Fertility and Housing in Britain

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Abstract

This study examines the relationships between childbearing decisions and housing transitions. We will use data from the British Household Panel Study and will apply event history analysis. We will first investigate the effect of children on housing changes and childbearing patterns by housing type. We will model childbearing and housing transitions jointly to control for unobserved characteristics of individuals, which may simultaneously influence their fertility behaviour and housing choices. We will then investigate the relationships between housing and fertility across residential contexts (London versus other areas) to determine whether and how the socioeconomic context moderates the relationships between the two domains of couples' life course.

Keywords: fertility, housing, event history analysis, Britain

Introduction

There is a long research tradition that investigates the effects of family changes on housing transitions in industrialised countries. Most early studies were based on cross-sectional data (Rossi 1955; Long 1972); research exploiting longitudinal data has only emerged over the past two decades. Deurloo et al. (1994) studied the effect of family change on the tenure change in the U.S. The analysis showed that the transition from a couple to a family significantly increased propensity of moving into owner-occupied housing. Davies Withers (1998) also looked at the impact of household transitions to housing transitions. Compared to others, individuals living in couple and nuclear households were less likely to move within the rental sector, while they, especially those in nuclear households, were more likely to move to homeownership. She concluded that transitions to ownership are related to transitions to relatively stable household types.

Mulder and Wagner (1998) investigated the effect of events in the family life-course on homeownership in Germany and the Netherlands. The analysis revealed that transition to first homeownership is connected with events in the family life course: marriage, first childbirth when it occurs close to marriage, and second childbirth. This connection was stronger in Germany than in the Netherlands, where homeownership is increasingly pursued by childless couples, probably often in anticipation of having children. The subsequent study by Feijten and Mulder (2002) supported that Dutch couples increasingly move into single-family houses before the child is born, mostly during the pregnancy. Kulu (2008) observed similar patterns in his study on childbearing and residential mobility in Austria. The analysis showed that first and second pregnancy significantly raised the likelihood of short-distance (housing-related) moves for the Austrian couples. A study by Clark and Davies Withers (2009) on fertility and spatial mobility in the US supported previous findings: the number of moves almost doubled from the six months before the birth and declined steadily after the birth.

Studies by Clark and Huang (2003) and that by Rabe and Taylor (2010) showed the triggering effect of childbearing on residential mobility in the British context. Further, the analysis by Clark and Huang (2003) revealed some interesting contextual effects; while the birth of a child increased mobility in the national model, there was no such effect in the model for London. The authors attributed this difference in impact to the role of the local housing market: in an expensive and tight housing market such as in London, the desire to move, as indicated by room stress and changes in household composition, may be difficult to fulfil.

Recent studies have also examined other side of the relationship: the timing of family formation relative to housing-related moves. Mulder and Wagner (2001) examined the interconnections between first childbirth and first-time homeownership in West Germany and the Netherlands. The analysis showed an elevated risk of first birth a year after moving to owner-occupied housing. They argued that elevated fertility levels after becoming a homeowner indicate that couples bought their homes because they aspire to have children. The subsequent study by Michielin and Mulder (2005) supported increasing fertility levels for Dutch couples after short-distance moves, which the authors attributed to housing changes in anticipation of childbearing. Similarly, in a study on Finland, Kulu and Vikat (2007) found elevated fertility levels among couples who had moved together, especially to detached

housing. They attributed elevated fertility after the move in the Finnish context to selective moves: couples moved in order to adjust their housing size to expected family size. Interestingly, Clark and Withers Davies (2009) reached to somewhat different conclusion in their recent study: while fertility triggered mobility among the American couples, fertility levels did not increase after moves.

Most recent research has thus concluded that couples change housing in order to adjust their dwelling size to (expected) family size. However, Mulder (2006) has provided an alternative interpretation for the observed patterns. She argued that an elevated fertility for couples after they have moved to owner-occupied housing is not so strongly related to so-called adjustment moves. Rather, childbearing is postponed until homeownership becomes possible. This is because couples prefer to secure housing of a certain quality before they have children. Ström (2010) presented a similar argument in her study on Sweden where she observed a positive relationship between the dwelling size and first-birth levels. Housing has thus been seen as a resource, which enables or hinders the realisation of childbearing plans (cf. Kostelecky and Vobecka 2009; Mulder and Billari 2010). The discussion of the effect of availability and affordability of housing on childbearing in not new in the literature, however. A quarter century ago, Murphy and Sullivan (1985) showed that couples who wished to become homeowners in Britain had to delay family formation until they had saved up sufficient funds for a deposit and until their income was large enough to pay for a mortgage. The postponement of childbearing might even lead to lower family size; significant housing costs foreseen for a longer period possibly led couples to consider having fewer children (see also Murphy 1984).

