Megbolugbe, 1992), Australia (Baker *et al.*, 2013) and Europe (Whitehead, 1991), although alternative measures have been proposed (for example Stone, 2006). By restricting the analysis to the lower 40 per cent of the income distribution we ensure that the same proportion of income spent on housing represents an equivalent financial burden for households with different incomes – a limitation acknowledged by others in recent work in this field (Pollack *et al.*, 2010). An individual's housing was classified as

affordable when household rent or mortgage payments were less than or equal to 30 per cent of gross household income.

In the HILDA survey, income and housing payment information was self-reported. At each wave, 9% to 15% of income values were imputed by the data custodians (Watson, 2008). This imputation was undertaken to address bias likely to result from missing data. In the BHPS, housing and income data are also self-reported. In about one-third of cases, self-reported income was matched to payslips, providing further validation of earnings (Jenkins, 2010).

Outcome variables

This study uses two subjective measures of mental health: the mental health subscale of the Short Form 36 measure (SF-36) for HILDA and the 12-item General Health Questionnaire (GHQ-12) for the BHPS. Although different, these self-reported measures of mental health have been demonstrated to have similar psychometric properties and have been compared in previous research (Failde *et al.*, 2000; McCabe *et al.*, 1996). Further, sensitivity testing using the 1999 wave of the BHPS, which includes both the SF-36 and GHQ-12, shows these two measures are highly correlated ($r = -0.69$, $p < 0.001$).

The SF-36 is a widely used self-completion measure of health status (Coons *et al.*, 2000), and has been validated for use in the Australian population (McCallum, 1995) and capable of detecting within-person change over time (Hemmingway *et al.*, 1997). A higher score on the mental health subscale (which ranges from 5 to 30) reflects better mental health. The GHQ-12 has been used extensively in the UK and in a variety of other settings as a tool for describing population mental health (McCabe *et al.*, 1996), and shown to be robust to annual retest effects (Pevalin, 2000). A higher score on this measure (which ranges from 0-36) reflects worse mental health. Both the SF-36 and the GHQ-12 have been used widely in cross-national research.

Interaction with tenure type

We included in the regression model for each country an interaction term for housing tenure and affordability, allowing us to address the key research question in this analysis: whether the mental health and wellbeing of people in different tenure types was differentially affected by unaffordable housing. On the basis of the regression coefficients generated by these models, we calculated tenure-specific estimates of differences in the respective mental health scores associated with affordable and unaffordable housing; that is, measures of the association between housing affordability and mental health were estimated separately for home purchasers and private renters. As previously noted, social renters were excluded from the analyses as too few social rental households were present in the Australian sample to offer a point of comparison.

Statistical analysis

All statistical analyses were performed using Stata 11.0 (StataCorp., College Station, TX, USA). To provide a description of the analytic sample, we calculated the mean age, household income and mental health scores of renters and home purchasers according to their housing affordability category for each country's dataset. We then used a linear fixed-effects longitudinal regression model to estimate the average within-person change in

mental health and wellbeing associated with housing becoming unaffordable. By estimating only within-person differences, these models essentially model change in the outcome associated with change in the exposure, allowing stronger causal inferences to be made about any observed associations.

Earlier work reported the outcomes of comparable analysis for the Australian data but for a different mental health outcome (Mason *et al.*, 2013). In that paper, and again here, the models were adjusted for age group (25-44 and 45-64 years), survey year, change of residence and equivalised household income. These adjustments were deemed necessary as each could contribute to observed differences in mental health independently of the affordability of housing. The analysis also separated out the effect of housing affordability from the effect of financial hardship more generally by adjusting for income. This adjustment was necessary because of the close links between housing affordability and income; that is, lower income households generally pay a greater proportion of their income on housing (Australian Bureau of Statistics, 2011). We used equivalised disposable household income (centred at year-specific sample mean and scaled by \$100) for this adjustment in order to also control for changes in household size and structure, which may additionally affect affordability and/or mental health. Further, this income measure was different to that used to generate the indicator of unaffordable housing (gross household income) so as to avoid correlation between variables within the model. Models were estimated with and without income (results not shown) to ensure that inclusion of income in the models did not result in an overestimate of associations.

As fixed-effects models were used, it was not necessary to adjust the model for potential confounders that remain constant over time, such as sex, ethnicity or personality. Fixed-effects models also overcome the problem of residual confounding by unmeasured time-constant characteristics that differ between people. Robust standard errors were used in the model estimation to account for within-person clustering of observations over time.

