Forced Housing Mobility and Mental Wellbeing: Evidence from Australia

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This paper examines the links between forced housing mobility and the mental wellbeing of Australians in an era of heightened risks in both labour and housing markets. Specifically, we examine how the links between forced housing mobility and mental wellbeing vary according states of employment and housing tenure insecurity. Using the 2001-2018 Household, Income and Labour Dynamics in Australia Survey, we implement hybrid models across four mental wellbeing dimensions and uncover three key findings. First, there is strong evidence that forced moves impair mental wellbeing. Second, the adverse wellbeing impacts of forced moves are greater for those experiencing employment insecurity than those in secure employment. Third, forced moves can depress the wellbeing of both owner purchasers and private renters, but the wellbeing penalty is greater in the case of the former. Overall, our analysis emphasises the importance of harnessing housing as a policy instrument for promoting wellbeing. Our findings also highlight the need for policies that mitigate against loss of home ownership and reforms that improve tenure security for renters.

Keywords: forced moves, residential mobility, mental health, wellbeing, housing tenure, insecure employment

Introduction

New forms of risks have emerged in both labour and housing markets on the back of a number of developments globally. In labour markets, fast-paced technological changes have quickened the pace at which jobs become obsolete. The spread of flexible employment has resulted in a transfer of risk from employers to workers (Caldbick et al. 2014). In housing markets, new financial products have led to the emergence of new forms of mortgage borrowing across all stages of the life course (Haffner et al. 2015). Smith (2010) argues that housing risk has intensified as a result of this. Recent work has highlighted the interactions between labour and housing insecurities. An important study is Desmond and Gershenson's (2016) conceptualisation of the phenomenon of 'double precarity', defined as a circumstance whereby "the job and the home are both on shaky ground" (Desmond and Gershenson 2016, p48). Desmond and Gershenson (2016) find that

forced moves is an important driver of employment insecurity, while Bentley et al. (2019) show that insecure employment is linked to five times greater odds of experiencing housing affordability stress.

Against this contextual backdrop, this paper presents evidence that gives rise to new knowledge on the links between forced housing mobility and mental wellbeing in an era of risk. Specifically, we shed light on the extent to which exposure to forced moves affects mental wellbeing, and examine how this effect differs by employment and housing tenure status. Australia offers an interesting and internationally relevant context for our inquiry. Its population is one of the most residentially mobile in the OECD (Sánchez and Andrews 2011; Bernard et al.'s 2017). It is one of many developed nations in which housing and employment conditions are now increasingly insecure. The Australian workforce underwent rapid casualisation during the 1990s (Campbell and Burgess 2001) and more recent trends show that casual workers consistently account for around one-fifth of the workforce (Australian Bureau of Statistics 2020). Australian renters and owners are also increasingly exposed to tenure insecurity. The Australian private rental sector is lightly regulated, with provisions for 'no grounds' eviction by landlords, housing subsidies to low-income households that fail to keep pace with growth in real rents in the private market and a shortage of public housing (Productivity Commission 2019). Among owners, mortgage indebtedness has climbed and extends later into the life course (Wood and Ong (2012). According to the Australian Bureau of Statistics' Surveys of Income and Housing, the share of home owners aged 25 years and over who owe a mortgage debt has climbed from 42% to 58% between 1990 and 2017. This rise in mortgage indebtedness has been observed in every age group, not just young homebuyers. These trends suggest growing numbers of Australian home owners are precariously perched on the margins of home ownership. Tenure insecurity has therefore increased alongside employment insecurity for the Australian population, and trends in Australia may signal what is happening in other societies that have become more exposed to risks in housing and labour markets. Our findings therefore have

important implications for national policies related to housing, industrial relations and welfare within a risk society where multiple precarities co-exist to impact on individual wellbeing.

The social science literature highlights the need to distinguish between residential mobility as a symptom of residential attainment as opposed to a symptom of residential instability (Kang 2019; Desmond et al. 2015). From the attainment perspective, the decision to move is typically a *voluntary housing move*, described by Duncan and Newman (2007, p174) as "rational, deliberate, and planned". It is also associated with upward socio-economic mobility (Logan and Alba 1993) or adjustments which allow households to align their location with their housing needs (Clark, 2013). On the other hand, where residential instability exists, individuals are typically at risk of *forced housing moves* as they are not able to exercise adequate control over their residential circumstances (Kang 2019). For vulnerable individuals, forced moves can be a precursor to further downward mobility if they are forced to move into more deprived neighbourhoods (Desmond and Shollenberger 2015), further precariousness in housing conditions (Desmond 2016), violence (Hartman and Robinson 2003), and homelessness (Crane and Warnes 2000).

The distinction between *voluntary* versus *forced* housing mobility is important as these are likely to have different, perhaps opposing, impacts on wellbeing. The literature has tended to focus on examining forced housing mobility due to its relative importance for policy, and provided convincing evidence that it has negative impacts on a range of wellbeing outcomes, including mental and physical health (Burgard et al. 2012; Desmond and Kimbro 2015), psychological distress (Serby et al. 2006) and social relationships (Oishi 2010). Another clutch of studies has investigated the impacts of mobility on mental wellbeing, *without* distinguishing between forced and voluntary forms of mobility. Studies within this strand have produced conflicting results. Some have found that residentially mobile people generally exhibit lower levels of wellbeing than residentially immobile people (Stokols et al. 1983; Liu et al. 2017). Others found that

residential mobility lead to an improvement or rebound in life satisfaction (Nowok et al. 2013; Nowok et al. 2018).

Against this background, this paper makes four distinct contributions to the literature. First, we seek to differentiate between the impacts of forced housing moves, voluntary housing moves and non-housing-related moves on mental wellbeing by modelling the three from the same sample. The distinction is an important contribution of our paper because it allows us to differentiate between the potentially beneficial versus the disruptive effects of residential mobility from the same sample. We hypothesise that all forms of moves have negative impacts on mental wellbeing, but that the most damaging effects stem from forced housing moves (*hypothesis 1*).

Second, we examine the extent to which the 'double precarity' of employment insecurity and forced moves affects mental wellbeing. Desmond and Gershenson (2016) found that forced housing moves are a key driver of employment insecurity without further examining impacts on wellbeing. Bentley et al. (2019) showed that insecure employment was linked to five times greater odds of experiencing housing affordability stress, though this did not extend to forced moves. We hypothesise that those who are forced to move while insecurely employed will suffer greater dents to their mental wellbeing levels than those whose forced moves are buffered by secure employment (*hypothesis 2*).

Third, we hypothesise that home owners who are forced to move suffer greater detriments to their mental wellbeing than private renters who are forced to move, all else being equal (*hypothesis 3*). To test this hypothesis, we draw on prospect theory and the endowment effect posited in seminal work by Kahneman and Tversky (1979), which has been extended as theoretical framework for studying residential change (Clark and Lisowski 2019). These studies point out that a residential move involves comparing the new residence relative to the current residence. In this context, the endowment effect becomes relevant because individuals have a

reference point and are generally loss averse. Hence, the use value of their current residence exceeds its exchange value, and acts as a deterrent to move (Clark and Lisowski 2019). Hence, we expect to see significant impairments to wellbeing when an individual is subject to a forced housing move. However, we extend the endowment effect framework to make a distinction between owners and renters. We posit that the endowment effect is greater for the owners than renters for three reasons. First, owners have typically spent a longer time in their current residence than renters. Second, the home is the most important household asset for many, with significant financial benefits tied to home ownership (Wood and Ong 2012; Yates and Bradbury 2010). Third, it is an important source of identity, and often perceived as a social ideal associated with adulthood and autonomy (Ronald 2008). If most owner purchasers who are forced to move are likely to land up exiting the ownership sector altogether, this loss of home ownership status would be expected to have a more damaging impact on one's wellbeing than a forced move from a rental home.