To sum up, recent studies have shown that childbearing and housing transitions are closely related. Most studies conclude that a causal link runs from childbearing to housing: childbearing leads to changes in housing conditions. However, some research has suggested that the causality may also operate in an opposite direction. Under ideal circumstances housing supply equals housing demand, and most couples are able to find at reasonable cost the type of housing they find suitable (Ström 2010). In reality, however, the housing market is never perfect and most couples face financial constraints; they may not be able to find or afford the type of housing they consider proper in a certain stage of their family life. If so, the availability of proper housing or the lack of it may shape the couple's childbearing plans and behaviour. Couples may delay their childbearing (or wait before having another child) until a proper housing becomes attainable rather than simply move to a proper housing when they decide to have a child.

Objectives

In this paper, we examine the relationships between childbearing decisions and housing choices in Britain. We extend previous research in the following ways. First, we model the timing of housing changes relative to the birth of a child and childbearing relative to housing transitions. While previous studies have focussed on either fertility or housing change as an outcome process, we simultaneously examine the changes in the two family careers to gain a better understanding of their interrelationships. Considering only the timing of one event with respect to other at time would provide us with a partial view on the relationships between the two domains of the family life.

Second, we control for unobserved characteristic of women, which may simultaneously influence their fertility behaviour and housing choices. It is likely that women's long-terms childbearing plans and housing aspirations are interrelated. For example, women who wish to have large families may select themselves into those housing types that are better suited to family life. Further, they may move several times before their housing aspirations are eventually fulfilled. If this were true, we would over estimate the risk of a birth for the women who move, particularly to 'family-friendly' housing (detached or semi-detached houses, but possibly also large terraced houses and apartments), compared to those who do not move. The effect of fertility on housing changes would also be biased: if some women, net of their observed characteristics, are more likely than others to have a(nother) child and move (to detached or terraced houses), then the effect of childbearing on the risk of moving would be over estimated.

Third, we examine the relationship between housing and fertility across residential context (London versus other areas); this is a way of identifying whether and how the context moderates the housing-fertility relationship. We are particularly interested in the variation between settlements in the order of events, i.e. whether couples move in anticipation of or in response to a birth. Again although both types of moves may be seen as adjustment moves, an examination of the timing patterns by settlement may provide us with valuable information on how easy or difficult it is to adjust housing size to family size in various contexts. In their recent study on Finland, Kulu and Steele (2013) showed that the moves occurring during pregnancy or after a birth were more common in larger than in smaller settlements; in the latter, many couples moved first and then had a child. These findings suggest that the issues of housing costs and affordability play a much more important role in larger than smaller settlements, which is not surprising; in cities, especially in large cities, some couples may have to delay childbearing or having another child until appropriate housing becomes available and affordable.

Data sources

We use data from the British Household Panel Survey (BHPS). The BHPS is an annual survey consisting of a nationally representative sample of about 5,500 households recruited in 1991, containing a total of approximately 10,000 individuals. The sample is a stratified clustered design drawn from 250 areas of Great Britain, and all residents present at those addresses at the first wave of the survey were designated as panel members. These same individuals are re-interviewed each successive year and, if they split off from original households to form new households, they are followed and all adult members of these households are also interviewed. New members joining sample households become eligible for interview, and children are interviewed once they reach the age of 16 (ISER 2008).

The BHPS collects annual information on major life events of individuals, including union formation and dissolution, birth of children, and residential and housing change. Additionally, in 1992, completed fertility, partnership, educational and employment histories of the respondents were collected. The extract we use include women aged 16–49 between 1991 and 2008. We focus on housing changes and childbearing among women between 1991 and 2008. We distinguish between moves within labour market areas (short-distance moves or housing changes) and between them (long-distance moves).

