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Why do home-owners do better?

Abstract: Australians who own their own home display favourable outcomes on a range of socio-economic indicators when compared to renters, and substantial benefits of home-ownership also appear to accrue to their children. Whether such effects are causal or simply reflect pre-existing characteristics associated with selection into home-ownership has important implications for decisions to be made by individuals and families, and for policy in light of recent declines in home-ownership rates for younger adults. The literature primarily attributes the better outcomes of those in home-ownership to greater residential stability, particularly in the case of children's educational attainment, and a greater incentive to invest in the local community, but there is little empirical evidence on the sources of benefits from home-ownership in Australia. Using longitudinal data from the Household, Income and Labour Dynamics in Australia survey (HILDA) this paper employs a range of strategies to test competing hypotheses relating to causal mechanisms and selection effects associated with home-ownership. We focus on indicators of physical and mental health, life satisfaction and, for youth, educational attainment. The results suggest the better physical and mental health outcomes of home-owners reflect selection effects rather than any causal impact of home-ownership on health. However, there is evidence that home-ownership promotes higher life-satisfaction, and of residential stability and parental community engagement associated with parental home-ownership impacting beneficially on outcomes for youth.

Key words: Home-ownership; renter; health; life-satisfaction; Australia.

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Introduction

Evidence that people who own their home have better outcomes in life, on average, than those who rent appears almost universal, applying across countries and a range of outcome measures (Aaronson 2000; Rossi & Weber 1996; Shaw 2004). Moreover, those benefits accrue not only to purchasers themselves, but extend to their children (Boehm & Schlottman 1999, Harkness & Newman 2003), and Australia is no exception (Dockery et al. 2013). The evidence is less clear with regard to mechanisms of causality (Aaronson 2000, Baker et al. 2013). Does owning your own home lead to better outcomes in life, or is buying a home just something that people are more likely to do if their lives go well? The question of causality is a critical one. If home-ownership does make a causal contribution in improving outcomes, then the housing market represents a feature of the economy through which socio-economic gradients are transmitted between generations. It also suggests that interventions to promote home-ownership may be warranted. The main mechanisms through which home-ownership is hypothesised to affect outcomes are through greater residential stability, psychological benefits of a greater sense of security and the creation of stronger incentives for individuals to invest in improving the social and physical amenity of their neighbourhoods. Understanding the mechanisms through which home-ownership promotes better outcomes would offer a guide to the design of policy and programs to address disadvantage.

Such considerations are not applicable if, on the other hand, there is no causal effect and the better outcomes for home-owners simply reflect selection into home-ownership. In this paper we employ a range of approaches to explore the nature of the relationship between tenure and outcomes for home-owners and their children aged 15 to 24, using longitudinal data from Household, Income and Labour Dynamics in Australia survey (HILDA).

Data and some descriptive statistics

HILDA is an annual panel survey of individuals from a representative sample of private households (Watson and Wooden 2010). Initiated in 2001, data from 17 annual waves of the survey (to 2017) were available at the time of writing. Within selected households all occupants aged 15 and over are surveyed. Around 13,000 individuals from over 7,000 households have responded each year, with year-on-year attrition rates averaging below 10 per cent. There are three main survey instruments used in collecting the data: a household questionnaire completed for the whole household by one responding adult; an individual 'person questionnaire' completed by interview; and a self-completion questionnaire that responding individuals fill out by themselves and return to the researchers.[1]

Data on housing tenure are collected in every wave through the household questionnaire. Specifically, the respondent is asked "Do you (or any other members of this household) own this home, rent it, or do you live here rent free?". The response options are:

- Own / currently paying off mortgage
- Rent (or pay board)
- Involved in a rent-buy scheme
- Live here rent free / Life Tenure
- Refused or don't know.

Those who indicate that the household rents are further asked who they rent from. We apply a number of exclusions to define two distinct groups of 'owner' and 'renter' households. First, we include only those who nominate one of the first two options. Those involved in a rent-buy scheme are excluded due to the ambiguity as to whether this equates to ownership or renting[2]; while the circumstances of those who live rent free or have life tenure would not be considered typical of renters.

[1] See http://melbourneinstitute.unimelb.edu.au/hilda for further details on the HILDA survey.

[2] In Wave 1 rent and rent-buy scheme were included in the same category. Rather than exclude all the wave 1 data these have been included among renters. Based on Wave 2 frequencies only 0.15 of a percent of respondents lived in a household involved in a rent-buy scheme.