In a fourth contribution, we examine the impacts of forced housing mobility across four mental wellbeing dimensions. Studies have typically focused on a single mental wellbeing measure, such as a mental health score (Mason et al. 2013; Bentley et al. 2016; Bentley et al. 2019). Our analysis draws on the proposition that mental wellbeing concepts do not "end at the skin" (Ware et al. 1993, 3:9), but extend to encompass the quality of external interactions with work and other people. Hence, we offer a nuanced examination of various aspects of mental wellbeing including two *affective* dimensions and two *behavioural* dimensions. The former reflects one's internal state while the latter relates to interactions with one's external environment. As shown in studies such as Luhmann et al. (2012), life events can have varying effects on different dimensions of wellbeing. The links between residential mobility and mental wellbeing can therefore vary across these dimensions.

Methodology

Data

We draw on the Household, Income and Labour Dynamics in Australia (HILDA) Survey, which is Australians' only nationally representative longitudinal survey. The HILDA Survey commenced in 2001 by interviewing a sample of 13,969 responding individuals aged 15 years and over. It contains a comprehensive range of socio-demographic, economic, wellbeing and attitudinal variables. The survey is particularly suited for the purposes of this study. The observations are categorised by waves, with each wave representing a specific year. The latest wave is for 2018, so the dataset offers up 18 years of rich information for analysis. Its panel nature is especially appropriate for mobility analysis, given we can observe changes in individuals' mobility over time and link this to changes in their wellbeing. The HILDA Survey is now a staple data source for social science analysis internationally, and is widely viewed as compatible with other national panel datasets such as the UK's British Household Panel Survey and the US Panel Study of Income Dynamics. We pool independent adult respondents aged 15 years and over across all 18 waves of the HILDA Survey, resulting in a person-period dataset comprised of around 220,000 observations.

Mental wellbeing variables

Wellbeing is a psychological state that cannot be fully measured from observable behaviour. However, they can be measured via 'well-proven self-reports of the frequency and intensity of feeling states' (Ware et al. 1993, 3:2). We draw on four self-reported variables in the HILDA Survey covering different dimensions of perceived mental wellbeing. The four mental health measures stem from two reliable and commonly used scales available from the Survey – the 36item Short Form Health Survey (SF-36) and Kessler 10 (K10) psychological distress scale. The former is widely used for monitoring general population health and evaluation treatment effects in clinical practice and research (Ware et al. 1993). The latter was developed as a measure of psychological distress and can be used as a screening instrument to identify cases of psychological distress (Kessler and Mroczek 1994). The SF-36 measures are available in all 18 waves of the HILDA Survey. The K10 measure is available in every second wave starting from wave 7.

The four mental wellbeing measures are defined as follows:

- SF-36 mental health score (0-100): The five-item mental health sub-scale (MH5) within the SF-36, constructed from questions regarding nervousness, feeling down in the dumps that nothing could cheer one up, whether one feels calm and peaceful, whether one feels down and whether one has been a happy person in the past four weeks.
- K10 psychological distress score (10-50): Made up of 10 questions which gives an overall score ranging from 10 to 50 to represent the level of psychological distress in an individual.
- 3. SF-36 role-emotional score (0-100): Reflects a person's ability to fulfil his or her work or other regular daily activities as a result of the person's emotional health. This score is constructed from questions regarding whether one has cut down the amount of time spent on work or other activities, accomplished less than one would like and whether one did not do work or other activities as carefully as usual.
- 4. SF-36 social functioning score (0-100): Describes the extent to which a person's social activities have been interfered by emotional problems. This score is constructed from questions regarding whether the frequency with which physical or emotional problems interfered with one's social activities and the extent to which one's physical or emotional health has interfered with one's social activities.

In regard to the SF-36 measures, a higher score represents higher mental wellbeing levels. In contrast, a higher K10 score reflects a higher level of psychological distress (and therefore lower wellbeing).

For the purposes of this analysis, the SF-36 mental health and K10 psychological distress scores are categorised as *affective* dimensions of wellbeing. On the other hand, the role-emotional and social functioning scores are categorised as *behavioural* dimensions. The former relates to engagement with one's own work or activities while the latter refers to one's engagement with other people.

Residential mobility variables

We construct three mutually exclusive categories of residential mobility from the HILDA Survey according to whether they are housing or non-housing related, and whether they are likely to be forced or voluntary:

- Forced housing mobility: These refer to moves in the last year that were due to eviction, property no longer available, living in government housing with no choice but to move, or moves made by those who had reported difficulty paying rent or mortgage during the year;
- 2. Voluntary housing mobility: These refer to moves in the last year that were motivated by the desire to improve or match one's housing or neighbourhood conditions to changing needs or preferences e.g. to get a larger or better place, to get a place of one's own, or to get a smaller or less expensive place (without having faced difficult paying rent or mortgage in the past year)ⁱ;
- Non-housing-related mobility: These are moves in the last year that were triggered by non-housing related reasons e.g. changes in family or job circumstance, health reasons, seeking a different lifestyleⁱⁱ.

Modelling strategy

Given the panel nature of the dataset, we can either estimate a fixed effects model or a random effects model. The less restrictive choice is the fixed effects model which allows for dependence between μ_i and X_{it} . However, one of the shortcomings of the fixed effects model is that it does

not allow us to determine the impacts of time-invariant characteristics. In order to address this, we propose a hybrid approach (Allison 2009). Hybrid models provide additional information whether the wellbeing impact of a form of mobility differs between and within persons.

The specification of the hybrid model takes the following general form:

$$wb_{it+1} = \beta_0 + \beta_1 (M_{i(t,t+1)} - \bar{M}_i) + \beta_2 \bar{M}_i + \beta_3 (X_{it} - \bar{X}_i) + \beta_4 \bar{X}_i + \beta_5 c_i + \mu_i + \varepsilon_{it}$$
(1)

where wb_{it+1} denotes the wellbeing score of individual *i* at time *t*. $M_{i(t, t+1)}$ represents the type of residential mobility experienced by individual *i* between *t* and *t*+1 and \overline{M}_i represents the mean of each mobility predictor for individual *i*. X_{it} is a vector of potential *k* controls measured at *t* and \overline{X}_i denotes a vector containing the mean of each of the *k* predictors for individual *i*. c_i denotes individual-level variables which are time-invariant. Here β_1 and β_3 are the fixed (within) effects estimator. β_2 and β_4 are the random (between) estimators. The time-invariant individual-level effects such as gender and ethnicity are estimated by β_5 .

We note that the within-person coefficients β_1 and β_3 in a hybrid model are the same coefficients that would be generated by a fixed effects model. However, comparisons between β_1 and β_2 are particularly useful for understanding whether a wellbeing outcome is more so linked to withinperson changes in mobility or between-person differences in mobility, hence our use of the hybrid model rather than a fixed effects model. Estimates for β_1 and β_2 are reported in tables 2, 3 and 4. Coefficients that do not relate to mobility e.g. age, sex etc. are reported as supplemental online material (S2).

Because the residential mobility variables indicate whether a move occurred in the year leading up to t+1, that is, between t and t+1, this minimises the risk of reverse causation by measuring the flow of observed effects from residential mobility to wellbeing, not the other way around. By lagging the control variables at t so that each control is measured before or at the start of a move, we reduce the risk of these covariates acting as intermediates along the causal pathway between mobility and wellbeing. The control variables fall broadly into socio-economic, housing, geographic and calendar year categories. The socio-demographic controls include age, sex, indigenous status, country of birth, marital status, whether dependent children are present, highest education qualification, labour force status and real equivalised household incomeⁱⁱⁱ. Housing variables are represented by duration at current address, housing tenure and housing cost to gross income ratios^{iv}. Geographical variations are captured through state, territory and capital city variables, and a socio-economic index for areas (SEIFA) constructed by the Australian Bureau of Statistics called the index of relative socio-economic advantage/disadvantage. A low SEIFA decile indicates less advantage while a high score indicates greater advantage. Calendar year predictors are entered into the model as proxies for housing market and economic cycles. All control variables are binary, with the exception of duration at current address, the housing cost to income ratio and income which are expressed in continuous terms. The variable definitions are provided in more detail as supplemental online material (S1).