Methods and modelling strategy

We will use an event-history analysis (Hoem 1987; 1993; Blossfeld and Rohwer 1995), fitting a series of regression models for the hazard of housing change and for the risk of having a child. The basic model for housing transitions can be formalised as follows:

$$\begin{aligned} \ln \mu_{im}^{S}(t) &= y^{S}(t) + \sum_k z_k^{S}(u_{imk} + t) + \sum_j \alpha_j^{S} x_{imj} + \sum_l \beta_l^{S} w_{iml}(t) + \varepsilon_i^{S} \\ \ln \mu_{im}^{L}(t) &= y^{L}(t) + \sum_k z_k^{L}(u_{imk} + t) + \sum_j \alpha_j^{L} x_{imj} + \sum_l \beta_l^{L} w_{iml}(t) + \varepsilon_i^{L} \end{aligned}, \qquad (1)$$

where $\mu_{im}{}^{S}(t)$, $\mu_{im}{}^{L}(t)$ denote the hazard of mth move of individual i over short or long distances in the competing risk framework. $y(t)$ denotes a piecewise linear spline that captures the baseline log-hazard (union duration for first move and time since previous move for the second and subsequent moves). We use a piecewise linear spline specification instead of the widely used piecewise constant approach to pick up the baseline log-hazard. Parameter estimates are thus the slopes for linear splines over user-defined time periods. With sufficient nodes (bend points), a piecewise linear-specification can capture any log-hazard pattern in the data (for further details, see Lillard and Panis 2003)[1]. $z_k(u_{imk} + t)$ denotes the spline representation of the effect of a time-varying variable that is a continuous function of t with origin u_{imk} (the woman's age, calendar time and union duration for the second and subsequent moves). x_{imj} represents the values for a time-constant variable (language), and $w_{iml}(t)$ represents a time-varying variable whose values can change only at discrete times (parity and all other variables). $\varepsilon_i{}^{S}$ and $\varepsilon_i{}^{L}$ are woman-specific time-invariant residuals for the moving short or long distances, respectively.

We will also fit a model for childbearing, which can be formalised as follows:

$$\begin{aligned} \ln \mu_i^{B1}(t) &= y^{B1}(t) + \sum_k z_k^{B1}(u_{ik} + t) + \sum_j \alpha_j^{B1} x_{ij} + \sum_l \beta_l^{B1} w_{il}(t) + \varepsilon_i^{B} \\ \ln \mu_i^{B2}(t) &= y^{B2}(t) + \sum_k z_k^{B2}(u_{ik} + t) + \sum_j \alpha_j^{B2} x_{ij} + \sum_l \beta_l^{B2} w_{il}(t) + \varepsilon_i^{B} \\ \ln \mu_i^{B3}(t) &= y^{B3}(t) + \sum_k z_k^{B3}(u_{ik} + t) + \sum_j \alpha_j^{B3} x_{ij} + \sum_l \beta_l^{B3} w_{il}(t) + \varepsilon_i^{B} \end{aligned}, \qquad (2)$$

where $\mu_i{}^{B1}(t)$, $\mu_i{}^{B2}(t)$, $\mu_i{}^{B3}(t)$ represent the hazard of the first, second and third conception (subsequently leading to a birth) of individual i, respectively. $\varepsilon_i{}^{B}$ is a woman-specific time-invariant residual for the fertility equations.

There may be unobserved factors which influence women's childbearing and housing choices over their family life. In order to control for such factors, we will build a

[1] The value of the linear spline function between the points (t_n, y_n) and (t_{n+1}, y_{n+1}) is computed as follows: $y(t) = y_n + s_{n+1}(t - t_n)$ for $n = 0, 1, 2 \ldots$, where s_{n+1} is the slope of the linear spline over the interval $[t_n, t_{n+1}]$. To compute the linear spline function we thus need to define nodes and estimate from the data constant y_0 and slope parameters $s_1, s_2, \ldots$.

