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Title:

Fertility Intention Induced Relocation: The Mediating Role of Housing Markets

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I declare that there is no conflict of interest.

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Fertility Intention Induced Relocation: The Mediating Role of Housing Markets

Abstract

This study provides an empirical investigation on the impact of fertility intentions on residential relocation behaviours of partnered women during periods of housing price inflation in Australia. The finding suggests that there is a significant impact of fertility intentions on residential mobility. Couples with strong fertility intentions tend to move from owner-occupied dwelling to another with more capacity in a more affordable local government areas. However, there is substantial heterogeneity around housing market conditions. The translation of fertility intention into relocation was not observed in housing markets with high affordability pressures. This study extends previous research on fertility intention and relocation behaviour by considering how housing market conditions can interfere the translation of fertility intentions into residential moves and the realisation of fertility intentions in births.

Keywords Fertility intention ▪ Residential relocation ▪ Housing markets ▪ Theory of Planned Behaviour ▪ Simultaneous equation models

1 Introduction

The adjustment of housing consumption over the course of life-cycle is often associated with residential relocation. Fertility is among the life-course events that require increased housing which may trigger residential mobility, and conversely, the incapability of households to relocate may delay or impede childbearing intentions and plans. An understanding on the nature of the relationship between fertility decisions and residential relocation has important implications across a range of policy areas including fertility and family support, infrastructure planning such as schools, childcare and health services, and housing policies more generally.

The ability of households to realise fertility intentions via fertility related relocations has social and economic significance in the Australian context. From a high of 2.95 in 1971, the total fertility rate declined to a low of 1.74 in 2001, and has been below the replacement rate of 2.1 children per woman since 1976 (ABS 2016a). This low fertility rate, combined with ageing population and shrinking proportion of workforce, may have adverse consequences over time. Along with the falling fertility rate, Australia has observed persistent and at times rapid rises in the price of housing in many regions over the proceeding few decades (RBA 2015). In the mid-2000s and early 2010s, house price growth accelerated and exceeded ten per cent in some markets such as Sydney and Melbourne.

Previous research has established the connection between changes in housing and childbirth (Mulder and Wagner 1998, 2001; Murphy and Sullivan 1985; Feijten and Mulder 2002; Kulu and Vikat 2008; Kulu, Boyle, and Andersson 2009; Kulu, Vikat, and Andersson 2007), and acknowledged the complexity and simultaneity of housing and fertility events

(Clark 2012; Öst 2012; Kulu and Steele 2013; Michielin and Mulder 2008). Due to the lack of information on fertility intentions, these studies utilise the timing of actual births to indirectly capture fertility intentions at the prior stage of family planning (Ermisch and Steele 2016; Öst 2012); and thus they fail to address the potential impact of intentions in one life domain on actual behaviour in another (Vidal, Huinink, and Feldhaus 2017). There is also a lack of studies into the role of housing contexts in the realisation of childbearing intentions. Incorporating housing market conditions is essential in understanding the realisation of fertility planning in residential relocation and childbirth behaviour.

This paper examines whether subjective childbearing intentions affect residential relocation outcomes, and whether the translation of fertility planning into adjustment relocations is conditioned by housing market conditions. The analysis is based on the extensive information on fertility history and fertility intention in the Household, Income and Labour Dynamics in Australia (HILDA) survey. The panel nature of the HILDA data along with the rich set of information available provides an opportunity to undertake an analysis that allows for observed and unobserved influences to be considered in explaining the decisions around fertility and housing demand. Fertility intention questions are consistently recorded and finely defined (on a scale of 0 to 10) in each wave, which serves as a direct and detailed measure on the anticipation and planning of childbirth that is otherwise problematic to define.

The study provides evidence on the impact of fertility intentions on residential relocations across housing market situations, and the potential role of residential mobility in the realisation of fertility intentions in births. Allowing for the correlation between

unmeasured selection on mobility and fertility decisions in a simultaneous equation framework, the results suggest that fertility intentions have significant impact on the residential behaviours of Australian couples. Large heterogeneity in responses was observed across relocation distance, housing tenure, location cost, dwelling size, and housing markets. In particular, fertility-induced moves are only observed for households in housing markets with low affordability pressures, and often involve an intra-regional transition to another owner-occupied dwelling with more bedrooms in a less expensive local government area.

2 Literature review

Early studies that examine the association between housing and fertility outcomes generally employed a cross-sectional framework. A series of studies have described the influence of changes in family composition on changes in housing tenure, size and location, especially over short distances (Kendig 1984; Henretta 1987; Clark, Deurloo, and Dieleman 1994; Dieleman and Everaers 1994; Deurloo, Clark, and Dieleman 1994). A limitation in using cross sectional data to analyse residential transition is that it fails to consider the temporal order of the life-course events. Further, it is likely that the decision to move is simultaneously determined with the life-course events associated with the change in the demand for housing (Clark and Withers 2009; Kulu and Steele 2013; Kulu and Vikat 2008). Therefore, in general, studies using cross-sectional data fail to control for unobserved heterogeneity and selection, and are hence unable to identify a causal relationship.

Longitudinal data allows for a life-course approach in which the interdependence of family events can be better explored. Employing event history analysis, some studies have

focused on the timing of moves in relationship to the birth of a child. Deurloo, Clark, and Dieleman (1994) suggest that moving to an owner-occupied dwelling with larger space is associated with a higher likelihood of becoming a parent. Kulu (2008) provided an analysis of the effect of childbearing on spatial mobility by parity and across locations, and found that first conception increases the likelihood of moving to a rural or small-urban destination. Kulu and Boyle (2009) also showed that fertility rates are higher in suburbs and rural areas and lower in urban cities.

Recent studies have showed that the cost of home ownership impacts on the decisions around fertility (Courgeau and Lelièvre 1992; Mulder and Wagner 1998; Clark and Drever 2000; Mulder and Wagner 2001; Anderson et al. 2003; Kulu and Vikat 2008; Sato 2007; Simon and Tamura 2009), which is particularly relevant to Australian policy debates. High-cost urban centres was found to drive relocation to more affordable suburban or rural areas to accommodate increasing family size (Kulu and Vikat 2008), and the high cost of homeownership increased the cost of rearing children and was associated with delayed fertility (Courgeau and Lelièvre 1992; Clark 2012). Similarly, the price of living space, measured by rent per room at the metropolitan area level, has shown a negative cross-sectional relationship with fertility, which implies that house prices may affect the location or childbearing decisions of families (Simon and Tamura 2009).

Accounting for unobserved heterogeneity and the joint determination of fertility and residential mobility is crucial in the identification of the causal the relationship between fertility and housing decisions. More recent research has considered the synchrony between mobility and fertility careers within the framework of simultaneous-equation models. Öst

(2012) investigated the synchronous covariation of housing choice and childbirth using pooled cross-sectional data in 1981, 1989 and 1999 in Sweden. The analysis pointed to evidence of simultaneity in the decisions of becoming a homeowner and becoming a parent, and this simultaneity is more obvious for young cohorts whose childbearing decisions are more likely to be affected by the cost of housing than those of older cohorts.

Using retrospective data for the period between 1926 and 1993 for the Netherlands, Michielin and Mulder (2008) examined how fertility choice affects the timing of the residential mobility and how residential mobility affects the birth of a child simultaneously. The analysis indicated that residential relocations are likely to take place before the birth of a child during pregnancy, and the likelihood of having a child increases some months after a residential move. The interdependency between fertility and residential mobility is also confirmed by Kulu and Steele (2013) using longitudinal data among partnered women from Finland during the period 1988-2000. By jointly modelling conception and housing transitions, they found a significant correlation between housing and childbearing decisions. In particular, they argue that facing lower housing costs, couples in rural areas and small towns move before or when planning to have a child, whereas couples in large cities move to single-family houses following the birth of a child.