Second, among households that rent, we include only those who indicate that they rent from 'a private landlord or real estate agent', 'an employer', 'manager of a complex/village' or 'other'. This excludes those renting in a caravan park, government housing authority, community housing or a cooperative housing group, as well as the various unspecified categories. Typically, those in public or community housing have experienced some form of adverse experiences to have qualified for such housing.

Finally, to avoid ambiguity around who within a household can be considered a home-owner or renter, we also restrict the sample to couple family households (with or without children), sole-parent households and lone parent households. This excludes group households, multi-family households and households with other combinations of related persons. Note that the questions on tenure are part of the household questionnaire, so the classification of individuals as a home-owner means that the family they live with owns the home – their name is not necessarily on the title deed. Similarly the classification of individuals as renters indicates that the family they live with is renting the home. This distinction is particularly relevant for younger adults, many of whom will be living with parents who are the ones who actually own or rent the home.

Applying these exclusions and pooling the data from waves 1 to 17 (2001-2017) gives a sample of 235,472 observations on individuals classified as either home-owners or renters. Using the HILDA provided person weights, 77.5 per cent were home-owners and 22.5 per cent renters. Table 1 presents means for this sample for selected variables relating to a range of life's outcomes.

Within each broad age-group, home-owners are healthier and happier than those renting. They report better physical and mental health and higher life satisfaction, even higher satisfaction with their relationship with their partner. In total, renters report better physical health on average than home-owners, but that is simply due to the fact that they are much younger – the mean age of renters is a full ten years lower than of home-owners (36.3 years versus 46.6 years). Home-owners are less likely to be unemployed at each age, and in the prime working years from age 30 to 59 they are substantially more likely to be participating in the labour force and to be employed. In terms of their home and neighbourhood, renters experience markedly greater residential instability. At each life-stage, home-owners live in higher socio-economic neighbourhoods, are more satisfied with their home and neighbourhood and feel safer than renters.

As noted, persons are considered home-owners if the family they live with owns their home. In many cases these will be people who are purchasing their home or own it outright. This is the group for whom selection effects are likely to be significant – individuals with positive attributes contributing to better outcomes in life are also more likely to purchase a home. The data presented in Table 1 on outcomes for persons aged 15-29 suggests children of home-owners may also benefit. To isolate this group more definitively, we calculate means for those measures for individuals aged 15-24 and classified as dependent students or non-dependent children within their household – essentially young people living in the parental home. There are 27,233 such individuals in the pooled sample, and a relatively high proportion (83%) live in owner occupied homes.

Table 1: Home-owners versus renters, comparison of selected outcomes by age group, pooled observations waves 2001 - 2017

		15-29 years	30-44 years	45-59 years	60+ years	Total
Health & wellbeing						
Self-assessed health [1-5]	Renter	3.66	3.49	3.11	2.78	3.43
	Home-owner	3.82	3.57	3.34	3.00	3.41
Physical health summary score	Renter	52.70	51.34	47.54	41.90	50.47
	Home-owner	53.93	52.65	50.29	45.15	50.32
Mental health summary score	Renter	50.31	49.68	48.01	45.85	49.33
	Home-owner	51.60	51.39	50.70	49.04	50.63
Life satisfaction [0-10]	Renter	7.84	7.51	7.46	7.99	7.67
	Home-owner	8.10	7.81	7.83	8.25	7.99
Satisfaction, relationship with partner [0-10]	Renter	8.36	8.10	7.80	8.56	8.17
	Home-owner	8.40	8.11	8.06	8.71	8.29
Labour force status						
Employed [0/1]	Renter	0.71	0.77	0.73	0.21	0.70
	Home-owner	0.70	0.84	0.80	0.21	0.63
Unemployed [0/1]	Renter	0.07	0.04	0.04	0.01	0.05
	Home-owner	0.06	0.02	0.02	0.01	0.03
Not in the labour force [0/1]	Renter	0.21	0.18	0.23	0.78	0.25
	Home-owner	0.23	0.14	0.18	0.78	0.34
Home, neighbourhood & community						
Number of homes lived in during past 10 years[a]	Renter	5.5	5.7	4.2	3.3	5.3
	Home-owner	2.8	3.7	2.2	1.6	2.7
Years lived at current address	Renter	2.2	2.8	4.1	6.3	3.1
	Home-owner	9.3	7.0	12.9	21.2	12.9
Decile, socio-economic adv & disadvantage [1-10]	Renter	5.57	5.66	5.37	4.78	5.50
	Home-owner	6.05	5.85	5.98	5.58	5.86
Satisfaction with the home in which you live [0-10]	Renter	7.49	7.02	7.22	8.01	7.32
	Home-owner	8.41	7.88	8.14	8.65	8.27
Satisfaction with neighbourhood in which you live [0-10]	Renter	7.47	7.52	7.56	7.88	7.54
	Home-owner	7.95	7.85	7.99	8.27	8.02
Satisfaction with how safe you feel [0-10]	Renter	8.18	7.86	7.76	8.12	7.99
	Home-owner	8.55	8.04	8.09	8.26	8.22