simultaneous-equations model to estimate jointly three equations for fertility and three equations for mobility. The model can be formalised as follows:

$$
\begin{aligned}
\ln \mu_{im}^{S}(t) &= y^{S}(t) + \sum_k z_k^{S}(u_{imk} + t) + \sum_j \alpha_j^{S} x_{imj} + \sum_l \beta_l^{S} w_{iml}(t) + \varepsilon_i^{S} \\
\ln \mu_{im}^{L}(t) &= y^{L}(t) + \sum_k z_k^{L}(u_{imk} + t) + \sum_j \alpha_j^{L} x_{imj} + \sum_l \beta_l^{L} w_{iml}(t) + \varepsilon_i^{L} \\
\ln \mu_{i}^{B1}(t) &= y^{B1}(t) + \sum_k z_k^{B1}(u_{ik} + t) + \sum_j \alpha_j^{B1} x_{ij} + \sum_l \beta_l^{B1} w_{il}(t) + \varepsilon_i^{B} \quad , \qquad (3) \\
\ln \mu_{i}^{B2}(t) &= y^{B2}(t) + \sum_k z_k^{B2}(u_{ik} + t) + \sum_j \alpha_j^{B2} x_{ij} + \sum_l \beta_l^{B2} w_{il}(t) + \varepsilon_i^{B} \\
\ln \mu_{i}^{B3}(t) &= y^{B3}(t) + \sum_k z_k^{B3}(u_{ik} + t) + \sum_j \alpha_j^{B3} x_{ij} + \sum_l \beta_l^{B3} w_{il}(t) + \varepsilon_i^{B}
\end{aligned}
$$

ε_i^B, ε_i^S and ε_i^L are woman-specific time-invariant residuals for the fertility and mobility equations, respectively. The residuals are assumed to follow a multivariate normal distribution. A positive value of ρ^{SB} suggests that women with an above-average risk of having a child (or another child), net of their observed characteristics, have also an above-average propensity of moving short distances (or change housing). The same logic applies for ρ^{LB}, which denote covariances between the residuals of the birth and migration equations. The identification of the model is attained through within-person replication (see Lillard 1993; Lillard *et al.*1995; Kulu 2005; 2006; Steele *et al.* 2005; 2006; Matysiak 2009; Kulu and Steele 2013). The models will be estimated via maximum likelihood using aML (Lillard and Panis 2003).

Results (*in progress*)

We have analysed the effect of fertility on short and long-distance moves. The results are as follows:

1. The presence of children reduces the likelihood of moving over long distances; the birth of a child triggers short-distance moves; many individuals / couples move when waiting their child to be born (Figures 1 to 3).
2. The moves of singles explain elevated moving rates during the first pregnancy, although couples are also prone to move locally before the birth of their first child (Figures 4 and 5).
3. Couples with children living in London are less likely of moving locally than those living elsewhere in Britain (Figures 6 and 7).
4. Unobserved co-determinants of fertility and mobility behaviour (Table 2); some over-estimation of the 'effect' of fertility on spatial mobility.

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Table 1. Descriptive Statistics.

	Person-years	*All moves*	*Migrations*	*Residential moves*
Childless	15904.07	3111	1023	2088
First pregnancy	604.83	168	36	132
First child	6649.71	849	162	687
Second pregnancy	517.79	94	15	79
Second child	12445.37	969	192	777
Third pregnancy	221.61	33	4	29
Third child	1877.21	188	54	134
Total	38220.60	5412	1486	3926

Data: British Household Panel Study, 1991–2008.

Table 2. Error Structure of the Simultaneous Equations Model.

Correlation between the person-level residuals

Migration – Residential move	0.09
Fertility – Migration	0.30 *
Fertility – Residential move	0.32 *

Significance: ''=10%; '**'=5%; '***'=1%*

Data: British Household Panel Study, 1991–2008.