The limitation of these studies is that they tend to rely on the timing of observed births in the absence of intentional measures. Some studies have acknowledged the challenge in the empirical definition of fertility intention and decision-making (Michielin and Mulder 2008; Öst 2012). Lacking direct measures on fertility intentions or expectations, previous studies on anticipatory moves may find it difficult to define the lag between the time when fertility

decisions are made and the time when these decisions are reached. Two studies have innovated and contributed to the empirical literature. Using a binary fertility expectation measure from the British Household Panel Survey (BHPS) in five non-consecutive years from 1992 to 2008, Ermisch and Steele (2016) estimated the effect of anticipated changes in family size on residential mobility within a simultaneous-equation framework. They found that expecting to have a child in the future increases the likelihood of moving by 0.036. Vidal, Huinink, and Feldhaus (2017) examined the effect of fertility intention, measured dichotomously, on relocations within town, over short distances and over long distances using the German Family Panel for the period 2008-2013. They found that rates of relocations are positively correlated with fertility intentions, but the association becomes statistically insignificant once age and parental status are controlled for.

3 Theoretical discussion

Beginning with Rossi (1955), a substantial literature has emerged providing a theoretical framework to explain the residential mobility of households. Economists view residential mobility in a utility maximisation framework (Graves and Linneman 1979; Mincer 1978). Within the optimisation framework, households maximise lifetime utility by evaluating the monetary and nonmonetary value of future perceived benefits from moving to alternative locations and the costs of moving, subject to expected income and time constraints (Bartel 1979; Sjaastad 1962). A decision to move is made when the benefit stream from moving is greater than or equal to the cost associated with moving.

Sociologists and geographers consider residential mobility the primary means to adjust housing consumption to housing needs or desired housing outcomes.[1] They formulated a Residential Satisfaction Model in which a move is initiated by the increase in dissatisfaction about the current location beyond a person's threshold level (Clark and Onaka 1983; Kendig 1984; Speare 1974). Family growth is one important and frequent consideration for a change in the need for more housing, in terms of either housing attributes or residential environment, resulting in residential relocation (Speare 1974).

To connect fertility intentions and behaviours, the Theory of Planned Behaviour (TPB) posits that childbearing related behaviour, such as fertility-induced relocation and the birth of a child, is an outcome of family fertility intentions (Ajzen 1991; Ajzen and Klobas 2013). The formation of intentions to have children, which are influenced by attitudes (beliefs about consequences of having a child), subjective norm (beliefs about social support for having a child), and perceived behavioural control (beliefs about enabling and interfering factors), ultimately leads to fertility-related behaviours. In general, the stronger the intention, the more likely should be its outcomes (Ajzen 1991). Considerable empirical work has demonstrated the predictability of fertility intentions on childbearing behaviours (Schoen et al. 1999; Randall and Wolff 1994; Quesnel-Vallée and Morgan 2003; Sheeran 2002).

However, the consistency between intentions and outcomes only holds under the assumption that perceived control is a good reflection of actual control (Ajzen 1991). The degree of such accordance is affected by individual and contextual factors, such as housing market circumstances and fertility/family policies, which can moderate the translation of

[1] Sociologists and geographers have also developed theories of residential segregation due to discriminatory barriers to residential mobility (Massey 1985; Massey and Denton 1988).

intentions into behaviours. These factors can mediate the translation of intentions via their effect on actual control or the formation of attitudes, subject norms and perceived control (Ajzen and Klobas 2013). Therefore, while fertility intentions can precipitate fertility-related behaviours, intervening obstacles such as housing market constraints may moderate or impede the translation of fertility intentions into fertility-induced relocation and/or realised fertility.

4 Data

The analysis uses data collected in the Household, Income and Labour Dynamics in Australia (HILDA) survey for the period between 2001 and 2015.[2] The analytical sample consists of females aged 20-44 years in at least one of the 15 waves of the collected data who have complete information on the covariates used in the empirical specification. This age segment covers women who are in the prime period of fertility and who are asked fertility intention questions in the HILDA survey. The sample is restricted to those who were cohabitating or married, defined as couples in registered marriage or living with someone in a relationship if not married. While limiting the sample size, this restriction allows the focus on the residential moves related to childbearing rather than parental home exit or partnership formation. Married or de-facto couples are more likely to be at risk of giving birth to a child and relocating for childbearing reasons, and have pregnancies planned within the partnership. The sample also excludes those who were involved in a rent-buy scheme or lived in the dwelling

[2] The Household, Income and Labour Dynamics in Australia (HILDA) Survey was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views based on these data should not be attributed to either DSS or the Melbourne Institute.

with life tenure, such as public housing, since individuals in need-based tenures tend to exhibit distinct mobility patterns.

Respondents in the HILDA survey are asked a detailed set of questions about their history and future intention regarding both mobility and fertility, consistently over the course of the survey. In particular, in each wave, the respondents aged 18-55 years are asked the question: *"(H)ow likely are you to have a child/more children in the future"*.[3] The question doesn't specify the timing of future childbearing. This self-reported likelihood is recorded on a 0 (very unlikely) to 10 (very likely) scale.[4] The fertility intention measure displays reasonable predictability in the sample, with reported intention and actual outcome of fertility showing a relatively high degree of consistency. Among women reporting the likelihood of having children in the future of above five on a scale of 0-10 in year *t*, 80.8 percent gave birth in the following two years and 93.9 percent gave birth in the following five years.

The relationship between residential mobility and fertility intention is examined graphically by considering the changes in mobility rates (the percent of women who were ever observed moving) across women of different ages with different degrees of fertility intentions. Figure 1 shows that females with different childbearing expectations exhibit distinct mobility behaviour. The probability of moving declines over time, and women reporting high fertility intention have significantly higher mobility rates with lower variation

[3] In wave 5, 8, and 11, only the respondents aged 18-44 years are asked the fertility intention question. Additionally, in these three waves, the respondents are asked whether they themselves or their partners have had a sterilisation operation or have physical or health difficulties in having children. Only individuals who were not sterilised were asked to report their fertility intentions. The results are similar using the sample without these three waves.

[4] Fertility intention is treated as a continuous explanatory variable for the purpose of empirical analysis. A similar approach is adopted by Drago et al. (2011) and Bassford and Fisher (2016).

than those reporting low fertility intention. This suggests that women who indicate an intention to have children are more likely to move consistently over ages.

[Figure 1 about here]

To illustrate the role of residential mobility in affecting the consistency between intended and realised fertility, Figure 2 shows the extent that residential mobility between *t-1* and *t* enables the translation of fertility intentions between *t-1* and *t* into pregnancies between *t* and *t+2*, broken down by family size (birth parity). The translation of fertility intentions into pregnancies is not mediated by the residential immobility for couples who yet have children or who have at least five children. Those couples show higher pregnancy rates when they stayed. In contrast, for couples who have one to four children, higher fertility intentions are more likely to translate into in higher pregnancy rates if they moved. The mediating role of residential mobility is particularly strong for couples with two or three children. The graphical inspection implies that residential immobility may constrain the realisation of family expansion.