We estimated changes in mental health associated with unaffordable housing for renters and home purchasers separately, through the inclusion of an interaction term between tenure and affordability, and then using the Stata post estimation *lincom* command to combine coefficients and generate appropriate confidence intervals. The p-value estimated for the interaction term provided an indication of whether the relationship between housing affordability and mental health was different for renters and home purchasers.

Results

Similar proportions of observations in each sample (around 22 per cent in Australia and 17 per cent in the UK) were in unaffordable housing between 2001 and 2008 (Table 2). Importantly, descriptive data indicate that many more private rental households were in unaffordable housing in Australia than the UK (40 per cent compared to 23 per cent).

In both Australia and the UK, the mean mental health score of home purchasers was more favourable than for private tenants (that is, the score for home purchasers was higher on average in Australia and lower in the UK), for both those whose housing was affordable and unaffordable (Table 2). Similarly, in both countries, even in a sample restricted to low-to-moderate income households in the lowest 40% of the income distribution, households below the sample median income were more likely to be in unaffordable housing than households above it. Twenty-eight per cent of households in Australia and 29% o

Table 2. Description of analytic sample, adults aged 25 to 64 years, low-to-moderate income households, Australia and the United Kingdom 2001-2008

	AUSTRALIA (HILDA)					UNITED KINGDOM (BHPS)				
	Affordable			Unaffordable (22% of total obs)		Affordable			Unaffordable (17% total obs)	
	(rent/mortgage <=30% of household income)			(rent/mortgage >30% of household income)		(rent/mortgage <=30% of household income)			(rent/mortgage >30% of household income)	
	Total observations	% observations	Mean SF-36 MCS score (SD)	% observations	Mean SF-36 MCS score (SD)	Total observations	% observations	Mean GHQ score (SD)	% observations	Mean GHQ score (SD)
Age										
25-44 years	4431	74.11%	22.70 (4.72)	25.89%	21.60 (5.33)	7226	82.27%	12.07 (5.80)	17.73%	12.68 (6.62)
45-64 years	4050	79.01%	22.59 (4.83)	20.99%	21.21 (5.34)	3017	85.02%	12.74 (6.29)	14.98%	13.08 (6.94)
Sex										
Male	3433	77.89%	22.89 (4.59)	22.11%	21.68 (5.30)	4368	82.58%	11.69 (5.59)	17.42%	12.15 (6.39)
Female	5048	75.48%	22.48 (4.89)	24.52%	21.28 (5.36)	5876	83.46%	12.70 (6.18)	16.54%	13.27 (6.90)
Tenure type										
Home purchaser	5445	85.84%	22.91 (4.74)	14.16%	22.29 (5.20)	7870	84.83%	12.03 (5.65)	15.17%	12.57 (6.58)
Private renter	3036	59.62%	21.96 (4.79)	40.38%	20.90 (5.35)	2373	77.29%	13.17 (6.93)	22.71%	13.24 (6.95)
Weekly equivalised income^a										
Below low-to-moderate income household median ^b	4202	71.58%	22.00 (5.03)	28.42%	20.69 (5.41)	5126	70.56%	12.66 (6.22)	29.44%	12.83 (6.76)
Above low-to-moderate income household median ^b	4279	81.23%	23.20 (4.47)	18.77%	22.54 (5.03)	5117	95.62%	11.99 (5.75)	4.38%	12.44 (6.37)

^a Weekly equivalised income averaged over all years of observation. OECD-modified equivalisation used for each data set.

^b Median based on analytic sample.

households in the UK with the lowest incomes were in unaffordable housing compared with 19% and 4% respectively of households above the median cut-off.

Analysis of the relationship between housing affordability and mental health for the different tenure types in Australia, after adjustment for age, survey wave, and equivalised income, shows that private renters whose housing became unaffordable experienced a small but significant decline in mental health (mean change = -0.45; 95% CI: -0.81 to -0.09), whereas home purchasers whose housing became unaffordable experienced, on average, no change in mental health (mean change = 0.00; 95% CI: -0.37 to 0.37). The p-value for the interaction term for tenure and affordability was 0.08 (Table 3).