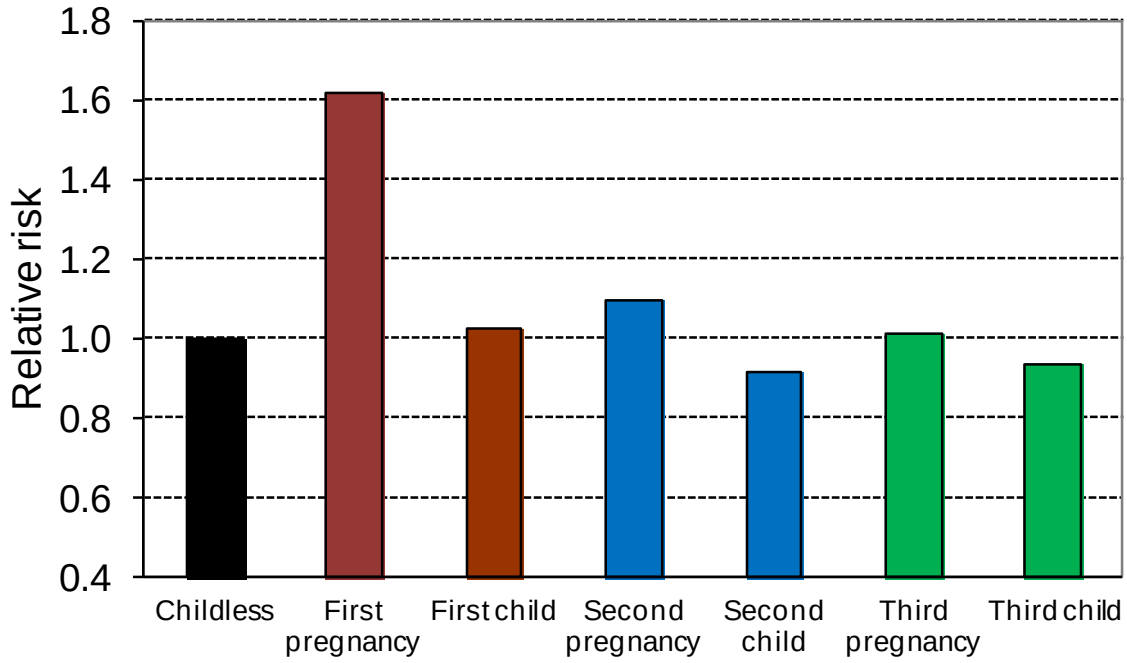

Figure 1. Relative Risks of Moving by Birth Order.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.

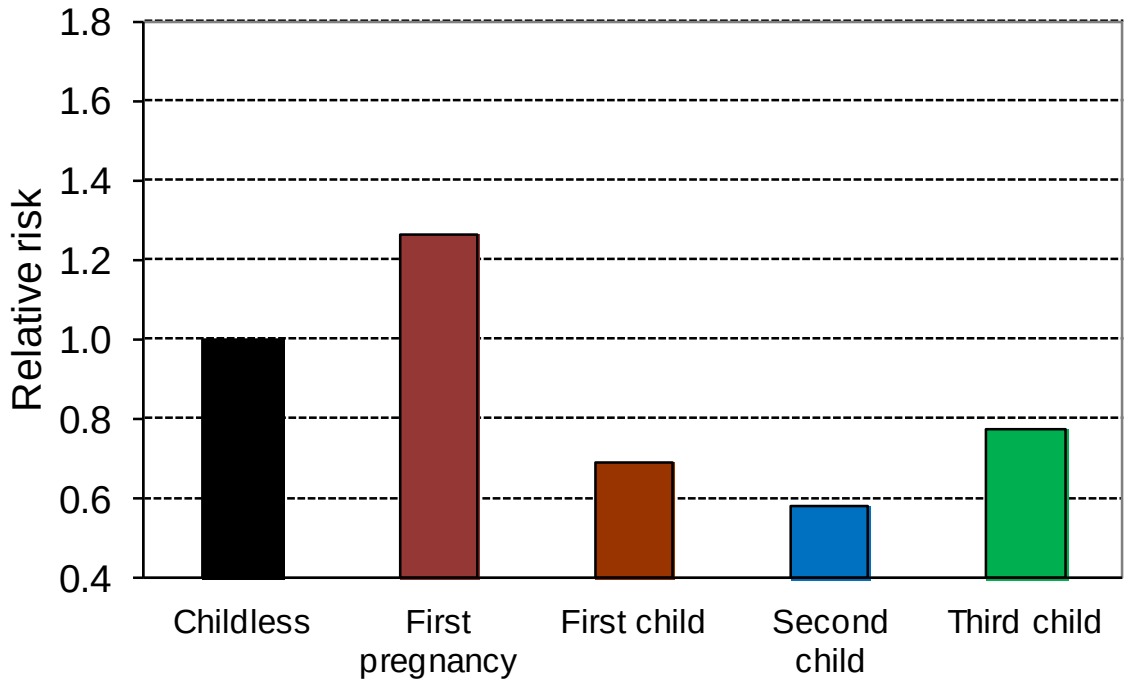

Figure 2. Relative Risks of Moving Between LMAs by Birth Order.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.