[Figure 2 about here]

Descriptive statistics are presented in Table 1. As noted, the sample consists of women aged 20-44 in a cohabitating or married partnership during 2001-2015. The analytical sample includes 6,048 women in 30,428 person-year observations. Women are on average observed for 5.03 years. Women who stayed in the same residence since last year reported an average fertility intention of 3.80, while those who moved have an average fertility intention of 6.08. Among respondents during the observation period, 26.0 percent of women were ever observed moving and 13.6 percent of women observed moving per year.

[Table 1 about here]

5 Empirical methodology

5.1 Residential mobility

Decisions to move and have children are often made jointly. Intentions to have children can be endogenous with respect to housing decisions, if for example households with higher preference for family-oriented life or (more) children tend to have tastes for residential stability or select into certain residential locations. To investigate the simultaneity of fertility and mobility decisions, a simultaneous-equation approach is adopted in which the mobility equation is modelled jointly with the fertility equation. Such modelling approach has been adopted in several previous studies on family and childbearing (Steele et al. 2005; Öst 2012; Kulu and Steele 2013; Vignoli, Rinesi, and Mussino 2013; Ermisch and Steele 2016). The joint modelling of fertility and mobility processes allows for the correlation of time-invariant and time-varying unobservables across fertility and mobility decisions. The formulation of the simultaneous decisions is given as follows:

$$U_{it}^{*} = \gamma F_{it} + \beta' X_{it-1} + \bar{F}_i + \bar{X}_i + e_{it} \quad (1)$$

$$F_{it}^{*} = \delta' Z_{it} + \bar{Z}_\iota + \varepsilon_{it} \quad (2)$$

where U_{it}^{*} is the latent net utility associated with the decision to move; F_{it}^{*} is the latent utility associated with each observed fertility intention formed over the past year and reported by woman *i* in year *t*; F_{it} is the self-reported fertility intention measured on a scale from 0 to 10 and treated as continuous; X_{it-1} and Z_{it} include demographic, socioeconomic, and local macroeconomic factors associated with residential mobility and fertility intention

respectively; $\bar{F}_i$, $\bar{X}_i$, and $\bar{Z}_i$ are the individual means of the time-varying observables in mobility and fertility equations; and e_{it} and ε_{it} are the time-varying residuals that are assumed to follow a bivariate normal distribution with nonzero cross-equation correlation coefficient ρ, i.e. $[e_{it}, \varepsilon_{it}] \sim N[0, 0, 1, 1, \rho]$.[5] The parameter γ is the coefficient of main interest that measures the impact of fertility intention on mobility behaviour. The main hypothesis is that $\gamma > 0$, that is, fertility intentions increase residential mobility. All socioeconomic characteristics are measured in year (*t-1)* for the moving behaviour between year (*t-1)* and year *t*. The measures at (*t-1)* capture the economic conditions prior to the move to avoid the effect of relocation on family financial resources and other family characteristics.[6]

Both Equation (1) and (2) are estimated using a correlated random effects model in which the individual means of the time-varying observed variables are included to control for the selection of households associated with individual heterogeneity. The correlated random effects model (Mundlak 1978; Chamberlain 1982) allows for the correlations between individual-specific effects and observed variables in a restrictive and parametric fashion. Several studies on residential mobility have followed such an empirical approach (Rabe and Taylor 2010; Isebaert 2013; Ermisch and Steele 2016; Baker et al. 2016).

A range of demographic and socioeconomic characteristics are included in the equations, including the respondent's age categories; marital status (married or de-facto); pregnancy status; real family income; housing tenure (outright homeowner, mortgaged

[5] Equation (1) is estimated using a probit model and Equation (2) is estimated as an ordered probit model. The simultaneous equations are modelled using Stata module CMP (Roodman 2018). Risse (2010) applied an ordered probit model in a study of the effect of the Baby Bonus policy on Australian women' fertility intentions.
[6] This specification has been adopted in a number of studies including Ermisch and Jenkins (1999), Böheim and Taylor (2002), Helderman, Mulder, and Ham (2004), Kan (2007), and Ermisch and Steele (2016).

homeowner or private renter); indirect measures of local social capital (satisfaction about neighbourhood and feeling of being part of community reported on a scale from 0 (totally dissatisfied) to 10 (totally satisfied)); presence of children aged 0-4, 5-14, and 15-24 years; number of bedrooms; length of residence; immigration status (Australian-born or not); employment status of the respondent and her partner (employed or not); and education level of the partner (above or below a bachelor degree).[7] To control for macroeconomic conditions, the specification also includes Local Government Area (LGA)-level unemployment rates, LGA-level house prices, and year fixed effects.[8]

According to the covariate exclusion restriction, the vector Z_{it} should include instrumental variables (IV) that are highly correlated with fertility intention and insignificantly impacting residential mobility. The first IV included is women's education attainment, defined as a binary variable that takes on the value of one if the woman achieved a level of education above a bachelor's degree and zero otherwise. In their study on the relationship between fertility intention and residential mobility, Ermisch and Steele (2016) found that women's educational qualification has no significant effect on residential mobility in the mobility model and included the variable in the fertility intention model as one of the excluded covariates. Women's education is more relevant in long-distance moves (e.g. job-related moves) than short-distance moves (e.g. fertility-related moves) (Bauernschuster et al.

[7] Women's education is insignificant in the mobility model. Following Ermisch and Steele (2016), women's education is tested and included as one of the instruments in the fertility equation.

[8] Local Government Areas (LGA) cover administrative regions of local governing bodies that represent legally designated parts of a State or Territory in Australia. As in the 2016 Australian Statistical Geography Standard, there are 564 Australian Bureau of Statistics defined Local Government areas. Annual unemployment rates at the LGA level are collected from the ABS National Regional Profile series (ABS 2016c), and annual median house prices at the LGA level are from the RP Data historical house price dataset. Both variables are merged into the HILDA data using the LGA identifiers.

2014; Van Ommeren, Rietveld, and Nijkamp 1997; Clark 2013). Moreover, some studies suggest that women's education may be irrelevant to mobility when other variables that are highly correlated with education are included (Quigley and Weinberg 1977), or when husbands' contribution to family income is large (Lichter 1982).

The second IV is provided by the Baby Bonus policy in Australia during 2004 and 2014. Announced on 12nd May 2004 in the Federal Budget, the Baby Bonus scheme was designed in part to encourage women to have more children (Budget 2004-05). The positive impact of the Baby Bonus payment on the intention to have children, family size, and the timing of births has been demonstrated in several studies (Lain et al. 2009; Guest and Parr 2010; Langridge et al. 2010; Risse 2010). The cash payment creates an exogenous variation in fertility intention that is arguably independent of mobility decisions of women. The Baby Bonus policy indicator is constructed as a dummy variable assigned the value of one for the period between the announcement on 12nd May 2004 and the abolition on 14th May 2013, and zero otherwise.[9]

The relevance and validity tests indicate that women's education and the Baby Bonus scheme are reasonably relevant and valid instruments. The relevance assumption is tested by checking the significance of the IVs in the fertility model, and the validity assumption is indirectly tested by adding the IVs into the mobility equation for significance tests. The

[9] The Baby Bonus policy indicator is alternatively defined based on the variation in the eligibility over years as follows: 1) assigned the value of $3,000 for the period between May 2004 and May 2008; 2) assigned the value of $3,000 for the period between May 2009 and May 2013 if family income during the past year is below $150,000; and $0 if family income is equal to or above $150,000; 3) assigned the value of $3,000 for the period between May 2013 and May 2014 if it is for the first child, and family income is below $150,000; $1,800 if it is for the second and subsequent child, and family income is below $150,000; and $0 if family income is equal to or above $150,000; 4) assigned the value of $0 before its introduction and after its abolition. The instruments failed validity and over-identification tests.

relevance test of women's education and the Baby Bonus scheme shows a high F statistic of 11.02, and the validity and over-identification test report the Chi-sq statistics of 3.51 and 3.01 respectively.[10] Given the relevance and validity test results, women's education and the Baby Bonus scheme are included as IVs in Equation (2).