Notes: means calculated using HILDA person weights; a. data available for new responding persons only, means calculated assuming figure of 7 homes for the category of 5-9; 11 for category of 10-14 and 15 for the category of 15 or more.

Table 2 confirms that young people are happier, healthier and more satisfied with their home and neighbourhood if they are living with parents who own their home. While this cannot arise due to selection on the basis of those young people's own characteristics, it may still reflect selection into home-ownership at the family level, with positive attributes of their parents leading to both better outcomes for the children and a higher likelihood of purchasing a home.

Table 2: Dependent children aged 15-24: Home-owners versus renters, selected outcomes, pooled observations waves 2001 – 2017

	Renters	Home-owners	Total
Health & wellbeing			
Self-assessed health [1-5]	3.71	3.87	3.84
Physical health summary score	52.96	54.20	54.01
Mental health summary score	50.61	51.76	51.58
Life satisfaction [0-10]	8.08	8.19	8.17
Home & neighbourhood			
Number of homes lived in during past 10 years[a]	4.6	2.3	2.7
Years lived at current address	3.8	10.9	9.7
Decile, socio-economic advantage & disadvantage [1-10]	5.31	6.22	6.07
Satisfaction with the home in which you live [0-10]	7.95	8.54	8.45
Satisfaction with the neighbourhood in which you live [0-10]	7.54	8.04	7.95
Satisfaction with how safe you feel [0-10]	8.50	8.66	8.63

Notes: see notes, Table 1.

Causal channels from ownership to outcomes

The data presented above are consistent with the general view that home-owners, on average, do better than renters across a broad spectrum of life's domains. This leaves open two key questions. Is the association causal or does it simply reflect selection into home-ownership? If there is a causal effect, through what channel(s), does it operate?

The two main hypotheses for a causal effect of the state of home-ownership are the positive effects of greater residential stability and greater incentives to invest in neighbourhood amenity and social capital. Proxy measures of residential stability are available in HILDA, including a question asked of all new responding persons on how many homes they had lived in during the last 10 years; an indicator on the household form for whether the household had moved since the previous interview; and a derived variable for all responding persons on how many years individuals had lived at their current address. Perhaps the most robust measure of residential instability is the number of homes lived in during the past 10 years, but his can be determined only for new entrants to the survey. As shown in Table 1, for persons first entering HILDA as a responding person, which includes those within existing HILDA households turning 15, those in rental housing have typically lived in 5.7 homes in the last 10 years, double that for home owners. A similar gap applies for dependent children (Table 2). For the full pooled sample, home-owners have lived at their current address for an average 12.9 years, compared to 3.1 years for renters, with that gap widening with age.

We also attempted to identify indicators within HILDA relating to investment in the local community. Two indicators available in every wave demonstrate that home-owners have stronger – or at least more active - social networks. They are much more likely to be an active member of a club or association and report getting together with friends and relatives slightly more often, but we cannot gauge how much this translates to local community or neighbourhood engagement.

In Waves 6, 10 and 14 the self-completion questionnaire included a series of 11 questions relating to community participation, each using a 6-point rating scale ranging from 1=never to 6=very often. From these we removed items we felt unlikely to reflect a local neighbourhood connection (eg. how often you 'Have telephone, email or mail contact with friends or relatives not living with you'). We then used a factor analysis of the remaining items to generate a composite score of 'community participation', standardised to have a mean of zero and standard deviation of 1 for the pooled sample. The items contributing to this community participation score, in descending order of correlation, are 'How often do you …:

- Encourage others to get involved with a group that's trying to make a difference in the community

- Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations
- Attend events that bring people together such as fetes, shows, festivals or other community events
- Get in touch with a local politician or councillor about issues that concern me
- Talk about current affairs with friends, family or neighbours
- Chat with your neighbours.