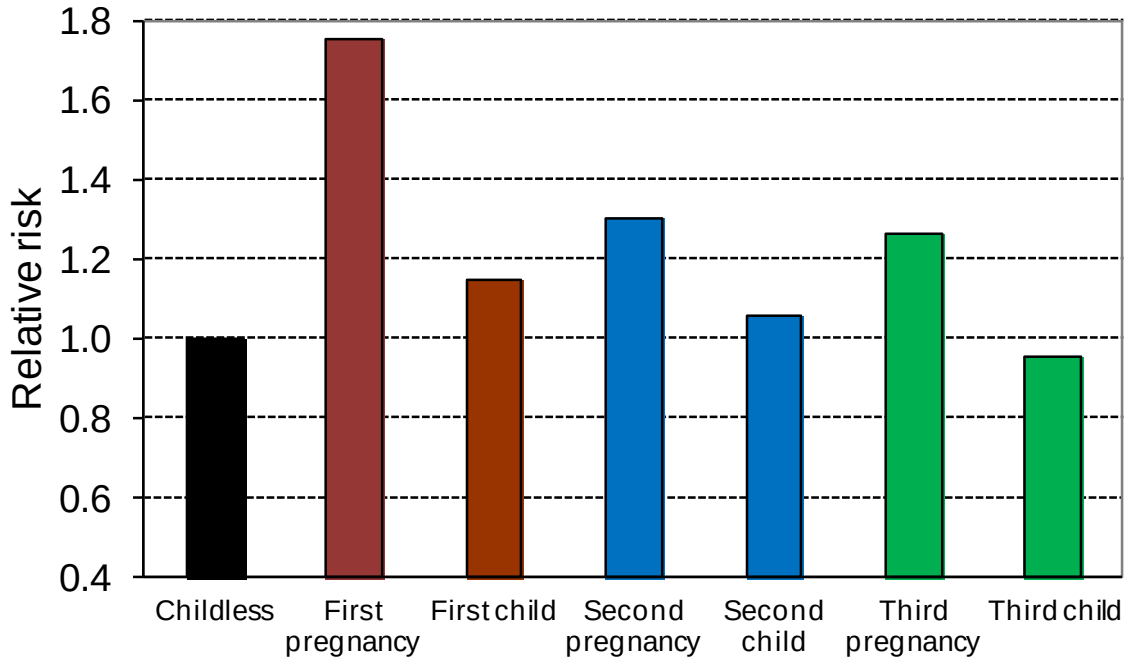

Figure 3. Relative Risks of Moving Within LMAs by Birth Order.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.