5.2 Relocation types

The mechanism in which childbearing intention shapes residential mobility patterns may be nuanced for relocations of different types regarding relocation distances, regional house prices, housing tenures, and dwelling sizes. Using a competing risk model, some research has highlighted the difference in migration patterns across types of relocations (Mulder and Wagner 1993; South and Crowder 1998; Withers 1998; Kulu 2008; Kulu and Steele 2013; Vidal, Huinink, and Feldhaus 2017). To take into account the heterogeneity in fertility related residential mobility patterns, four types of residential relocations are considered: 1) relocation distance (no move, moves within a LGA, moves across LGAs within a Major Statistical Region (MSR), moves across MSRs within a State or Territory, and moves across States or Territories within Australia)[11]; 2) housing tenure (no move, moves from renter to renter, moves from renter to owner, moves from owner to owner, and moves from owner to renter); 3) regional house price (no move, moves within a LGA, moves to a more expensive LGA,

[10] The relevance tests report 4.10 for Sydney and Melbourne and 9.73 for the remaining MSRs. The validity tests report 0.90 for Sydney and Melbourne and 1.96 for the remaining MSRs. And the over-identification tests report 1.56 for Sydney and Melbourne and 2.19 for the remaining MSRs.

[11] State or Territory is the largest unit, including New South Wales, Victoria, Queensland, South Australia, Western Australia, Tasmania, the Northern Territory, and the Australian Capital Territory. Major Statistical Regions (MSR) divide New South Wales, Victoria, Queensland, South Australia and Western Australia into two geographical regions: the capital city and the remainder of the State. Tasmania, the Northern Territory, and the Australian Capital Territory each consist of only one MSR covering the entire area.

and moves to a less expensive LGA); and 4) house size (no move, moves to a house with same numbers of bedrooms, moves to a house with more bedrooms, and moves to a hose with less bedrooms). For each move, a multinomial response is recorded. To account for unobserved heterogeneity across individuals, the model allows for common time-invariant individual random effects across types of relocation. The competing risk discrete-time event history model of residential relocation is considered as follows:

$$log(\frac{H_{it}^{R}}{H_{it}^{0}}) = \alpha(t)^{R} + \gamma^{R} F_{it}^{R} + \beta^{R} X_{it}^{R} + \nu_i \quad (3)$$

where H_{it}^{R} is the probability of housing transition of type *R* made by woman *i* given no earlier occurrence of such move within the episode; $\alpha(t)^{R}$ is the baseline mobility profile over time; F_{it}^{R} is self-reported fertility intention; the vector X_{it}^{R} includes time-varying and time-invariant covariates that explain the heterogeneity in the mobility behaviour specified in Equations (1); and ν_i is the individual-specific random effects that allow for shared unobserved individual heterogeneity across types of relocation (Hill, Axinn, and Thornton 1993). The baseline hazard function $\alpha(t)^{R}$ is specified as dummy variables for each survey year, with year six and above grouped into one dummy variable.

6 Estimation results

6.1 Residential mobility

Table 2 reports the main results from estimating the simultaneous-equation models of residential mobility and fertility intention for Australia as a whole (column 1), for the two largest housing markets – Sydney and Melbourne (column 2), and for the remaining regions (column 3). Across Australia, the average marginal effect of fertility intention of 0.0043 is

significant at the one percent level (column1). The positive and significant estimate on the impact of fertility intention on residential mobility indicates that a one unit increase in the expectation to have an additional child in the future on a scale of 0-10 increases the probability of moving by a 0.0043 percentage point on average. Relative to the annual mobility rate of 0.14, a one unit higher fertility intention reported is associated with a 3.16 percent increase in the likelihood for moving. Assuming the equal distance between adjacent ratings in the fertility intention question, the change from very unlikely to very likely to have an additional child increases the probability of moving by a 0.043 percentage point.

[Table 2 about here]

Some studies suggest that the simultaneous effects of becoming parents and becoming homeowners can be greater when housing market and economic conditions pose challenges to homeownership entry among young adults (Öst 2012). One of the significant features of Australian housing market is the substantial and sustained housing price growth in Sydney and Melbourne relative to other housing markets over the analytical period. Among close to two-thirds of Australia's population residing in capital cities (ABS 2015-16), Melbourne and Sydney have exhibited the largest population growth over the past decade (ABS 2016b). Since 1990s, as the largest and most expensive housing markets, Sydney and Melbourne have led the growth in national property markets (ABS 2016d; CoreLogic 2015, 2017a). Consequently, housing affordability pressure has been much higher for the residents in these two housing markets. Either measured as price to income ratio, years of household income required for the deposit, or percentage of households income required to serve the mortgage,

housing affordability has deteriorated most significantly in Sydney and Melbourne relative to the remaining MSRs (CoreLogic 2017b; AIHW 2017).

The results in columns 2 and 3 show that the estimated coefficient on fertility intention is -0.0000 and statistically insignificant in Sydney and Melbourne. In comparison, for the remaining MSRs, it is equal to 0.0048 and highly significant. For those MSRs, a one point increase in the intention to have children increases the propensity to move by a 0.0048 percentage point, or 3.22 percent (0.0048/0.15). The cross-equation correlations of time-varying residuals indicate that shocks that increase residential mobility of households are associated with an increase in childbearing intentions in Sydney and Melbourne (positive correlation) and a decrease in other MSRs (negative correlation).

The insignificance of fertility intention in affecting residential mobility in Sydney and Melbourne implies that the housing market conditions may have implications on residential mobility patterns and the realisation of fertility intentions. For example, households in high cost housing markets may be constrained by tight housing markets, insufficient financial resources or large expense of moving (e.g. stamp duty and real estate agents commission that increase proportionally with housing prices), to adjust their housing conditions and residential environment to the expected or desired growth in family size. Compared to couples in other MSRs, those in Sydney and Melbourne are less mobile (mobility rate, 0.267 vs 0.246), have smaller family size (total numbers of children, 1.575 vs 1.337), and delay having the first child (age at first birth, 30.248 vs 31.582).

Alternatively, as an adaptive response to the housing market constraint, residents in Sydney and Melbourne may adjust their housing demand by restructuring the existing

dwelling, which may explain their residential immobility. For individuals that the number of bedrooms at the time of occupancy is available, a binary variable was constructed to indicate dwelling expansion. It is shown that 22.49% (307/1365) of couples in Sydney and Melbourne and 20.74% (499/2406) in other MSRs were recorded ever expanding their space, although the difference in expansion rates across housing markets is not statistically significant in the sample.[12]

It may also be the case that, in response to housing market constraints, Sydneysiders and Melbournian tend to anticipate long-term housing needs and plan ahead by acquiring extra housing capacity at the time of the purchase of the house. Using information on the number of bedrooms and resident children in the relocation year, the number of resident children per room when couples first moved into the current address is calculated. Family size relative to housing capacity is found to be statistically significantly lower in Sydney and Melbourne (0.235) than that other MSRs (0.309). This may reflect the forward planning and/or small family size of Sydneysiders and Melbournian in the face of high costs of housing and moving. Future research could investigate further alternative pathways or strategies, or the lack thereof, for residents in high cost housing markets.