The modelling strategy is repeated across each of the four mental wellbeing outcomes described above. The general form expressed in equation (1) is operationalised through a linear specification in the case of affective wellbeing measures, and logistic regression models in the case of the behavioural wellbeing measures. As shown in figure 1, while the distributions of the mental health and psychological distress scores lend themselves to an linear specification, the role-emotional and social functioning scores are non-linear in nature, with 75% of the sample reporting a role-emotional score of 100 and 50% reporting a social functioning score of 100. We therefore specify logit models for these two wellbeing outcomes, where the outcome variable is equal to 1 when a score is 'high', that is, the score is 100. For all other values, the outcome variable is set to 0.

We begin by executing the model on the full sample drawn from all person-periods to capture the separate effects of different forms of residential mobility on mental wellbeing, hence addressing hypothesis 1. Following this, we address hypotheses 2 and 3 by executing models stratified according to employment security and housing tenure.

In regard to employment security, we adopt Bentley et al.'s (2019) approach, where a person is classified as insecurely employed if the person is on a casual job contract, on labour hire, self-employed or unemployed. On the other hand, a person is classified as securely employed if the person is on a permanent or fixed-term job contract. Individuals who are not in the labour force are deemed to be voluntarily economically inactive. Hence, person-period cases in which people are out of the labour force are dropped from the analysis relating to hypothesis 2^v.

In regard to housing tenure, we split the sample into owner purchaser and private renter personperiods. We exclude outright owner and social housing person-periods, as both tenure groups enjoy tenure security due to the former having paid off their mortgages and the latter regulatory framework that provides for long-term social housing leases. Person-period cases in which people are living rent-free are dropped from the analysis relating to hypothesis 3 as rent-free individuals are unlikely to be responsible for their costs of housing^{vi}.

Results

Descriptive statistics

Our total sample comprises over 240,000 person-period cases drawn from 30,335 individuals. Of these, the majority (over three-quarters) report no mobility in the last year and about 10% experienced non-housing-related mobility. The shares attributed to forced and voluntary housing mobility are 3% and 8% respectively.

Table 1 documents the average mental wellbeing scores and characteristics of different residential mobility groups based on person-period observations across 18 years. Forced housing movers display the poorest mean wellbeing scores, while non-movers rate the highest in average wellbeing levels. For instance, average psychological distress scores are 19.2 for forced movers, compared to lower distress scores of around 17 for voluntary housing movers and non-housing-related movers, and even lower at 15.6 for non-movers.

There are some obvious differences in the profiles of the different mobility groups. Firstly, those who are residentially stable (i.e. do not move), more likely to be married or widowed, in the midto-late stages of their life course and not in the labour force. They tend to be more well-off materially, with higher incomes and housing assets, lower housing costs and living in higher socio-economic status (SES) neighbourhoods. The residentially mobile group, however, is more heterogenous. While these tend to be young, economically active private renters, sharp differences exist between those who experienced forced versus voluntary housing moves. Forced movers are characterised by multiple vulnerabilities including indigeneity, divorce, singlehood, part-time employment, unemployment, low incomes, high housing cost burdens and low SES neighbourhoods. Their mobility patterns reflect residential instability. Voluntary housing movers and non-housing-related movers, on the other hand, are better positioned to control mobility decisions and use it as a form of adjustment to changing needs. These are more likely to be fulltime employed, on higher incomes and low-to-moderate housing cost burdens and living in higher SES neighbourhoods than forced movers.

[Table 1]

Testing hypothesis 1: All forms of moves have negative impacts on mental wellbeing, but that the most damaging effects stem from forced housing moves

Table 2 presents the hybrid model results based on the general form expressed in equation (1). The model reports the coefficients of the mobility predictors. Predictors that do not relate to mobility e.g. age, sex etc. act as controls and are therefore reported as supplemental online material (S2). In the linear models, each mobility predictor's coefficient represents the unit change in the wellbeing score that arises in the presence of a characteristic defined by a categorical predictor or in relation to a unit change in the value of a continuous predictor. In the logit models, we report odds ratios. In the case of a categorical predictor, the odds ratio measures the odds of reporting a higher wellbeing score when a characteristic defined by a categorical predictor is present relative to the omitted predictor category. In the case of a continuous predictor, it measures the odds of a high wellbeing score that is linked to a unit change in the value of the predictor.

The number of observations for these models is around 190,000 cases per model after excluding cases with missing values. In the psychological distress model, the number of cases is around 69,000 because the variable only available from 2007 onwards and only in alternate years.

The sample of 190,000 cases is smaller than the initial sample of 240,000 due to non-response or missing values for some variables in the models. In particular, the wellbeing variables are from the HILDA survey's self-completion questionnaires (SCQ), which typically have higher nonresponse rates than questionnaires administered face-to-face or over the phone (Summerfield et al. 2019). Studies that use the survey's SCQ measures are subject to a sample reduction of around 10%. The mobility variables have missing values ranging from 7 to 10% of the cases. The extent of missing values is minor for the remaining variables, ranging from 0 to 0.6% of the cases. Overall, the model samples remain very healthy after dropping cases with missing values. Further details on the extent of missing values are provided as supplemental online material (S3). The between-person coefficients tell us the extent to which average between-person variations of the predictors are associated with a change in wellbeing score (in the case of mental health and psychological distress) and the likelihood of experiencing a high wellbeing score (in the case of the role-emotional and social functioning models). Referring first to the between-person coefficients in table 2, a clear pattern emerges that those who engage in any form of mobility report lower levels of mental wellbeing than those who are not residentially mobile. However, comparing between- and within-person effects, we make two observations. First, negative wellbeing impacts are observed for both between- and within-person mobility where the mobility if forced or non-housing-related. However, while persons who engage in voluntary housing

mobility have lower wellbeing levels than those who are not mobile (the between-person coefficient is negative), the actual wellbeing impact of a voluntary housing move is positive (the within-person coefficient is positive). This further reinforces the importance of distinguishing between within-person and between-person effects.

A discussion of the between-person effects is available as supplemental online material (S4). From this point on, we focus on a discussion of within-person effects in order to directly address hypothesis 1, because the within-person coefficients indicate the changes in wellbeing within a person that result from changes in residential mobility and other predictors. The within-effect coefficients are identical to coefficient estimates produced by fixed effects models so we are able to make causal inferences between mobility and wellbeing.

A key finding from the within-person coefficients is that the form of mobility that has the strongest and most widespread negative wellbeing impacts is forced housing mobility. Forced moves reduce average mental health scores by 1.4 points and raise distress scores by 0.5 points relative to no moves (equating to a 2% and 3% change in average scores respectively). At the same time, forced housing mobility reduces a person's odds of experiencing high role-emotional and social functioning by 12% and 19% respectively relative to no mobility.

On the other hand, while forced moves are disruptive, a voluntary housing move appears to improve mental health by 0.2 points (0.3% change in average scores) and reduce psychological distress by 0.2 points (1% change in average) relative to not moving. However, the size of these wellbeing improvements is small compared to the negative wellbeing impacts of forced moves. Furthermore, voluntary housing moves do not appear to have a significant influence on the odds of reporting high role-emotional or social functioning relative to not moving.