Table 3(a) presents means for these indicators of social networks and community participation for the pooled sample, and Table 3(b) for the sub-sample of dependent children aged 15-24.[3] On each measure, and at each age, those in owner-occupied housing display stronger community engagement.

Table 3: Home-owners versus renters, comparison of community investment indicators, pooled observations wave 2001 – 2017

(a) All persons by age

	15-29 years	30-44 years	45-59 years	60+ years	Total
Active member of club/association [0/1]					
Renter	0.31	0.27	0.28	0.35	0.29
Home-owner	0.44	0.34	0.37	0.48	0.41
How often get together with friends & relatives [1-7]					
Renter	4.98	4.34	4.04	4.26	4.53
Home-owner	5.18	4.41	4.17	4.43	4.51
Community participation factor score					
Renter	-0.35	-0.16	-0.15	0.01	-0.21
Home-owner	-0.24	-0.01	0.11	0.28	0.05

Notes: means calculated using HILDA person weights.

(b) Dependent children aged 15-24

	Renters	Home-owners	Total
Active member of club/association [0/1]	0.34	0.48	0.46
How often get together with friends & relatives [1-7]	5.22	5.32	5.30
Community participation factor score	-0.48	-0.24	-0.27

Notes: means calculated using HILDA person weights.

This greater residential stability and community connectedness of home-owners is consistent with the hypothesised causal channels. To try to distinguish between competing hypotheses, we separately examine 'own-account' home-owners or renters and children living with their parents. For each we estimate a range of multivariate models of outcomes for physical health, mental health and life-satisfaction and, for dependent youth, education. Rather than look at economic outcomes, which will be directly entwined with ownership status, we focus on outcomes in personal domains and where the association with home-ownership presents more of a conundrum.

Own-account home-owners and renters

To identify 'own-account' owners and renters, as opposed to children or other persons living in a home owned or rented by others, we select the subset of the sample for whom their relationship within the household is classified as a couple, lone parent, or lone person. Recall multi-family

[3] We use the term 'dependent children' to mean those living with their parents. They may be financially independent. Our use of the term differs from that in HILDA, which distinguishes between 'dependent students' and 'non-dependent children'.

households are already excluded from our sample. As outcomes, we model physical health, mental health and overall life satisfaction. Physical and mental health summary scores are derived through factor analyses of the SF36 items[4], and standardised to have a mean of 50 and standard deviation of 10. Commencing from a reduced-form multivariate panel model, a number of strategies are followed to test hypotheses of causal relationships:

- Estimate a base model with basic demographics (gender, age, age-squared, marital/sole-parent status, presence of a long-term disability and non-English speaking background) and then an expanded model including factors relating to socio-economic status (SEIFA decile of neighbourhood advantage, log household income and educational attainment). These models are estimated by random-effects and fixed effects – estimates of the coefficient on housing tenure in the fixed effects model are based only on persons who changed tenure status, thus controlling for selection effects. The model cannot, however, control for potential omitted variables that impact upon both outcomes and housing tenure.
- Entering variables capturing the hypothesised causal mechanisms associated with home-ownership: residential stability (years at current address) and investment in the local neighbourhood (community participation factor). If home-ownership does promote better outcomes through these mechanisms, then their inclusion in the modelling should account for some of the estimated home-ownership effect.
- Including the proportion of homes within the neighbourhood that are owner-occupied, by matching the Statistical Area (SA1) of respondents' addresses to 2011 Census data. If it is the case that home-ownership creates positive social capital investment in the local neighbourhood and community, then that externality should also accrue to renters living in neighbourhoods with high rates of home-ownership.
- Restricting the sample to persons who were currently renting, but including a variable indicating whether the person will be in home-ownership within three years. The strategy is that the variable for imminent home-ownership will capture selection effects, but future ownership cannot have a causal effect upon current outcomes.