Table 3. Tenure-specific estimated mean change in MHI-5 (scale 5-30) and GHQ-36 (scale 0-36) associated with housing becoming unaffordable, excluding social renters

Tenure type	Australia (2239 individuals, 8481 observations)			UK (2269 individuals, 9184 observations)		
	Mean change in MHI-5 (95%CI)	P	P value for interaction term	Mean change in GHQ (95% CI)	P	P value for interaction term
Owner	-0.00 (-0.37, 0.37)	0.991	0.077	0.48 (0.03 – 0.94)	0.038	0.749
Private renter	-0.45 (-0.81, -0.09)	0.014		0.30 (-0.67, 1.26)	0.547	

Note: Models have been adjusted for age group (25-44 and 45-64 years), survey year, change of residence and equivalised household income. The outcome measures are not on the same scale.

The adjusted analysis of the relationship between housing affordability and mental health for the different tenure types in the UK indicated that home purchasers whose housing became unaffordable experienced a small but significant decline in mental health (mean change = 0.48; 95% CI: 0.03 to 0.94), whereas private renters whose housing became unaffordable experienced, on average, no change in mental health (mean change = 0.30; 95% CI: -0.67 to 1.26). However, an interaction term for tenure and affordability was not statistically significant.

Discussion - National Context, Housing Affordability and Mental Wellbeing

Our findings provide moderate evidence of cross-national differences between Australia and the UK in the relationship between housing affordability and mental health for different tenure types, after adjustment for age, survey wave, and equivalised income. Analysis of Australian data revealed that private tenants whose housing became unaffordable experienced a small but significant decline in mental health that was not observed for home purchasers whose housing became unaffordable. Despite the moderate p-value of 0.08 estimated for the Australian data, our assertion is strengthened by findings of previous analyses conducted on a larger sample with a mental health measure that used more survey items found significant results in the same direction (Mason *et al.*, 2013). Analysis of the UK data, in contrast, indicated that the mental health of home purchasers significantly worsened

when housing became unaffordable while there was no effect on private renters. However, the interaction effect (i.e. the overall interaction term) was not significant or close to it. We therefore conclude differential effects of housing affordability on mental health for owners and renters in the UK are not likely.

There are clear differences between Australia and the UK with respect to the impact of an erosion of housing affordability on mental health over the period 2001 to 2008. The polarised outcomes across the two nations should be understood within the context of the broader housing environment and the opportunities available to affected households. In Australia, private tenants as a group were under considerable stress over the period 2001 to 2008, with 40% being low income with unaffordable housing costs (occupying unaffordable housing). For many households in the private rental market, a decline in their housing affordability was likely to result in additional financial pressure on the household – and stress for the individuals – given the relatively parsimonious and inflexible nature of Commonwealth Rent Assistance (CRA), the Australian Government's rental support scheme (Beer *et al.*, 2011). By contrast, private tenants in the UK were much less likely to be affected by unaffordable housing in the first instance (23% for this period). Those tenants who did experience a fall in housing affordability had both more generous forms of governmental support to call upon (Housing Benefit) and, potentially, access to a far larger stock of social housing – with 17% of the stock either council or housing association-owned.

It is important to acknowledge that the differences in mental health scores observed in the Australian population in this study are small in magnitude, however this limited impact is to be anticipated given that the analysis models change over time for individuals, and also employs a conservative modelling strategy. In such analyses, changes are typically much smaller than the population-averaged mental health effects of life events reported more broadly in the literature. Further, even small differences at the individual level can represent substantial increases in the numbers of individuals at risk of clinically significant mental health problems when experienced by large proportions of the population (Rose, 1992). Moreover, when these effects are concentrated in already disadvantaged subpopulations (e.g. low-income households), profound social and health inequalities may be created for current and future generations.

Strengths and limitations

This study utilised two large and robust datasets representative of the Australian and British populations to examine a potentially important but as yet poorly understood aspect of the housing and health relationship; that being the intersection between affordability and tenure in relation to mental health. By using longitudinal analytical methods the analysis was able to estimate potential causal relationships at work in households over the short term, and identify evidence of effect modification in Australia but not the United Kingdom. We have been able to use model adjustment to reduce the risk of confounding by observed changes within individuals with respect to time-varying variables such as income. The research was also able to control for confounding by observed and unobserved time-invariant differences between individuals by using a fixed-effects model.