A non-housing-related move appears to impact wellbeing in the same direction as forced housing moves, i.e. the former also has adverse impacts on wellbeing across all four measures relative to not moving. However, the size of the impact is smaller for non-housing-related moves than for forced housing moves. For instance, a non-housing related move reduces mental health scores by just 0.7 points which is around half the deterioration of 1.4 points experienced by someone who is forced to move. Similarly, relative to not moving, a non-housing-related move reduces the odds of experiencing high social functioning by 6% compared to the 19% reduction linked to forced housing mobility.

[Table 2]

Testing hypothesis 2: Forced moves experienced while insecurely employed will result in greater detriment to mental wellbeing than forced moves that are buffered by secure employment, all else being equal

Existing studies have identified employment insecurity as both a precursor to forced moves and as a consequence of forced moves. In the former case, the loss of income can lead to evictions (Desmond and Gershenshon (2017) and in the case of the latter forced moves can prevent people from keeping or looking for employment (Desmond and Gershenson 2016). In table 3, we distinguish between four groups that allow us to gain some insight into interactions of forced moves and employment security. Due to the exclusion of cases that are out of the labour force and missing values, the sample size is over 115,000 cases for the models using the SF-36 measures and around 42,000 cases for the psychological distress model (due to its limited availability across the years of the data).

Because forced moves draw on a question from the HILDA Survey that asks whether a respondent has changed address between t and t+1, we are able to distinguish between the following four groups of forced movers:

 Securely employed at both *t* and *t*+1, i.e. the individual remains securely employed despite experiencing a forced move;

- 2. Insecurely employed at t and securely employed at t+1, i.e. the individual gains employment security in the same period that a forced move occurs;
- Insecurely employed at both *t* and *t*+1, i.e. the individual remains insecurely employed while experiencing a forced move;
- 4. Securely employed at t and insecurely employed at t+1, individual falls into insecure employment in the same period that a forced move occurs.

As with hypothesis 1, we focus on within-person coefficients that offer causal interpretations. We find that those who *retain secure employment* through a forced move do still suffer adverse wellbeing impacts in the dimensions of mental health, and role-emotional and social functioning relative to not moving. However, in the case of mental health, the 0.7-point reduction in the forced mobility within-person coefficient among this group, is only around one-quarter to half the impact felt by those who are insecurely employed at t or t+1 while experiencing a forced move.

Importantly, those who were somehow able to shift *out of insecure into secure employment* while experiencing a forced move suffer no detriment to their wellbeing relative to not moving across all four dimensions, with all the within-person coefficients of the forced housing mobility predictor remaining statistically insignificant across all wellbeing measures.

On the other hand, those who *remain insecurely employed* while experiencing a forced move suffer a decline in mental health and role-emotional functioning relative to not moving. There is a 1.2-point drop in mental health among this group, controlling for other factors. This is nearly twice the deterioration in mental health scores experienced by those forced movers who manage to remain securely employed. Compared to an absence of mobility, forced housing mobility also reduces the odds of a high role-emotional score by 17% among those who remain insecurely employed.

In addition, those who *lose employment security* during the same period as a forced displacement sustain the greatest damage to their mental wellbeing in the affective dimension among the four employment security subgroups. Holding all other factors constant, this group experiences a mental health score reduction of 3.3 points (4% of their average mental health score) and a large rise in psychological distress score of 3.1 points (16% of their average distress score) relative to not moving.

Overall, the findings confirm that the disruption to mental wellbeing is significant when double precarity exists, and that this disruption is greater than when a forced move occurs within the context of employment insecurity. However, the effects appear to be more significant in affective wellbeing dimensions than behavioural ones. Indeed, the results suggest that employment security has a protective effect against the wellbeing damage imposed by a forced move.

[Table 3]

Testing hypothesis 3: Home owners who are forced to move suffer greater detriments to their mental wellbeing than private renters who are forced to move, all else being equal

We hypothesised earlier that owner purchasers who are forced to move suffer greater detriments to their mental wellbeing than private renters who are forced to move, all else being equal. The models stratified by tenure pre-move (i.e. at time *t*) confirm our hypothesis across all mental wellbeing domains (table 4). Our sample comprises around 110,000 cases for models of the SF-36 measures and 40,000 cases for the psychological distress models.

Once again, the discussion here focuses on within-person coefficients that offer causal interpretation. It is firstly worth noting from the within-person coefficients that forced housing mobility reduces mental wellbeing scores in both tenures. However, the wellbeing penalty is two to three times as great for owner purchasers as private renters in the affective wellbeing dimensions of mental health and psychological distress. For instance, forced housing mobility

reduces the mental health score by 1.2 and 2.2 points for private renters and owner purchasers respectively compared to when a move does not occur, controlling for other factors. Furthermore, it raises psychological distress by 0.6 and 1.9 points among private renters and owner purchasers respectively relative to an absence of mobility. In the behavioural dimension, the odds of experiencing a high role-emotional or social functioning are smaller in the case of owner purchasers when a forced move occurs compared to when a move does not occur.

[Table 4]

Discussion and Conclusion

This paper documents important empirical evidence on the extent to which exposure to forced moves affects mental wellbeing, and examine how this effect differs by employment and housing tenure status. We test three hypotheses through a series of hybrid models.

Our findings offer partial support for the first hypothesis. We find that not all forms of moves have negative impacts on mental wellbeing. While forced housing mobility and non-housing-related mobility tend to have adverse impacts on mental wellbeing relative to no mobility, the impact of voluntary housing mobility is insignificant in the case of the behavioural wellbeing dimensions and positive (though very small) in the case of the affective dimensions. However, we do find – in line with the second part of hypothesis 1 – that the most damaging wellbeing effects stem from forced housing moves, and these impacts are pervasive, ranging across multiple wellbeing dimensions.

In general, policymakers seeking to promote wellbeing have often preferred to focus policy thinking and investment on non-housing sectors such as education and employment. However, the evidence presented to address hypothesis 1 highlight the fact that housing policies which reduce exposure to forced moves can also reduce public expenditure on health. Another important policy implication relates to the negative impacts that forced moves have on social functioning, which raises questions regarding the efficacy of social mix policies such as the United States' Housing Opportunities for People Everywhere (HOPE) VI program (Popkin et al. 2004) and Australian state governments' public housing estate regeneration strategies (Arthurson 2002). Various studies have questioned the benefits of uprooting low-income people from their communities, often times against their will (Morris 2019). Our findings reinforce the need for caution around social mix strategies that are implemented without appropriately considering the mutual support and place attachments that residents may have formed with one another in their communities.

Our findings offer strong support for both hypotheses 2 and 3. In relation to hypothesis 2, our model results show that those who are forced to move while insecurely employed, suffer greater dents to their mental wellbeing levels than those whose forced moves are buffered by secure employment. It is evident that forced housing mobility has important links to employment insecurity. In particular, forced displacement leads to significant detriments in mental wellbeing when it occurs alongside employment insecurity, though these effects appear to be more significant in affective wellbeing dimensions than behavioural ones. A forced move can therefore become a crucial crisis point, especially among low-income groups, if it leads to a job loss, which in turn leads to significant downward spirals in mental wellbeing.

In addressing hypothesis 3, we find that a forced move from an owner-occupied home results in greater damage to mental wellbeing than a forced move from a privately rented home. This aligns with the predictions of prospect theory when applied to models of residential change. We attribute this to stronger endowment effects with respect to home ownership. We conjecture that the findings may also point to the trauma of loss of home ownership, because our data shows that over 70% of owner purchasers who are forced to move land up exiting the ownership sector altogether. As growing numbers of Australians are carrying higher mortgage debt burdens into old age (Wood and Ong 2012), our findings suggest a need to extend support to those at risk of losing home ownership to mitigate wellbeing losses. However, it is undeniable that forcibly displaced private renters also suffer significant impairments to multiple wellbeing dimensions. In

a largely unregulated private rental sector as Australia's, there remains scope for stronger legal protections for tenants to protect their wellbeing.