Table 4 contains estimates of the coefficients on the home-ownership variable from the models with, respectively, the physical health summary score, mental health summary score and life-satisfaction rating as the dependent variable. All are estimated as linear panel models, with robust standard errors reflecting repeat observations on individuals. Full results for selected models are presented in Appendix Table A1.[5] The reported coefficients can be interpreted as the estimated effect on the dependent variable of being a home-owner as opposed to a renter. Life satisfaction is self-assessed on an 11 point scale (0=completely dissatisfied, 10=completely satisfied). While an ordered probit model would be the more technically appropriate specification for modelling this variable, linear models have been found to give very similar results and provide for much simpler interpretation of coefficients.

The initial random-effects models show highly significant and positive associations between home-ownership and physical health, mental health and life satisfaction. Surprisingly, these are quite unaffected by the inclusion of variables capturing the household's socio-economic status and the individual's level of education. However, when the models are estimated using the fixed-effects specification, there is no evidence that moving into home-ownership is associated with better physical or mental health. Both the random and fixed-effects models indicate positive and significant associations between home-ownership and life satisfaction.

[4] Medical Outcomes Study short-form 36-item health survey (see Ware et al. 2000).

[5] Full results for other models available upon request.

Table 4: Estimated coefficients on home-ownership from selected models of physical health summary score, mental health summary score and life-satisfaction

	Physical health		Mental health		Life satisfaction	
	Random effects	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects
Waves 1-17						
Base Model	0.465***	-0.158*	0.520***	-0.110	0.140***	0.081***
Base model + SES variables	0.497***	-0.149*	0.543***	-0.111	0.140***	0.081***
Base model + SES vars + Years at current address[a]	0.500***	-0.135	0.563***	-0.082	0.149***	0.093***
Base model + SES vars + SA1 home-ownership rate	0.505***	-0.144*	0.561***	-0.094	0.138***	0.081***
Observations (individuals)	161,178 - 166,989 (21,989 – 22,047)		166,565 – 167,376 (22,003 – 22,064)		188,310 – 189,366 (23,257 – 23,320)	
Waves 6, 10 & 14						
Base model + SES variables	0.804***	-0.228	1.064***	0.045	0.156***	0.103***
Base model + SES vars + community participation score	0.724***	-0.294	0.927***	-0.040	0.139***	0.061
Base model + SES vars + community participation score + SA1 HO rate	0.741***	-0.255	0.945***	-0.029	0.136***	0.054
Observations/individuals	28,362 – 28,897 (14,808 – 14,964)		28,403 – 28,93 (14,809 – 14,962)		28,967 – 32,631 (14,973 – 16,362)	

Notes: ***, ** and * denote significance at the 1, 5 and 10 per cent levels, respectively; a. see Appendix Table A1 for full results for these models.

We find no evidence that residential instability is a causal channel from tenure to outcomes, since the estimated coefficients for home-ownership in fact become larger with the inclusion of the variable measuring years at current address. Similarly, we find no evidence that the effects of home-ownership operate through neighbourhood externalities, since the neighbourhood home-ownership rate itself is insignificant in all but one model and its inclusion has minimal effect upon the estimated coefficient for the individual's home-ownership status. The neighbourhood home-ownership rate was weakly significant (p=0.098) in the fixed effects models for mental health, but its estimated effect was negative.

The variable for community participation is available only from waves 6, 10 and 14. The community participation factor score was highly significant in all models and of some magnitude, consistent with persons with stronger community engagement being healthier and happier (although the direction of causality could run either way). There is evidence that effects of home-ownership are mediated through increased community engagement, since the inclusion of this factor leads to a lower (less positive or more negative) coefficient on home-ownership - mostly the change is very marginal, but more substantial in the fixed-effects model for life satisfaction.

Finally, we further restricted the sample to persons who were currently renting, but included a variable indicating whether or not the person will be in home-ownership within three years' time (Table 5). For both physical and mental health, the results suggest stronger positive effects from imminent home-ownership than is observed for actual home-ownership. Clearly this effect cannot operate through a causal mechanism from home-ownership, and appears to provide strong evidence that positive health premiums observed for home-owners relative to renters is principally one of selection. In contrast, the estimated effect of future home-ownership on life satisfaction is smaller than when home-ownership is modelled contemporaneously. Hence this test does not dismiss the possibility of a causal effect of home-ownership on life satisfaction.

Table 5: Renters - estimated current effect of entering home-ownership within three years, Waves 1-14.