This study and the data used have some limitations. First, different measures of subjective mental health were compared across the settings. Acknowledging this limitation, the research has taken care to use measures that are psychometrically similar and previously

compared and validated. Second, the choice of fixed-effects regression represents just one possible modelling approach, chosen for its ability to avoid time-invariant and time-varying confounding. The potential limitations of a ratio measure of housing affordability are well known and widely discussed in this field. We chose to use the 30/40 rule as our indicator of poor housing affordability because of its prominence within the international literature, its widespread acceptance amongst policy makers and the relative quality of underlying data when compared with the alternatives (as discussed in Baker *et al.*, 2013).

We also note that the effects of housing affordability on mental health may be underestimated in this analysis due to the inclusion of all adult household members. We expected that all household members were potentially affected by high housing costs relative to income, regardless of how much responsibility they have over household finances. Any negligible effects on some household members may dilute stronger effects on other persons within the household resulting in conservative estimates of effect sizes.

Conclusion

This paper presents important empirical evidence that the relationship between housing affordability and health is dependent upon context. Critically, it is important that we discard notions that there are dimensions of housing *per se* that make one tenure intrinsically more vulnerable or risky than another (Beck, 1992). Instead, the combination of social, legal, economic and cultural dynamics surrounding individual tenures in particular places exposes individual households to stress, and consequent declines in mental health. Within this study, it is possible that the conservative lending regime of financial institutions in Australia between 2001 and 2008 was protective of the mental health of home buyers. By contrast, assertive lending practices in the UK resulted in many low-income home buyers becoming exposed to a volatile housing market, with consequent mortgage default, negative equity and social deprivation (Paris *et al.*, 2010). Depending on context, renters too faced different experiences. Private tenants in Australia from 2001 to 2008 were confronted by rapidly escalating rents fuelled by a shortage in housing supply (Commonwealth of Australia, 2013) and consequent house price rises. Declining affordability resulted in impaired mental wellbeing for many households because few alternatives or supports were available to them: rental subsidies under Commonwealth Rent Assistance are of limited benefit (as discussed earlier), social housing is small-scale and difficult to access, and few protections are afforded tenants under tenant legislation (Paris, 1986). In the United Kingdom, by comparison, the mental health of tenants affected by declining housing affordability was unlikely to be affected because of a more generous and effective welfare safety net.

More broadly, this study demonstrates the importance of considering the interaction between multiple characteristics of housing, such as affordability and tenure, when investigating how housing and health are related. Tenure type influences health, but only in some contexts. This cross-national variation shines light on the political economy of mental health and raises questions regarding a) whether policy should be tailored toward the distinct challenges faced by renters and purchasers in Australia and b) whether social housing serves as a buffer for lower income households from unaffordable housing in the private sector (Pega *et al.*, 2013). In addition, this study re-emphasises the value of cross-national comparisons. Too often researchers draw substantial conclusions based on the evidence from one nation alone whereas this study demonstrates that such approaches may be limited by the context from which those conclusions are drawn.

Finally, this analysis has implications for public policy. Comprehensive and effective welfare systems – including strong social housing systems – have a protective effect on mental health for both individuals and populations. The rise of austerity-focussed governments in both the United Kingdom and Australia over recent years has challenged the efficacy of welfare supports and increases the vulnerability of households already at risk. Australia in particular could strengthen the mental health of its economically vulnerable populations through the implementation of more effective housing policies. Such systematic changes are likely to be more cost effective, and produce more substantial additional welfare gains, than acute medical interventions or socialisation programs for which there is little evidence of effectiveness.

In Australia and many other nations, health expenditure increasingly dominates public sector outlays as a consequence of an ageing population and the costs of increasingly sophisticated medical interventions. Broader social policies – including housing – often appear to be ‘squeezed out’ from both public discourse and the consideration of governments, or become entangled in broader agendas of national productivity and ‘welfare traps’. Our findings suggest that a focus on mental health and the need to provide adequate safety nets for vulnerable individuals within the housing markets should become a rallying point for advocates for greater social investment in housing. The contemporary emphasis on the contribution housing makes to physical health have been effective in some jurisdictions, but not others – for example Australia – and a greater focus on mental health could provide a new impetus for action by governments. The evidence presented in this paper suggests that high housing costs and, in some contexts, precarious accommodation arrangements lowers population mental health, potentially contributing to greater levels of harm for individuals and their households.

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Appendix Table 1: Sample composition in each year for BPHS and HILDA

Year	BPHS Respondents	HILDA Respondents
2001	1,204	2,007
2002	1,282	1,737
2003	1,222	1,541
2004	1,176	1,404
2005	1,148	1,337
2006	1,086	1,353
2007	1,080	1,313
2008	986	1,253