The evidence presented gives rise to new and important avenues for future research that address identified limitations within this study. For instance, the relative change measures used to interpret the findings in this study could be improved upon. The medical literature has suggested that it is helpful to determine whether a change in health score is important in clinical terms using measures such as the minimum clinically important difference. This represents the smallest change identified as important by a patient which would in turn determine the effectiveness of a treatment (Copay et al. 2007). The minimum clinically important differences in the medical literature are highly specific to the type of condition a patient is suffering from and hence not directly transferable to our study. Thus, future research could seek to ascertain whether the changes in wellbeing scores detected in this study are clinically important.

Seminal subjective wellbeing studies have also suggested that individuals may react to events, but return to baseline levels of wellbeing over time (Diener et al. 1999; Lucas et al. 2003). This adaptation over time is not accounted for in our analysis, which measures the impacts of mobility on wellbeing one year later. Another limitation of the present study is that it does not account for the potential buffer that housing assistance may provide to renters and low-income groups who experienced forced housing moves. Hence, an important future research direction would be to uncover evidence that will assist policymakers with predicting the timeframe that assistance might be needed, to counter the trauma of forced moves before individuals recover their baseline wellbeing levels. This will also assist in formulating measures that might shorten the time that one takes to return to baseline mental health levels after a forced move. Nonetheless, despite its limitations, this study provides ample evidence that highlights the importance of harnessing housing as a policy instrument for promoting population wellbeing.

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Forced Housing Mobility and Mental Wellbeing: Evidence from Australia

Supplemental Material

S1. Definitions of explanatory variables in the models

Table S1: Explanatory variable definitions

| Variable category | Variable definition | Binary (B) or | Time-variant (TV) |
|------------------------------|--|---------------|-------------------|
| Residential mobility | <i>Forced housing mobility:</i> A residential move was made in the last year (i) due to eviction, property no longer available, or living in government housing with no choice but to move, or (ii) the individual faced difficulty paying rent or mortgage during the calendar year <i>Voluntary housing mobility:</i> A residential move in the last year that was motivated by the desire to improve or match one's housing or neighbourhood conditions to changing needs or preferences e.g. to get a larger or better place, to get a smaller or less expensive place, to get a place of one's own <i>Non-housing-related mobility:</i> A residential move in the last year that was triggered by non-housing related reasons e.g. changes in family or job circumstance, health reasons, seeking a different lifestyle. <i>No mobility:</i> Did not make a forced housing move, voluntary housing move, or non-housing-related move in the last year (omitted) | B | TV |
| Duration at current address | Number of years at current address | С | TV |
| Tenure type | Homeowner – outright owner (omitted) Homeowner – mortgage Private renter Public renter Other tenure type | В | TV |
| Housing cost to income ratio | Housing cost divided by household's disposable income, then multiplied by 100% | С | TV |
| Age | Age 15 – 24 (omitted) Age 25 – 34 Age 35 – 44 Age 45 – 54 Age 55 – 64 Age 65+ | В | TV |
| Sex | Male Female (omitted) | В | TI |
| Indigenous status | Indigenous origin Non-indigenous origin (omitted) | В | TI |

| Variable category | Variable definition | Binary (B) or | Time-variant (TV) |
|----------------------------|--|---------------|-------------------|
| Country of hirth | Australia | | or invariant (11) |
| Country of birth | | В | |
| | Overseas (omitted) | D | |
| Marital status | Married (omitted) | В | IV |
| | | | |
| | Separated | | |
| | Divorced | | |
| | Widowed | | |
| | Single, not married | | |
| Dependent children | Whether there is more than one dependent child in the household or none. | В | TV |
| Highest education level | Postgraduate | В | TV |
| | Graduate diploma | | |
| | Undergraduate | | |
| | Diploma | | |
| | Certificate 3 or 4 | | |
| | Year 12 or below (omitted) | | |
| Labour force status | Full-time employed (omitted) | В | TV |
| | Part-time employed | | |
| | Unemployed | | |
| | Not in labour force | | |
| Real equivalised household | Household annual disposable income is divided by the OECD modified equivalence scale. This scale | С | TV |
| disposable income | allocates the first adult 1 point, with a further 0.5 points for each additional person aged 15 years or | | |
| | older and 0.3 points for each child <15 years old. This value is then converted to 2018 levels. | | |
| Geographical area | Sydney (omitted); Balance of new south wales (NSW); Melbourne; Balance of Victoria; Brisbane; | В | TV |
| | Balance of Queensland; Adelaide; Balance of South Australia (SA); Perth; Balance of Western Australia | | |
| | (WA); Tasmania; Northern Territory (NT); Australian Capital Territory (ACT) | | |
| SEIFA decile of index of | Lowest decile; Second decile; Third decile; Fourth decile; Fifth decile; Sixth decile; Seventh decile; | Binary | TV |
| relative socioeconomic | Eighth decile; Ninth decile; Highest decile (omitted) | | |
| advantage/disadvantage | | | |
| Calendar year | 2001 (omitted); 2002; 2003; 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013: 2014: 2015: | В | TV |
| | 2016; 2017; 2018 | | |

S2. Non-mobility and non-housing factors that influence mental wellbeing

The section reports the coefficients of predictors that do not relate to mobility e.g. age, sex etc. Table S2 is a companion table to table 2 in the main text which documents the magnitude and significant mobility predictors in the mental wellbeing models.

| Predictors | Mental health OLS | | Psychological | distress OLS | Role-emo | tional logit | Social functioning logit | |
|----------------------------------|-------------------|-----------|---------------|--------------|----------|--------------|--------------------------|----------|
| | Coefficients | | Coeffic | cients | Odds | ratios | Odds ratios | |
| | Between | Within | Between | Within | Between | Within | Between | Within |
| Owner with a mortgage | -1.210*** | 0.001 | 0.251 | -0.071 | 0.728*** | 1.048* | 0.760*** | 1.038 |
| | (0.410) | (0.103) | (0.154) | (0.067) | (0.059) | (0.029) | (0.056) | (0.025) |
| Private renter | -1.760*** | -0.306*** | 0.757*** | 0.148 | 0.614*** | 0.936** | 0.619*** | 0.953* |
| | (0.462) | (0.117) | (0.169) | (0.075) | (0.053) | (0.028) | (0.049) | (0.026) |
| Public renter | -4.958*** | -0.688** | 2.854*** | 0.866*** | 0.434*** | 0.936 | 0.372*** | 0.936 |
| | (0.589) | (0.303) | (0.255) | (0.202) | (0.045) | (0.068) | (0.040) | (0.070) |
| Other tenure type | 0.436 | 0.049 | -0.144 | 0.092 | 0.871 | 0.944 | 0.960 | 0.912* |
| | (0.813) | (0.221) | (0.305) | (0.142) | (0.130) | (0.054) | (0.131) | (0.048) |
| Duration at current address | -0.007 | -0.037*** | 0.003 | 0.011** | 0.993*** | 0.993*** | 0.998 | 0.994*** |
| | (0.011) | (0.006) | (0.005) | (0.004) | (0.002) | (0.002) | (0.002) | (0.002) |
| Housing cost to income ratio (%) | -0.012 | -0.006* | 0.009** | 0.006*** | 0.998 | 0.998*** | 0.999 | 0.999* |
| | (0.012) | (0.003) | (0.004) | (0.002) | (0.002) | (0.001) | (0.002) | (0.001) |
| Age 25 – 34 | -1.692*** | -0.214 | -0.359** | 0.072 | 0.648*** | 1.192*** | 0.628*** | 1.368*** |
| | (0.421) | (0.171) | (0.181) | (0.108) | (0.050) | (0.054) | (0.046) | (0.054) |
| Age 35 – 44 | -2.874*** | -0.054 | -0.033 | 0.066 | 0.474*** | 1.544*** | 0.492*** | 1.840*** |
| | (0.455) | (0.245) | (0.192) | (0.158) | (0.039) | (0.100) | (0.040) | (0.104) |
| Age 45 – 54 | -3.609*** | 0.524* | 0.026 | 0.122 | 0.397*** | 2.027*** | 0.337*** | 2.286*** |
| | (0.473) | (0.307) | (0.196) | (0.197) | (0.034) | (0.165) | (0.029) | (0.162) |
| Age 55 – 64 | 1.160** | 1.839*** | -1.696*** | -0.239 | 0.653*** | 2.979*** | 0.555*** | 2.853*** |
| | (0.530) | (0.375) | (0.217) | (0.236) | (0.066) | (0.296) | (0.053) | (0.247) |
| Age 65+ | 6.542*** | 3.136* | -3.798*** | -0.815*** | 0.563*** | 3.522*** | 0.659*** | 2.988*** |
| | (0.583) | (0.451) | (0.246) | (0.279) | (0.061) | (0.418) | (0.072) | (0.312) |
| Male | 0.927*** | | -0.289*** | | 1.139*** | | 1.148*** | |
| | (0.200) | | (0.087) | | (0.040) | | (0.039) | |
| Indigenous | -0.193 | | 0.533** | | 1.030 | | 0.785** | |
| | (0.570) | | (0.252) | | (0.100) | | (0.077) | |