Dependent variables	Random Effects		Fixed Effects	
	Base models	With SES variables	Base models	With SES variables
Physical Health Summary score	0.818***	0.593***	0.077	0.059
Mental Health Summary score	0.809***	0.621***	0.201	0.181
Life satisfaction [0-10]	0.065***	0.053***	0.035	0.031

See notes, Table 4.

Dependent children aged 15-24

We follow a similar approach to estimate tenure effects on youth and young adults living with their parents. Variables relating to marital status are not included in the base models, though we add an indicator for whether the youth lives in a sole-parent family. The neighbourhood decile of socio-economic advantage, log of household income and whether or not any parent had a university degree were included as controls for socio-economic background. Full results for selected models for youth are provided in Appendix Table A2. The variable for community participation now relates to parental community engagement, in line with the hypothesis that the parent, as the home-owner, will invest more in the local community with spill-over benefits to their children. The variable is based on the mother's or father's community participation factor score for sole-parent families, and the higher of the two for two-parent families.

Table 6: Estimated effects of home-ownership on dependent children, coefficients from selected models of physical health summary score, mental health summary score, life satisfaction and educational attainment

	Physical health		Mental health		Life satisfaction		Educational attainment
	Random effects	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	
Waves 1-17							
Base Model	0.913***	0.100	0.741***	0.028	0.111***	0.129**	0.528***
Base model + SES variables	0.833***	0.071	0.704***	0.014	0.100***	0.137**	0.425***
Base model + SES variables + Years at current address[a]	0.683***	0.068	0.582**	0.053	0.070**	0.132**	0.380***
Base model + SES variables + SA1 home-ownership rate	0.813***	0.050	0.646***	-0.042	0.093***	0.125**	0.414***
Observations (individuals)	21,407 - 21,648 (5,814 - 5,875)		21,485 - 21,727 (5,825 – 5,887)		24,389 - 24,692 (6,169 - 6,236)		1,292 – 1,301
Waves 6, 10 & 14							
Base model + SES variables	1.081***	-0.492	1.095***	0.471	0.061	0.269	0.329**
Base model + SES variables + community participation score	0.959***	-0.712	0.985**	0.307	0.047	0.217	0.299
Base model + SES vars + community partic. + SA1 HO rate	0.912***	-0.600	0.909**	0.277	0.050	0.211	0.278
Observations (individuals)	3,740 – 3,888 (2,886 – 2,999)		3,750 - 3,898 (2,896 - 3,009)		4,056 - 4,418 (3,084 - 3,339)		303 - 305

See notes, Table 4; a. see Appendix Table A2 for full results for these models.

Finally, we look at educational attainment of young people at age 24 conditional upon their parents' tenure. We select 24 as an age at which most people have completed their main investment in education in preparation of a career, although many will go on to do further studies as an adult. Because of likely movement out of the parental home following completion of school or university, we do not restrict the sample to people living in their parents' home at age 24, but instead model educational attainment at age 24 conditional upon the family's housing tenure when the youth was aged 17. This corresponds to around the final year of high school for those who complete Year 12, and thus an important developmental stage. Educational attainment is modelled using an ordered probit model and 6-point scale progressing from did not complete Year 12, completed Year 12, Certificate III/IV, diploma or advanced diploma, Bachelor's degree to post-graduate qualification as the highest level of education attained at age 24.

As with the sample of own-account home-owners, the random effects models (Table 6) show positive associations between the family owning their home and children's physical health, mental health and life satisfaction as young adults. However, the associations for physical and mental health are not robust to estimation by fixed-effects. We also now observe that children living in home-ownership at age 17 progress to achieve higher levels of education than those living in rental housing, but we do not attempt to assess whether or this is due to selection effects. While it is difficult to interpret the meaning of coefficients from ordered probit models, by way of comparison the estimated effect of a parent holding a university degree in the education models was around +0.34 and highly significant, suggesting the estimated housing tenure effect is of quite some importance.

In terms of potential mediating channels, the coefficient on years at current address is significant in the random-effects models for physical health, mental health ($p<0.05$) and life satisfaction. The inclusion of this variable does result in a drop in magnitude of the coefficient on home-ownership in the random-effects models and in the model for educational attainment, indicating that greater residential stability is a mechanism through which home-ownership affects young people's outcomes to a small degree. There is minimal evidence of externalities associated with a higher rate of neighbourhood home-ownership, with that variable insignificant in all but the random effects model for mental health ($\beta=0.012$, $p=0.046$).