6.2 Relocation types

Fertility related residential mobility may vary across types of relocations related to relocation distance, housing tenure, local house price, and house size. Competing risks discrete-time event history models are well suited to the analysis of multiple types of residential relocation.

[12] The number of bedrooms is only available for individuals who moved to the current address after 2001.

The results from estimating a competing risk random effects multinomial logit model in the form of Equation (3) are reported in Table 3. Individual specific random effects are included to account for unobserved individual heterogeneity that may lead to the dependence across relocation types for the same respondent (Steele, Goldstein, and Browne 2004; Steele, Diamond, and Wang 1996). The random variance term commonly specified across relocation types is found to be statistically significant at the one percent level.

[Table 3 about here]

The results in the top panel suggest fertility induced relocation tends to be intraregional, across LGAs and within a MSR. This reflects that households with intentions and plans about future fertility move to an alternative area within a region to achieve appropriate housing conditions and locational environment for childbearing. Fertility intention driven relocations are also significantly associated with a move from an owner-occupied dwelling to another. This may indicate that families with preferences for a larger family may outgrow their starter homes and upgrade their dwellings to accommodate increased housing needs. Such transition can be from an apartment to a house or from a house to another. For those who live with their parents previously, an owner-to-owner transition may indicate exit from parental home and purchase their own house. The results from the remaining two panels suggest that couples with strong fertility intentions are more likely to relocate to a dwelling in a more affordable LGA and with more bedrooms in response to the additional housing demand and costs of more children. This is consistent with previous literature that reports an increased likelihood of moving to a larger space and to a suburban or rural area for childbearing.

7 Conclusion

This paper has investigated the relationship between residential mobility and fertility intention among partnered women in Australia. The estimation results indicate that the intention to have children in the future increases the residential mobility of couples. In particular, a one-point increase in the intention to have children increases the propensity to move by a 0.0068 percentage point, or 4.36 percent (0.0068/0.14). To achieve adequate housing conditions and locations for future childbearing, couples tend to move across local government areas within the region, to another owner-occupied dwelling with more bedrooms in a less expensive area.

However, the fertility driven residential mobility is only observed in relatively affordable housing markets, but not in regions of high housing price growth such as Sydney and Melbourne. The insignificant impact of fertility intention in Sydney and Melbourne implies that the housing market developments may have repercussions on fertility related decisions. Couples in Sydney and Melbourne show a lower residential mobility rate, a lower level of total fertility, and a much higher median age of mother. At the same time, couples in these high cost areas are slightly more likely to expand their current dwelling and purchase extra housing capacity for children.

This paper contributes to the literature in the following aspects. First, this study investigates the causal impact of fertility intentions on residential relocation decisions. The relationship is analysed using simultaneous equations of correlated random effect models, along with rich information on demographic and socio-economic characteristics of

households, indirect measures on social capital, and local macroeconomic factors. Second, this study provides an assessment on the role of residential mobility in affecting the consistency between fertility intentions and actual outcomes. The results suggest that, consistent with the TPB model, housing markets serve as a background factor or actual control that moderates the effect of fertility intentions on behaviour. Third, the analysis incorporates a direct measure of fertility intention measured with scaled items. The measure on fertility intentions allows for the consideration of long-term family planning and decision-making process rather than a "one shot" observed outcome. The results on such measure highlight the importance of the translation of subjective intentions one domain to the realisation of life-course events in other domains. Fourth, fertility-induced relocations are investigated across housing market conditions. The heterogeneity in the translatability from fertility intentions to residential mobility provides important evidence on the ease or difficulty of households in translating fertility intention into realised births by the means of residential relocations. Fifth, the study adds more nuanced evidence on fertility-driven residential relocation by examining relocation distances, transitions of housing tenure, and changes in housing market costs and dwelling size. The results can improve the understanding of residential mobility behaviour of families in response to decision making of life-course events.

The results have potential policy implications. First, evidence on the difference in the response of residential mobility to fertility intention across housing markets suggests that housing market circumstances may have repercussions on the translation of fertility intention into fertility-induced residential mobility. In particular, housing market constraints may

interfere with the translation of intended fertility into realised fertility via its effect on residential mobility. To the extent that housing markets moderate the consistency between fertility intention and outcomes, high cost housing markets may prevent households from achieving desired housing conditions for childbearing, which can lead to delays in fertility timing or a reduction in total fertility. The possibility that housing policies (e.g. stamp duty) may facilitate residential relocation and homeownership attainment, which is instrumental to the realisation of childbearing aspirations of young couples, should be taken into account in future research and for development of effective fertility/family policies. For example, it may be the case that policies ostensibly designed to increase fertility may be largely ineffective if complementary housing policies that support households to achieve their desired housing outcomes are not put in place. The implications are of policy significance in the current environment of Australia where low fertility, ageing population, and shrinking proportion of working-age population have posed challenges to economic stability and growth for policy makers.

Second, the results on fertility induced relocation are of interest to regional governments and communities. Residential mobility decisions of households are important for regional infrastructure planning and labour force mobility. To the extent that childbearing intentions drive residential relocation, understanding when and where households move as an outcome of fertility planning is crucial to designing policies on land use, housing development, and the provision of local services and infrastructures such as health service, childcare, and education facilities.

References

ABS. 2015-16. 'Regional population growth, various years', *Australian Bureau of Statistics, cat. no. 3218.0*.

———. 2016a. 'Births', *Australian Bureau of Statistics, cat. no.3301.0*.

———. 2016b. 'Census of population and housing', *Australian Bureau of Statistics, cat. no. 2071.0*.

———. 2016c. 'National regional profile', *Australian Bureau of Statistics, cat. no. 1379.0.55.001*.

———. 2016d. 'Residential property price indexes: eight capital cities', *Australian Bureau of Statistics, cat. no. 6416.0*.

AIHW. 2017. 'Australia's welfare', *Australian Institute of Health and Welfare*.

Ajzen, Icek. 1991. 'The theory of planned behavior', *Organizational behavior and human decision processes*, 50: 179-211.

Ajzen, Icek, and Jane Klobas. 2013. 'Fertility intentions: An approach based on the theory of planned behavior', *Demographic Research*, 29: 203.

Anderson, Laurie M, Joseph St Charles, Mindy T Fullilove, Susan C Scrimshaw, Jonathan E Fielding, Jacques Normand, and Task Force on Community Preventive Services. 2003. 'Providing affordable family housing and reducing residential segregation by income: a systematic review', *American journal of preventive medicine*, 24: 47-67.

Baker, Emma, Rebecca Bentley, Laurence Lester, and Andrew Beer. 2016. 'Housing affordability and residential mobility as drivers of locational inequality', *Applied Geography*, 72: 65-75.

Bartel, Ann P. 1979. 'The migration decision: what role does job mobility play?', *The American Economic Review*, 69: 775-86.

Bassford, Micaela, and Hayley Fisher. 2016. 'Bonus babies? The impact of paid parental leave on fertility intentions', *Life Course Centre Working Paper Series*, 2016-02.

Bauernschuster, Stefan, Oliver Falck, Stephan Heblich, Jens Suedekum, and Alfred Lameli. 2014. 'Why are educated and risk-loving persons more mobile across regions?', *Journal of Economic Behavior & Organization*, 98: 56-69.