Table S2: Hybrid models of mental wellbeing, predictors not related to mobility, 2001-2018

| Predictors | Mental health OLS | | Psychological distress OLS | | Role-emotional logit | | Social functioning logit | |
|---------------------------------------|-------------------|-----------|----------------------------|-----------|----------------------|----------|--------------------------|----------|
| | Coeff | icients | Coefficients | | Odds | ratios | Odds ratios | |
| | Between | Within | Between | Within | Between | Within | Between | Within |
| Australian-born | 0.330 | | -0.161 | | 0.897*** | | 1.222*** | |
| | (0.228) | | (0.100) | | (0.036) | | (0.047) | |
| Cohabitating t-1 | -2.171*** | 0.549*** | 0.696*** | -0.070 | 0.621*** | 0.999 | 0.738*** | 1.021 |
| | (0.335) | (0.155) | (0.139) | (0.100) | (0.036) | (0.042) | (0.041) | (0.036) |
| Separated t-1 | -5.456*** | -0.019 | 1.978*** | 0.439*** | 0.353*** | 0.813*** | 0.436*** | 0.923 |
| | (0.736) | (0.235) | (0.310) | (0.154) | (0.044) | (0.047) | (0.055) | (0.051) |
| Divorced t-1 | -2.663*** | 1.622*** | 1.145*** | -0.268* | 0.556*** | 1.017 | 0.556*** | 1.102* |
| | (0.456) | (0.238) | (0.187) | (0.160) | (0.042) | (0.060) | (0.042) | (0.061) |
| Widowed t-1 | -0.237 | 0.895*** | 0.314 | -0.604*** | 0.600*** | 0.970 | 0.686*** | 0.827*** |
| | (0.513) | (0.283) | (0.216) | (0.192) | (0.051) | (0.068) | (0.059) | (0.056) |
| Single not married t-1 | -3.637*** | 0.261 | 1.322*** | 0.085 | 0.530*** | 0.884** | 0.550*** | 0.942 |
| | (0.352) | (0.206) | (0.150) | (0.135) | (0.033) | (0.048) | (0.033) | (0.044) |
| Dependent children t-1 | 1.366*** | -0.834*** | -0.543*** | 0.107 | 1.507*** | 0.959 | 1.272*** | 0.968 |
| | (0.306) | (0.111) | (0.127) | (0.072) | (0.083) | (0.029) | (0.068) | (0.025) |
| Postgraduate t-1 | 0.849* | 0.897 | -0.478** | -0.376 | 0.971 | 1.138 | 1.078 | 1.228* |
| | (0.497) | (0.477) | (0.205) | (0.320) | (0.086) | (0.142) | (0.088) | (0.135) |
| Graduate diploma t-1 | 0.780* | 0.533 | -0.519*** | 0.259 | 1.014 | 1.090 | 1.095 | 0.987 |
| | (0.454) | (0.446) | (0.190) | (0.304) | (0.081) | (0.128) | (0.081) | (0.102) |
| Undergraduate t-1 | 1.235*** | 0.383 | -0.620*** | 0.078 | 0.946 | 0.974 | 1.070 | 0.954 |
| | (0.304) | (0.334) | (0.131) | (0.226) | (0.051) | (0.084) | (0.054) | (0.073) |
| Diploma t-1 | 1.146*** | 0.404 | -0.315** | -0.297 | 1.017 | 1.017 | 0.961 | 1.043 |
| | (0.344) | (0.358) | (0.148) | (0.237) | (0.060) | (0.099) | (0.055) | (0.087) |
| Certificate t-1 | 0.517** | -0.044 | -0.066 | 0.124 | 0.903** | 0.981 | 0.878*** | 1.098* |
| | (0.253) | (0.216) | (0.109) | (0.146) | (0.040) | (0.056) | (0.037) | (0.055) |
| Part Time t-1 | -1.669*** | 0.135 | 0.600*** | -0.008 | 0.613*** | 1.022 | 0.717*** | 1.042* |
| | (0.353) | (0.102) | (0.142) | (0.066) | (0.039) | (0.028) | (0.044) | (0.024) |
| Unemployed t-1 | -8.557*** | 0.037 | 3.714*** | 0.288** | 0.298*** | 0.947 | 0.246*** | 1.011 |
| | (0.702) | (0.192) | (0.287) | (0.124) | (0.038) | (0.045) | (0.031) | (0.046) |
| Not in the labour force t-1 | -9.409*** | -0.378*** | 3.427*** | 0.208*** | 0.190*** | 0.840*** | 0.203*** | 0.936** |
| | (0.353) | (0.121) | (0.146) | (0.079) | (0.012) | (0.026) | (0.012) | (0.026) |
| Real equivalised household disposable | 0.023*** | 0.001 | -0.006*** | 0.000 | 1.005*** | 1.001*** | 1.006*** | 1.000 |
| income (\$'000) t-1 | (0.003) | (0.001) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) |
| Rest of New South Wales t-1 | 1.506*** | 0.164 | -0.689*** | 0.188 | 1.078 | 1.186* | 1.298*** | 0.948 |
| | (0.37) | (0.331) | (0.162) | (0.216) | (0.070) | (0.103) | (0.082) | (0.072) |