Parental community participation was significant in all three random-effects models, albeit only weakly in some, and in the fixed effects model for physical health ($\beta=0.531$, $p=0.076$). The estimated coefficient for parental home-ownership is reduced very marginally when this variable is added. Hence there is some evidence that young people benefit when their parents are more engaged in the local community, and possibly that home-ownership plays a causal role in promoting that engagement.

Conclusion

Analyses of the HILDA data confirm that Australian home-owners and their children display better outcomes, relative to renters, across a range of domains. In this paper we have focussed on the relationships between home-ownership and physical and mental health and self-assessed life satisfaction, as well as educational attainment for youth. We believe there is a strong case to argue that the better physical and mental health outcomes for home-owners primarily reflect selection effects rather than causal effects. This is on the basis that home-ownership is not significant in fixed-effects models of health outcomes and, more convincingly, that imminent home-ownership has just as strong an association with mental and physical health outcomes as actual home-ownership. Baker et al. (2013), using data from earlier waves of HILDA, similarly found the better mental health of home-owners to be attributable to selection rather than causal effects. However, there is evidence that being in home-ownership does promote happiness, with the positive associations with life satisfaction robust to the various tests. This is surprising given existing literature suggesting psychological benefits of home-ownership (Shaw 2004), and could be expected to impact on mental health as much as life satisfaction.

For own-account home-owners, we find no evidence to support the hypotheses that residential instability or greater community participation act as causal mechanisms between home-ownership and outcomes. Similarly we find no evidence that the effects of home-ownership operate through neighbourhood externalities or spill-overs, even though this is a key justification for policies to promote home-ownership. There is, however, weak evidence that residential stability, parental community participation and spill-over effects of home-ownership do impact upon outcomes for dependent children. In part the null findings may reflect a limited capacity of the instruments to capture these mediating mechanisms - while our measure of community participation appears intuitively appealing, it is not an established, tested instrument. The development and validation of robust measures offers a potential avenue for further research.

References

Aaronson, D. (2000), 'A note on the benefits of homeownership', *Journal of Urban Economics*, 47(3), 356-69.

Baker, E, Bentley, R & Mason, K 2013, 'The mental health effects of housing tenure: Causal or compositional?', *Urban Studies*, 50(2), pp.426-442.

Boehm, TP. and Schlottman, AM. (1999), 'Does homeownership by parents have an economic impact on their children?', *Journal of Housing Economics*, 8, pp. 217-22.

Dockery, A. M., Ong, R., Colquhoun, S., Li, J. and Kendall, G. (2013), *Housing and children's development and wellbeing: Evidence from Australian Data*, AHURI Final Report No. 201, Australian Housing and Urban Research Institute, Melbourne.

Harkness, J. and Newman, S. (2003), 'Differential effects of homeownership on children from higher- and lower-income families' *Journal of Housing Research*, 14(1), pp. 1-19.

Rossi P. and Weber, E. (1996), 'The social benefits of homeownership: empirical evidence from national surveys', *Housing Policy Debate*, 7, 1-35.

Shaw, M. (2004), 'Housing and public health', *Annual Review of Public Health*, 25, pp. 397–418.

Ware, J.E., Snow, K.K., Kosinski, M., Gandek, B., 2000. *SF-36 Health Survey: Manual and Interpretation Guide*, QualityMetric Inc., Lincoln, RI.

Watson, N. and Wooden, M. (2010) 'The HILDA survey: progress and future developments', *Australian Economic Review*, 43, pp. 326–36.

Appendix: Full results for selected regression models

Table A1: Random effects linear regression models for physical health, mental health and life satisfaction, all persons aged 15 and over, HILDA Waves 2001-2017.