Böheim, René, and Mark P Taylor. 2002. 'Tied down or room to move? Investigating the relationships between housing tenure, employment status and residential mobility in Britain', *Scottish Journal of Political Economy*, 49: 369-92.

Budget. 2004-05. *Australian Government*.

Chamberlain, Gary. 1982. 'Multivariate regression models for panel data', *Journal of econometrics*, 18: 5-46.

Clark, William AV. 2012. 'Do women delay family formation in expensive housing markets?', *Demographic research*, 27: 1.

———. 2013. 'Life course events and residential change: Unpacking age effects on the probability of moving', *Journal of Population Research*, 30: 319-34.

Clark, William AV, Marinus C Deurloo, and Frans M Dieleman. 1994. 'Tenure changes in the context of micro-level family and macro-level economic shifts', *Urban Studies*, 31: 137-54.

Clark, William AV, and Anita I Drever. 2000. 'Residential mobility in a constrained housing market: implications for ethnic populations in Germany', *Environment and Planning A*, 32: 833-46.

Clark, William AV, and Jun L Onaka. 1983. 'Life cycle and housing adjustment as explanations of residential mobility', *Urban studies*, 20: 47-57.

Clark, William AV, and Suzanne Davies Withers. 2009. 'Fertility, mobility and labour -force participation: A study of synchronicity', *Population, Space and Place*, 15: 305-21.

CoreLogic. 2015. 'Value growth is still all about Sydney and Melbourne'.

———. 2017a. 'Deteriorating housing affordability in Sydney and Melbourne due to both demand and supply'.
———. 2017b. 'Perceptions of Housing Affordability Report '.
Courgeau, Daniel, and Eva Lelièvre. 1992. 'Interrelations between first home-ownership, constitution of the family, and professional occupation in France', *Demographic applications of event history analysis*: 120-40.
Deurloo, Marinus C, William AV Clark, and Frans M Dieleman. 1994. 'The move to housing ownership in temporal and regional contexts', *Environment and Planning A*, 26: 1659-70.
Dieleman, Frans M, and Pieter CJ Everaers. 1994. 'From renting to owning: life course and housing market circumstances', *Housing Studies*, 9: 11-25.
Drago, Robert, Katina Sawyer, Karina M Shreffler, Diana Warren, and Mark Wooden. 2011. 'Did Australia's baby bonus increase fertility intentions and births?', *Population research and policy review*, 30: 381-97.
Ermisch, John, and Fiona Steele. 2016. 'Fertility expectations and residential mobility in Britain', *Demographic Research*, 35: 1561-84.
Feijten, Peteke, and Clara H Mulder. 2002. 'The timing of household events and housing events in the Netherlands: A longitudinal perspective', *Housing studies*, 17: 773-92.
Graves, Philip E, and Peter D Linneman. 1979. 'Household migration: Theoretical and empirical results', *Journal of urban economics*, 6: 383-404.
Guest, Ross, and Nick Parr. 2010. 'The effects of family benefits on childbearing decisions: A household optimising approach applied to Australia', *Economic Record*, 86: 609-19.
Helderman, Amanda C, Clara H Mulder, and MaartenVan Ham. 2004. 'The changing effect of home ownership on residential mobility in the Netherlands, 1980–98', *Housing Studies*, 19: 601-16.
Henretta, John C. 1987. 'Family transitions, housing market context, and first home purchase by young married households', *Social Forces*, 66: 520-36.
Hill, Daniel H, William G Axinn, and Arland Thornton. 1993. 'Competing hazards with shared unmeasured risk factors', *Sociological methodology*: 245-77.
Isebaert, Daan. 2013. 'Housing tenure and geographical mobility in Belgium', *Faculty of economics and business administration working paper, Ghent University*.
Kan, Kamhon. 2007. 'Residential mobility and social capital', *Journal of Urban Economics*, 61: 436-57.
Kendig, Hal L. 1984. 'Housing careers, life cycle and residential mobility: implications for the housing market', *Urban Studies*, 21: 271-83.
Kulu, Hill. 2008. 'Fertility and spatial mobility in the life course: evidence from Austria', *Environment and planning A*, 40: 632-52.
Kulu, Hill, and Paul J Boyle. 2009. 'High fertility in city suburbs: compositional or contextual effects?', *European Journal of Population/Revue européenne de Démographie*, 25: 157-74.
Kulu, Hill, Paul J Boyle, and Gunnar Andersson. 2009. 'High suburban fertility: Evidence from four Northern European countries', *Demographic Research*, 21: 915.
Kulu, Hill, and Fiona Steele. 2013. 'Interrelationships between childbearing and housing transitions in the family life course', *Demography*, 50: 1687-714.
Kulu, Hill, and Andres Vikat. 2008. 'Fertility differences by housing type: an effect of housing conditions or of selective moves', *Demographic Research*, 17: 775-802.
Kulu, Hill, Andres Vikat, and Gunnar Andersson. 2007. 'Settlement size and fertility in the Nordic countries', *Population Studies*, 61: 265-85.
Lain, Samantha J, Jane B Ford, Camille H Raynes-Greenow, Ruth M Hadfield, Judy M Simpson, Jonathan M Morris, and Christine L Roberts. 2009. 'The impact of the Baby Bonus payment

in New South Wales: who is having “one for the country”?', *The medical journal of Australia*, 190: 238-41.
Langridge, Amanda T, Natasha Nassar, Jianghong Li, Peter Jacoby, and Fiona J Stanley. 2010. 'The impact of monetary incentives on general fertility rates in Western Australia', *Journal of Epidemiology & Community Health*: jech. 2009.100347.
Lichter, Daniel T. 1982. 'The migration of dual-worker families: does the wife's job matter?', *Social Science Quarterly*, 63: 48.
Massey, Douglas S. 1985. 'Ethnic residential segregation: A theoretical synthesis and empirical review', *Sociology and social research*, 69: 315-50.
Massey, Douglas S, and Nancy A Denton. 1988. 'The dimensions of residential segregation', *Social Forces*, 67: 281-315.
Michielin, Francesca, and Clara H Mulder. 2008. 'Family events and the residential mobility of couples', *Environment and Planning A*, 40: 2770-90.
Mincer, Jacob. 1978. 'Family migration decisions', *Journal of political Economy*, 86: 749-73.
Mulder, Clara H, and Michael Wagner. 1993. 'Migration and marriage in the life course: a method for studying synchronized events', *European Journal of Population/Revue européenne de Démographie*, 9: 55-76.
———. 1998. 'First-time home-ownership in the family life course: A West German-Dutch comparison', *Urban studies*, 35: 687-713.
———. 2001. 'The connections between family formation and first-time home ownership in the context of West Germany and the Netherlands', *European Journal of Population/Revue europeenne de demographie*, 17: 137-64.
Mundlak, Yair. 1978. 'On the pooling of time series and cross section data', *Econometrica: journal of the Econometric Society*: 69-85.
Murphy, Mike J, and Oriel Sullivan. 1985. 'Housing tenure and family formation in contemporary Britain', *European Sociological Review*, 1: 230-43.
Öst, Cecilia Enström. 2012. 'Housing and children: simultaneous decisions?—a cohort study of young adults’ housing and family formation decision', *Journal of Population Economics*, 25: 349-66.
Quesnel-Vallée, Amélie, and S Philip Morgan. 2003. 'Missing the target? Correspondence of fertility intentions and behavior in the US', *Population Research and Policy Review*, 22: 497-525.
Quigley, John M, and Daniel H Weinberg. 1977. 'Intra-urban residential mobility: a review and synthesis', *International Regional Science Review*, 2: 41-66.
Rabe, Birgitta, and Mark Taylor. 2010. 'Residential mobility, quality of neighbourhood and life course events', *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 173: 531-55.
Randall, Donna M, and James A Wolff. 1994. 'The time interval in the intention -behaviour relationship: Meta *British Journal of Social Psychology*, 33: 405-18.
RBA. 2015. 'Long-run trends in housing price growth', *Reserve Bank Bulletin*: 21-30.
Risse, Leonora. 2010. '‘… And one for the country’The effect of the baby bonus on Australian women’s childbearing intentions', *Journal of Population Research*, 27: 213-40.
Roodman, David. 2018. 'CMP: Stata module to implement conditional (recursive) mixed process estimator'.
Rossi, Peter Henry. 1955. *Why families move: A study in the social psychology of urban residential mobility* (Free Press).
Sato, Yasuhiro. 2007. 'Economic geography, fertility and migration', *Journal of Urban Economics*, 61: 372-87.
Schoen, Robert, Nan Marie Astone, Young J Kim, Constance A Nathanson, and Jason M Fields. 1999. 'Do fertility intentions affect fertility behavior?', *Journal of Marriage and the Family*: 790-99.