| Predictors | Mental health OLS | | Psychological distress OLS | | Role-emotional logit | | Social functioning logit | | |
|----------------------------------|-------------------|----------|----------------------------|---------|----------------------|---------|--------------------------|---------|--|
| | Coeffi | cients | Coeffic | ients | Odds i | ratios | Odds ratios | | |
| | Between | Within | Between | Within | Between | Within | Between | Within | |
| Melbourne t-1 | -0.622** | 0.713* | 0.019 | 0.289 | 0.899* | 1.151 | 1.044 | 0.944 | |
| | (0.316) | (0.422) | (0.139) | (0.283) | (0.050) | (0.128) | (0.056) | (0.09) | |
| Rest of Victoria t-1 | 2.028*** | 0.132 | -0.690*** | 0.424 | 1.199** | 1.124 | 1.430*** | 0.908 | |
| | (0.437) | (0.472) | (0.192) | (0.315) | (0.091) | (0.142) | (0.104) | (0.099) | |
| Brisbane t-1 | 0.843** | 0.354 | -0.394** | -0.129 | 1.020 | 1.312** | 1.182*** | 1.007 | |
| | (0.384) | (0.406) | (0.167) | (0.268) | (0.069) | (0.139) | (0.077) | (0.093) | |
| Rest of Queensland t-1 | 1.651*** | 0.561 | -0.698*** | -0.225 | 1.108 | 1.254** | 1.271*** | 1.049 | |
| | (0.385) | (0.383) | (0.167) | (0.251) | (0.074) | (0.125) | (0.082) | (0.092) | |
| Adelaide t-1 | 0.403 | -0.310 | -0.203 | 0.094 | 1.048 | 1.294 | 1.227*** | 1.018 | |
| | (0.432) | (0.593) | (0.188) | (0.399) | (0.079) | (0.209) | (0.090) | (0.138) | |
| Rest of South Australia t-1 | 1.732*** | -0.362 | -0.844*** | -0.456 | 1.326** | 1.072 | 1.438*** | 0.953 | |
| | (0.632) | (0.701) | (0.278) | (0.468) | (0.146) | (0.198) | (0.153) | (0.154) | |
| Perth t-1 | 0.679 | 1.895*** | -0.181 | 0.234 | 1.025 | 1.024 | 1.297*** | 1.299** | |
| | (0.418) | (0.547) | (0.182) | (0.363) | (0.076) | (0.148) | (0.092) | (0.164) | |
| Rest of Western Australia t-1 | 2.281*** | 1.964*** | -0.920*** | 0.090 | 1.228* | 1.267 | 1.422*** | 1.163 | |
| | (0.653) | (0.665) | (0.285) | (0.447) | (0.138) | (0.225) | (0.155) | (0.180) | |
| Tasmania t-1 | 3.282*** | -0.060 | -1.258*** | 0.562 | 1.537*** | 1.009 | 1.568*** | 0.856 | |
| | (0.583) | (0.664) | (0.254) | (0.44) | (0.157) | (0.176) | (0.155) | (0.130) | |
| Northern Territory t-1 | 2.869** | -0.182 | -0.858* | -0.125 | 0.980 | 1.452** | 0.922 | 0.826 | |
| | (1.247) | (0.672) | (0.506) | (0.44) | (0.221) | (0.261) | (0.192) | (0.126) | |
| Australian Capital Territory t-1 | -0.326 | 0.422 | 0.256 | 0.491 | 0.862 | 1.336* | 1.020 | 1.047 | |
| | (0.715) | (0.573) | (0.306) | (0.372) | (0.109) | (0.202) | (0.124) | (0.134) | |
| Lowest SEIFA decile t-1 | -3.990*** | 0.098 | 2.035*** | 0.234 | 0.596*** | 1.000 | 0.392*** | 0.975 | |
| | (0.517) | (0.271) | (0.220) | (0.179) | (0.054) | (0.071) | (0.035) | (0.062) | |
| Second SEIFA decile t-1 | -2.832*** | -0.056 | 1.602*** | 0.220 | 0.641*** | 0.959 | 0.517*** | 0.891* | |
| | (0.492) | (0.258) | (0.210) | (0.170) | (0.055) | (0.066) | (0.043) | (0.054) | |
| Third SEIFA decile t-1 | -1.755*** | 0.106 | 0.957*** | -0.015 | 0.790*** | 0.937 | 0.604*** | 0.873** | |
| | (0.491) | (0.252) | (0.209) | (0.166) | (0.069) | (0.063) | (0.050) | (0.051) | |
| Fourth SEIFA decile t-1 | -1.168** | 0.063 | 0.666*** | 0.062 | 0.874 | 1.007 | 0.757*** | 0.922 | |
| | (0.498) | (0.252) | (0.213) | (0.165) | (0.076) | (0.068) | (0.062) | (0.054) | |
| Fifth SEIFA decile t-1 | -1.761*** | -0.002 | 0.865*** | 0.088 | 0.811** | 0.968 | 0.690*** | 0.891** | |
| | (0.492) | (0.250) | (0.208) | (0.165) | (0.070) | (0.065) | (0.057) | (0.052) | |
| Sixth SEIFA decile t-1 | -1.417*** | 0.044 | 0.510** | 0.108 | 0.779*** | 0.901 | 0.700*** | 0.873** | |
| | (0.491) | (0.247) | (0.207) | (0.163) | (0.068) | (0.06) | (0.058) | (0.050) | |

| Predictors | Mental health OLS | | Psychological distress OLS | | Role-emotional logit | | Social functioning logit | |
|--------------------------|-------------------|-----------|----------------------------|----------|----------------------|----------|--------------------------|----------|
| | Coeff | icients | Coeffi | cients | Odds | ratios | Odds | ratios |
| | Between | Within | Between | Within | Between | Within | Between | Within |
| Seventh SEIFA decile t-1 | -1.807*** | -0.022 | 0.787*** | 0.149 | 0.797*** | 0.999 | 0.707*** | 0.902* |
| | (0.472) | (0.237) | (0.200) | (0.157) | (0.068) | (0.064) | (0.057) | (0.050) |
| Eighth SEIFA decile t-1 | -1.253*** | -0.343 | 0.457** | 0.268* | 0.838** | 0.922 | 0.793*** | 0.923 |
| | (0.466) | (0.230) | (0.196) | (0.153) | (0.070) | (0.057) | (0.062) | (0.049) |
| Ninth SEIFA decile t-1 | -0.346 | 0.038 | 0.205 | 0.042 | 0.938 | 0.907* | 0.853** | 0.940 |
| | (0.470) | (0.215) | (0.199) | (0.142) | (0.079) | (0.054) | (0.066) | (0.047) |
| 2003 | 4.146** | -0.058 | | | 0.737 | 0.962 | 0.831 | 0.900*** |
| | (1.753) | (0.160) | | | (0.272) | (0.041) | (0.339) | (0.034) |
| 2004 | 0.884 | -0.283 | | | 0.637 | 0.901** | 0.454** | 0.912** |
| | (1.796) | (0.163) | | | (0.233) | (0.039) | (0.177) | (0.035) |
| 2005 | 1.439 | -0.228 | | | 1.691 | 0.866*** | 1.668 | 0.842*** |
| | (1.928) | (0.166) | | | (0.320) | (0.039) | (0.314) | (0.033) |
| 2006 | 3.752* | -0.305* | | | 1.018 | 0.888*** | 0.752 | 0.901*** |
| | (1.936) | (0.167) | | | (0.466) | (0.040) | (0.358) | (0.035) |
| 2007 | 2.598 | -0.317* | | | 0.992 | 0.911** | 1.144 | 0.851*** |
| | (1.976) | (0.170) | | | (0.298) | (0.042) | (0.195) | (0.034) |
| 2008 | 5.738*** | -0.410** | | | 1.453 | 0.804*** | 2.844*** | 0.837*** |
| | (1.989) | (0.174) | | | (0.469) | (0.038) | (1.091) | (0.034) |
| 2009 | 2.098 | 0.069 | 0.063 | -0.102* | 1.293 | 0.847*** | 0.972 | 0.874*** |
| | (1.957) | (0.176) | (0.372) | (0.059) | (0.651) | (0.041) | (0.429) | (0.036) |
| 2010 | 3.691** | -0.639*** | | | 1.269 | 0.743*** | 1.467 | 0.686*** |
| | (1.819) | (0.178) | | | (0.287) | (0.036) | (0.371) | (0.029) |
| 2011 | 2.763* | -0.460** | -0.659** | 0.079 | 1.236 | 0.713*** | 1.220 | 0.732*** |
| | (1.521) | (0.182) | (0.328) | (0.062) | (0.673) | (0.035) | (0.680) | (0.031) |
| 2012 | 1.700 | -0.318* | | | 1.271 | 0.713*** | 1.135 | 0.734*** |
| | (1.424) | (0.180) | | | (0.275) | (0.035) | (0.239) | (0.031) |
| 2013 | 3.287** | -0.312* | -0.252 | 0.026 | 1.449 | 0.678*** | 1.569 | 0.716*** |
| | (1.480) | (0.185) | (0.315) | (0.066) | (0.413) | (0.034) | (0.418) | (0.031) |
| 2014 | 2.205 | -0.913*** | | | 1.410 | 0.580*** | 1.147 | 0.629*** |
| | (1.510) | (0.189) | | | (0.335) | (0.029) | (0.347) | (0.028) |
| 2015 | 0.621 | -1.121*** | 0.435 | 0.379*** | 0.895 | 0.545*** | 0.997 | 0.582*** |
| | (1.476) | (0.195) | (0.308) | (0.072) | (0.350) | (0.028) | (0.266) | (0.027) |
| 2016 | -1.128 | -1.170*** | | | 1.078 | 0.539*** | 0.992 | 0.583*** |
| | (1.387) | (0.199) | | | (0.283) | (0.029) | (0.292) | (0.027) |