	SF-36 physical health summary score		SF-36 mental health summary score		Life satisfaction: 0=totally dissatisfied to 10=totally satisfied	
	β	P>z	β	P>z	β	P>z
Constant	48.331	0.000	46.417	0.000	8.201	0.000
Age (years)	0.152	0.000	0.129	0.000	-0.029	0.000
Age-squared	-0.003	0.000	-0.002	0.000	0.000	0.000
Female	-0.932	0.000	-1.182	0.000	0.101	0.000
Marital status						
Married	—		—		—	
Separated/widow	-0.110	0.397	-0.776	0.000	-0.419	0.000
Never married	0.183	0.075	-0.524	0.000	-0.334	0.000
Sole parent	-0.337	0.022	-0.947	0.000	-0.123	0.000
Has a disability	-4.711	0.000	-3.556	0.000	-0.251	0.000
Country of birth						
Australia	—		—		—	
Main English spkg country	0.825	0.000	0.874	0.000	0.012	0.634
Non-English spkg country	-1.210	0.000	-0.969	0.000	-0.272	0.000
Decile, socio-economic advantage [1-10]	0.180	0.000	0.130	0.000	0.008	0.000
Household income (log)	0.166	0.000	0.165	0.000	0.026	0.000
Educational attainment						
Post graduate	2.041	0.000	1.361	0.000	-0.083	0.007
Bachelor degree	1.578	0.000	1.163	0.000	-0.099	0.000
Diploma/Advanced diploma	1.172	0.000	0.996	0.000	-0.055	0.036
Certificate level III/IV	0.254	0.050	0.212	0.144	-0.075	0.000
Year 12 or equivalent	1.114	0.000	0.979	0.000	-0.068	0.005
Did not finish Year 12	—		—		—	
Years at current address	0.000	0.945	-0.006	0.138	-0.004	0.000
Home owner	**0.500**	**0.000**	**0.563**	**0.000**	**0.149**	**0.000**
R-squared	0.27		0.12		0.07	
Wald Chi-square	10229	0.000	4126	0.000	2185	0.000
Observations	166,178		166,565		188,310	
Individuals	22,015		22,033		23,282	
Obs per Individual						
Minimum	1		1		1	
Average	7.5		7.6		8.1	
Maximum	17		17		17	

Table A2: Random effects linear regression models for physical health, mental health and life satisfaction; ordered probit model of educational attainment[a], dependent children, HILDA Waves 2001-2017

	Dependent children aged 15-24						17 year olds	
	SF-36 physical health score		SF-36 mental health scored		Life satisfaction (0 - 10		Educational attainment by age 24[a]	
	β	P>z	β	P>z	β	P>z	β	P>z
Constant	51.943	0.000	69.698	0.000	12.160	0.000		
Age (years)	0.048	0.833	-1.858	0.000	-0.397	0.000		
Age-squared	-0.002	0.686	0.044	0.000	0.008	0.000		
Female	-1.109	0.000	-3.002	0.000	-0.108	0.000	0.433	0.000
Sole-parent home	-0.358	0.025	-0.922	0.000	-0.125	0.000	-0.162	0.038
Has a disability	-3.135	0.000	-3.270	0.000	-0.309	0.000	-0.184	0.064
Country of birth Australia								
Main English spkg country	-0.365	0.460	-0.416	0.514	-0.079	0.409	0.168	0.452
Non-English spkg country	-0.239	0.474	-0.443	0.324	-0.099	0.130	0.567	0.000
Decile, socio-economic advantage [1-10]	0.081	0.001	0.049	0.163	0.016	0.002	0.053	0.000
Household income (log)	0.103	0.096	0.129	0.078	0.031	0.011	-0.020	0.581
Any parent has a degree	0.273	0.068	0.084	0.707	0.003	0.913	0.342	0.000
Years at current address	0.030	0.003	0.028	0.030	0.007	0.000	0.008	0.112
Home owner	**0.683**	**0.000**	**0.583**	**0.015**	**0.070**	**0.047**	**0.380**	**0.000**
Probit model intercepts:								
/cut1							-0.499	
/cut2							0.676	
/cut3							1.188	
/cut4							1.412	
/cut5							2.544	
R-squared	0.06		0.06		0.05		0.05	
Wald chi-square	345	0.000	542	0.000	730	0.000		
Log-likelihood							-1987	
LR chi-square							199	0.000
Observations	21,407		21,485		24,389		1,292	
Individuals	5,814		5,825		6,169		1,292	
Obs per Individual								
Minimum	1		1		1		1	
Average	3.7		3.7		4.0		1	
Maximum	10		10		10		1	

Notes: a. the ordered probit model estimates the likelihood of higher attainment, with outcome ranging from 1=did not finish Year 12; 2=Year 12 or equivalent; 3=Certificate level III/IV; 4=diploma, associate or advanced diploma; 5= bachelor's degree; 6=post-graduate degree.