Sheeran, Paschal. 2002. 'Intention—behavior relations: A conceptual and empirical review', *European review of social psychology*, 12: 1-36.
Simon, Curtis J, and Robert Tamura. 2009. 'Do higher rents discourage fertility? Evidence from US cities, 1940–2000', *Regional Science and Urban Economics*, 39: 33-42.
Sjaastad, Larry A. 1962. 'The costs and returns of human migration', *Journal of political Economy*, 70: 80-93.
South, Scott J, and Kyle D Crowder. 1998. 'Avenues and barriers to residential mobility among single mothers', *Journal of Marriage and the Family*: 866-77.
Speare, Alden. 1974. 'Residential satisfaction as an intervening variable in residential mobility', *Demography*, 11: 173-88.
Steele, Fiona, Ian Diamond, and Duolao Wang. 1996. 'The determinants of the duration of contraceptive use in China: A multilevel multinomial discrete-hazards mdeling approach', *Demography*, 33: 12-23.
Steele, Fiona, Harvey Goldstein, and William Browne. 2004. 'A general multilevel multistate competing risks model for event history data, with an application to a study of contraceptive use dynamics', *Statistical Modelling*, 4: 145-59.
Steele, Fiona, Constantinos Kallis, Harvey Goldstein, and Heather Joshi. 2005. 'The relationship between childbearing and transitions from marriage and cohabitation in Britain', *Demography*, 42: 647-73.
Van Ommeren, Jos, Piet Rietveld, and Peter Nijkamp. 1997. 'Commuting: in search of jobs and residences', *Journal of urban economics*, 42: 402-21.
Vidal, Sergi, Johannes Huinink, and Michael Feldhaus. 2017. 'Fertility Intentions and Residential Relocations', *Demography*, 54: 1305-30.
Vignoli, Daniele, Francesca Rinesi, and Eleonora Mussino. 2013. 'A home to plan the first child? Fertility intentions and housing conditions in Italy', *Population, Space and Place*, 19: 60-71.
Withers, S Davies. 1998. 'Linking household transitions and housing transitions: a longitudinal analysis of renters', *Environment and Planning A*, 30: 615-30.

Table 1. Descriptive statistics

	Mean	SD	Min	Max
Moved	0.26	0.44	0	1
Fertility intention	4.40	4.24	0	10
Age 20-24	0.12	0.33	0	1
Age 25-29	0.19	0.40	0	1
Age 30-34	0.22	0.42	0	1
Age 35-39	0.25	0.43	0	1
Age 40-44	0.21	0.41	0	1
Married	0.67	0.47	0	1
Family income ($1000)	128.47	87.28	-359.63	3124.22
Outright owner	0.13	0.33	0	1
Mortgage owner	0.54	0.50	0	1
Renter	0.33	0.47	0	1
Resident children aged 0-4	0.38	0.49	0	1
Resident children aged 5-14	0.42	0.49	0	1
Resident children aged 15-24	0.11	0.31	0	1
Resident children aged ≥25	0.00	0.02	0	1
Total children	1.49	1.35	0	12
No. bedrooms	3.28	0.94	0	11
Years of stay	4.30	4.59	0	77.05
Satisfaction about neighbourhood	7.81	1.74	0	10
Feeling being part of community	6.71	2.05	0	10
University degree	0.34	0.48	0	1
Employment status	0.73	0.45	0	1
Partner's university degree	0.28	0.45	0	1
Partner's employment status	0.85	0.35	0	1
Born abroad	0.80	0.40	0	1
LGA average house price ($1000)	449.98	235.82	21.10	2735.68
LGA unemployment rate	5.61	2.01	0.30	16.10

Notes: The analytical sample consists of females aged 20-44 years in at least one of the 15 waves of the collected data who were cohabitating or married. All the monetary values are adjusted to 2015 dollars. The State or Territory is the largest unit, followed by Major Statistical Regions (MSR) and Local Government Areas (LGA). Source: HILDA 2001-2015.

Table 2. Simultaneous-equation models for residential mobility and fertility intention

	Australia	Sydney, Melbourne	Remaining MSRs
Average marginal effect of fertility intention	0.0043**	-0.0000	0.0048***
	(0.0012)	(0.0019)	(0.0015)
Cross-equation correlation	-0.0225	0.0437*	-0.0352*
	(0.0274)	(0.0263)	(0.0191)
No. observations	20,811	7,192	13,030

Notes: All economic and social characteristics are measured in year *t-1* for the moving behaviour between year *t-1* and year t. Sydney and Melbourne are the two largest Major Statistical Regions (MSR). The remaining MSRs include the balance of New South Wales and Victoria, Queensland, South Australia and Western Australia, Tasmania, the Northern Territory, and the Australian Capital Territory. * p<0.1, ** p<0.05, *** p<0.01. The relevance tests for the full sample, the subsample of Sydney and Melbourne, and the subsample of the remaining MSRs indicate the significant association between the instruments and fertility intentions (F statistics = 11.02, 4.10 and 9.73 respectively). The validity tests for the full sample, the subsample of Sydney and Melbourne, and the subsample of the remaining MSRs show that there is no strong evidence that women's education and Baby Bonus policy have influence on mobility decisions (Chi-sq =3.51, 0.90 and 3.10 respectively). The over-identification tests for the full sample, the subsample of Sydney and Melbourne, and the subsample of the remaining MSRs show that the excluded instruments are valid (Chi-sq =3.01, 0.21 and 0.14 respectively).