| Predictors | Mental health OLS | | Psychological distress OLS | | Role-emotional logit | | Social functioning logit | |
|-----------------------|-------------------|-----------|----------------------------|----------|----------------------|----------|--------------------------|----------|
| | Coefficients | | Coefficients | | Odds ratios | | Odds ratios | |
| | Between | Within | Between | Within | Between | Within | Between | Within |
| 2017 | 3.377** | -1.275*** | 0.653** | 0.449*** | 0.943 | 0.464*** | 1.169 | 0.521*** |
| | (1.463) | (0.205) | (0.270) | (0.079) | (0.232) | (0.025) | (0.260) | (0.025) |
| 2018 | 0.111 | -1.671*** | | | 1.372 | 0.439*** | 0.972 | 0.503*** |
| | (1.371) | (0.212) | | | (0.236) | (0.025) | (0.199) | (0.025) |
| Constant | 76.537*** | | 14.951*** | | 3.451*** | | 1.244*** | |
| | (0.898) | | (0.357) | | (0.170) | | (0.162) | |
| Ν | 190,646 | | 68,866 | | 188,498 | | 191,642 | |
| Wald-Chi ² | 3,954.91*** | | 3,642.18*** | | 3,915.55*** | | 4,115.96*** | |

Source: Authors' own calculations from the 2001-2018 HILDA Survey.

Notes: *** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors are in parentheses. All predictors are binary with the exception of duration at the current address, the housing cost to income ratio and income which are continuous measures. The omitted categories are outright owner, age 15-24 years old, female, non-indigenous, born overseas, legally married, no dependent children, high-school qualification, employed full-time, Sydney, highest SEIFA decile and 2001. Predictors that relate to mobility are reported in table 2.

S3. Missing values in the analysis

Table S3: Number and percentage of observations that have missing values, pooled observations

| Variables | Number of observations | Percentage of total observations |
|--|------------------------|----------------------------------|
| Wellbeing | with missing value | with missing value |
| Wentel health [0, 100] | 27 221 | 10 830/ |
| Preseltate aireal distances [10, 50] | 27,331 | 10.85% |
| Psychological distress [10-50] | 1/3,398 | 08.80% |
| Role-emotional functioning $[0 - 99, 100]$ | 29,551 | 11.8/% |
| Social functioning [0-99, 100] | 26,094 | 10.34% |
| Mobility | | |
| Forced housing mobility | 26,376 | 10.45% |
| Voluntary housing mobility | 23.097 | 9.15% |
| Non-housing-related mobility | 19.333 | 7.66% |
| Housing | -) | |
| Duration at current address | 1.469 | 0.58% |
| Housing tenure | 307 | 0.12% |
| Housing cost burden | 0 | 0.00% |
| Socio-demographic | | |
| Age | 0 | 0.00% |
| Gender | 0 | 0.00% |
| Indigeneity | 71 | 0.03% |
| Country of birth | 73 | 0.03% |
| Marital status | 44 | 0.02% |
| Highest qualification | 146 | 0.06% |
| Labour force status | 231 | 0.09% |
| Income | 0 | 0.00% |
| Geographical area | | |
| State/territory and capital city | 31 | 0.01% |
| SEIFA decile of index of relative | 73 | 0.03% |
| socioeconomic advantage/disadvantage | | |
| Years | | |
| 2001-2018 | 0 | 0.00% |

Source: Authors' own calculations from the 2001-2018 HILDA Survey.

S4. Between-person effects in hybrid models of mental wellbeing

This section discusses the size and significance of the between-person coefficients reported in table 2 in the main text. As between-person coefficients cannot be interpreted causally, the discussion in the main text was focused on within-person effects. This section should be read in conjunction with table 2.

The between-person coefficients show that those who experience forced housing mobility have poorer wellbeing than those who do not move, holding other factors constant. Forced movers on average have lower mental health scores and higher distress scores than non-movers. At the same time, those who experience forced housing mobility are less likely to experience high role-emotional or social functioning than non-movers. Those who experience voluntary and non-housing-related moves also have poorer wellbeing across both the affective and behavioural dimensions than those who do not move. However, the between-person coefficients indicate that forced housing movers suffer from poorer wellbeing than voluntary housing or non-housing-related movers, and this is true across all wellbeing dimensions. These cannot be attributable to causal effects but are likely derived from pre-existing lower wellbeing outcomes among groups at risk of forced housing mobility compared to the other two mobility groups.

Significant between-person differences also exist across other characteristics. On average, outright home ownership, marriage, children, qualifications greater than secondary school, full-time employment, higher incomes and residence in high SES neighbourhood are all linked to better wellbeing across all four domains. Men and the Australian-born have better wellbeing than women and migrants respectively, though indigenous status is associated with a wellbeing penalty. The between-person age coefficients show that elderly people are less prone to psychological distress. There is a typical U-shaped curve in the case of mental health, role-emotional and social functioning, dipping to its lowest in the 45-54 age range. This U-shaped

relationship between age and wellbeing has been documented in other studies such as Schwandt (2016). However, in the case of the behavioural

wellbeing dimensions, individuals never regain the wellbeing levels achieved in their youth.

ⁱ Voluntary housing moves include moves for one or more of the following reasons in the HILDA Survey questionnaire: to be closer to amenities/services/public transport, to live in a better neighbourhood, to get a larger/better place, to get a place of my own/our own, to get a smaller/less expensive place and a housing/neighbourhood reason. None of these moves are accompanied by difficulty paying rent or mortgage in the year of the move.

ⁱⁱ Non-housing-related moves include moves for one or more of the following reasons in the HILDA Survey questionnaire: to get married/moved in with partner, to be closer to friends and/or family, to follow a spouse or parent/whole family moved, martial/relationship breakdown, personal/family reasons, health reasons, change of lifestyle, to be nearer place of work, to look for work, to start a new job with a new employer, to start own business, decided to relocate own business, work transfer, work reasons and and temporary relocation. None of these moves are accompanied by reported difficulty in paying rent or mortgage in the year of the move.

ⁱⁱⁱ Household annual disposable income is divided by the OECD modified equivalence scale, which allocates the first adult 1 point, with a further 0.5 points for each additional person aged 15 years or older and 0.3 points for each child <15 years old. This value is converted to 2018 price levels.

^{iv} Housing cost divided by household's disposable income, then multiplied by 100%.

^v These 'not in the labour force' person-periods are not excluded from the analysis pertaining to hypotheses 1 and 3.

^{vi} These rent-free person-periods are not excluded from the analysis pertaining to hypotheses 2 and 3.