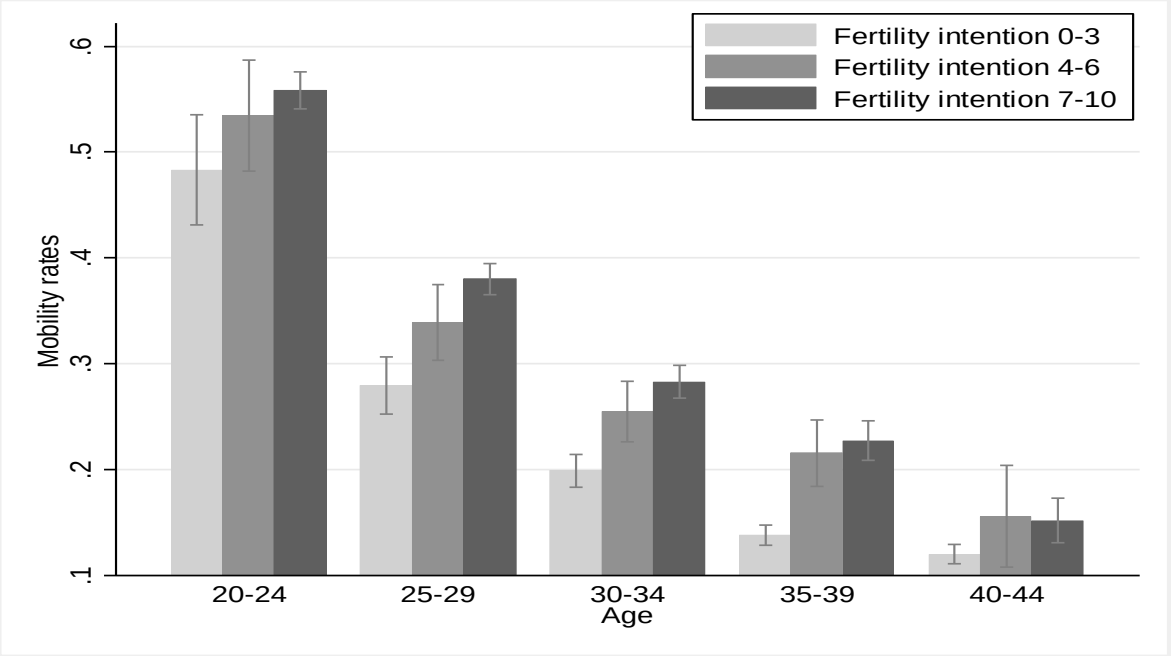
Table 3. Discrete-time event history models for relocation types

	Estimated average marginal effects of fertility intention			
Relocation distance				
	Intra-LGA	Inter-LGA, Intra-MSR	Inter-MSR, Intra-State	Inter-State
	-0.0003	0.0018***	-0.0001	-0.0002
	(0.0007)	(0.0006)	(0.0002)	(0.0003)
Changes in housing tenure				
	Renter to Renter	Renter to Owner	Owner to Owner	Owner to Renter
	0.0006	-0.0001	0.0011**	-0.0003
	(0.0006)	(0.0005)	(0.0005)	(0.0003)
Changes in housing market costs				
	Within a LGA	To a higher-cost LGA	To a lower-cost LGA	
	-0.0007	0.0001	0.0013**	
	(0.0007)	(0.0004)	(0.0005)	
Changes in numbers of bedrooms				
	Unchanged	Move bedrooms	Fewer bedrooms	
	-0.0004	0.0021***	0.0004	
	(0.0006)	(0.0006)	(0.0005)	

Notes: Residential relocations are categorised as: 1) relocation distance: no move, moves within a LGA, moves across LGAs within a MSR, moves across MSRs within a State or Territory, and moves across States or Territories within Australia; 2) housing tenure: no move, moves from renting to renting, moves from renting to owning, moves from owning to owning, and moves from owning to renting; 3) regional house price: no move, moves within a LGA, moves to a more expensive LGA, and moves to a less expensive LGA; and 4) house size:

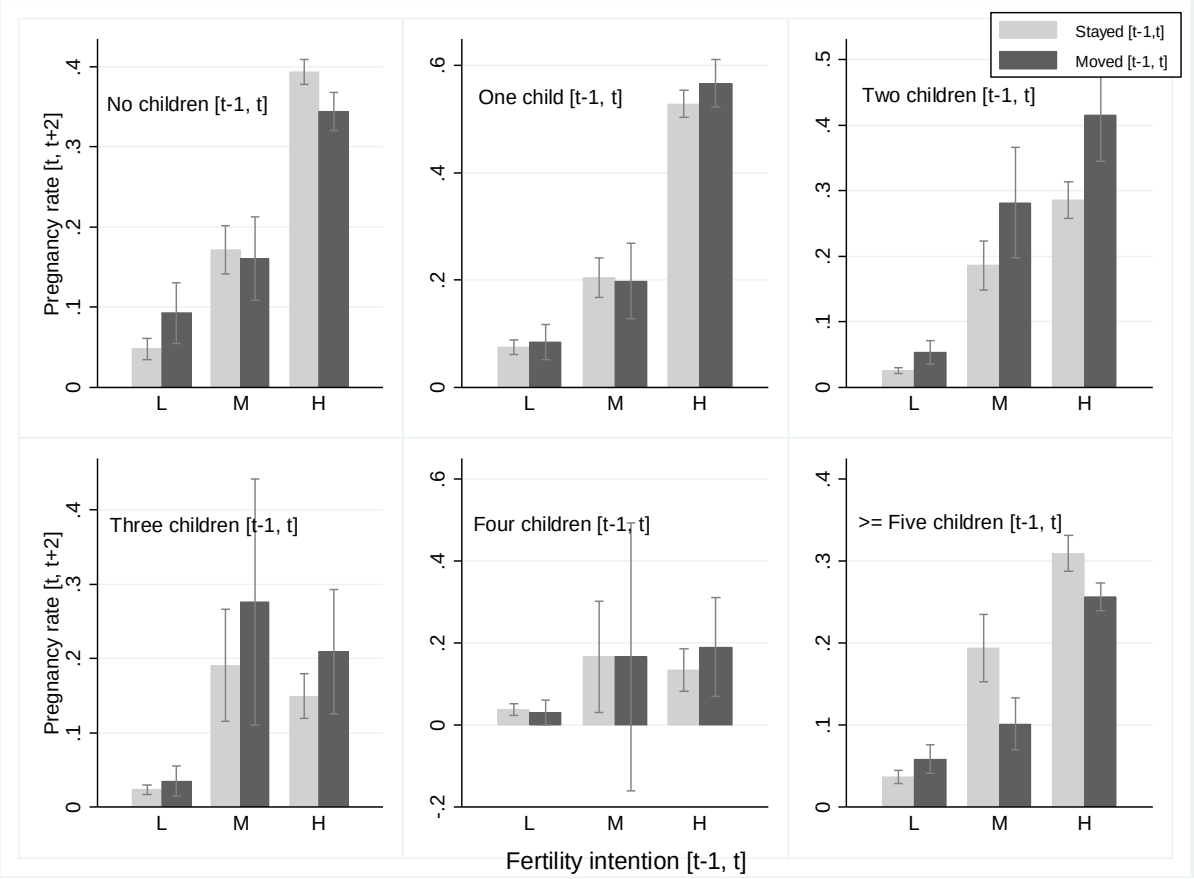
no move, moves to a house with same numbers of bedrooms, moves to a house with more bedrooms, and moves to a hose with less bedrooms. All economic and social characteristics are measured in year *t-1* for the moving behaviour between year *t-1* and year *t.* * p<0.1, ** p<0.05, *** p<0.01.

Figure 1. Residential Mobility over Age Groups by Fertility Intention



Notes: The mobility rate is defined as the number of moves observed divided by the total number of observations over the study timeframe. Source: Author's own calculation using waves 1-15 of HILDA.

Figure 2. Realisation of Fertility Intention in Pregnancy by Residential Mobility and Birth Parity



Notes: Fertility intention (0-10) between t-1 and t is categorised into low (0-3), median (4-6), and high (7-10). Pregnancy is defined as being pregnant between t and t+2. Mobility decision is defined as a move or not between t-1 and t. The mediating/facilitating role of residential relocation on the relationship between intended and realised fertility is broken down by the number of children prior to time t.