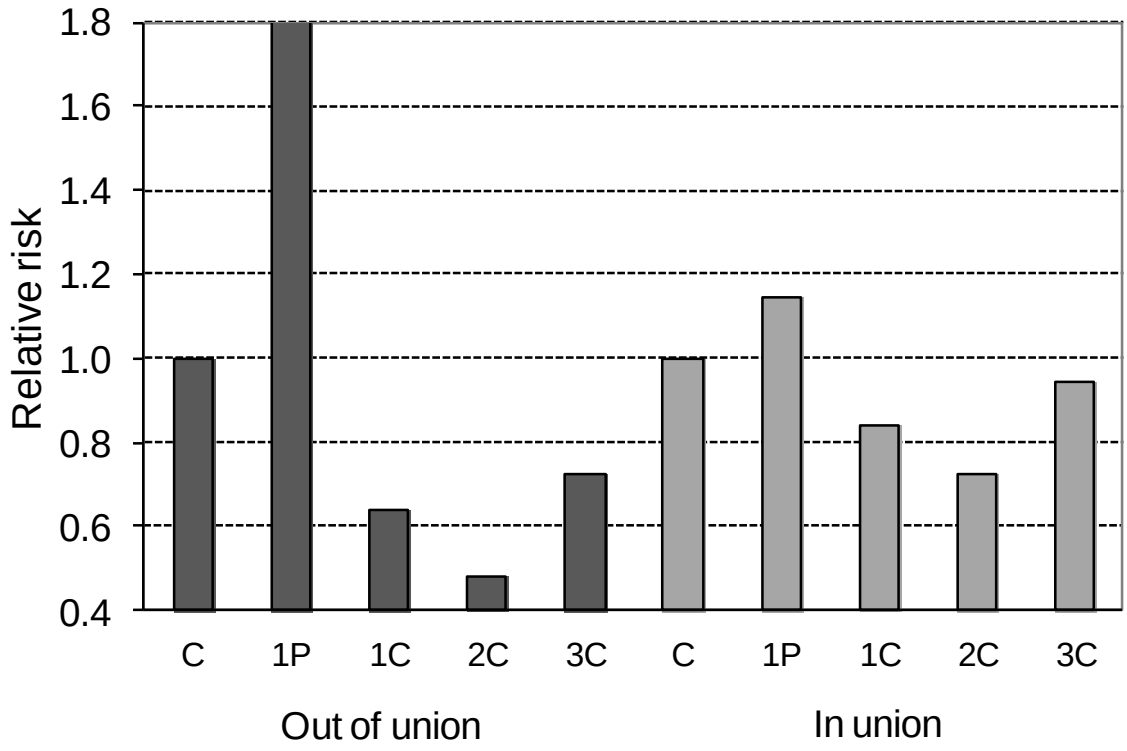

Figure 4. Relative Risks of Moving Between LMAs by Partnership Status.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.

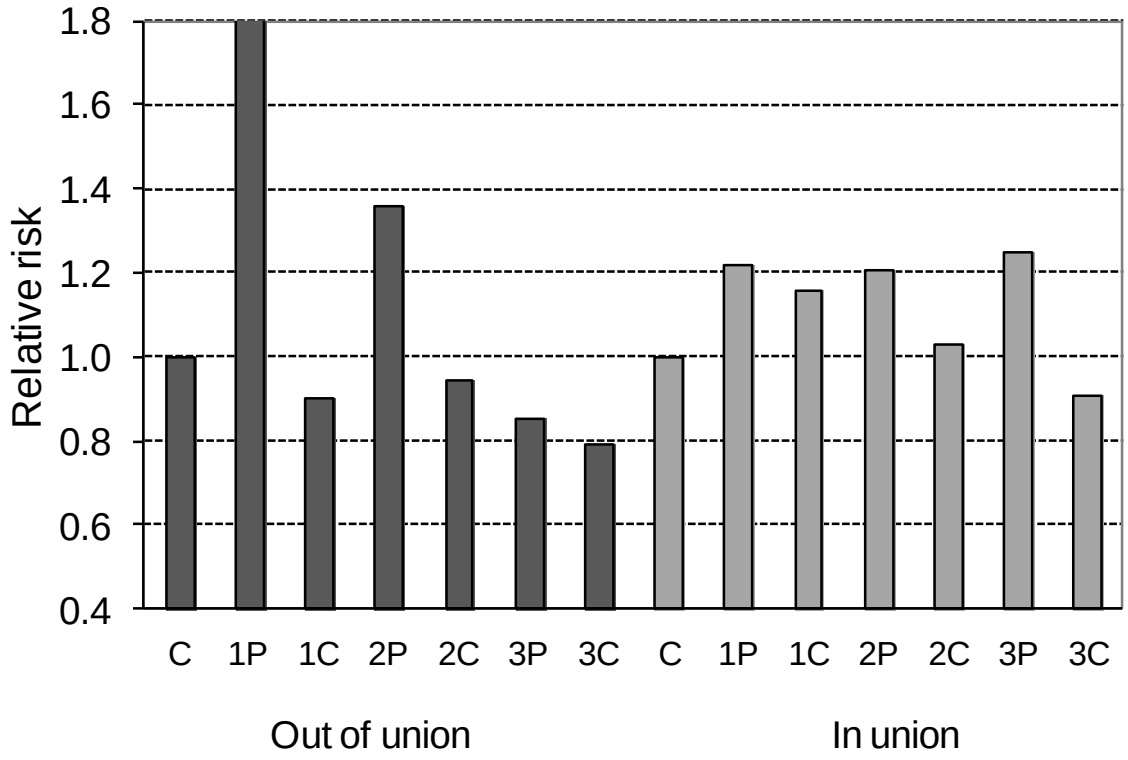

Figure 5. Relative Risks of Moving Within LMAs by Partnership Status.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.

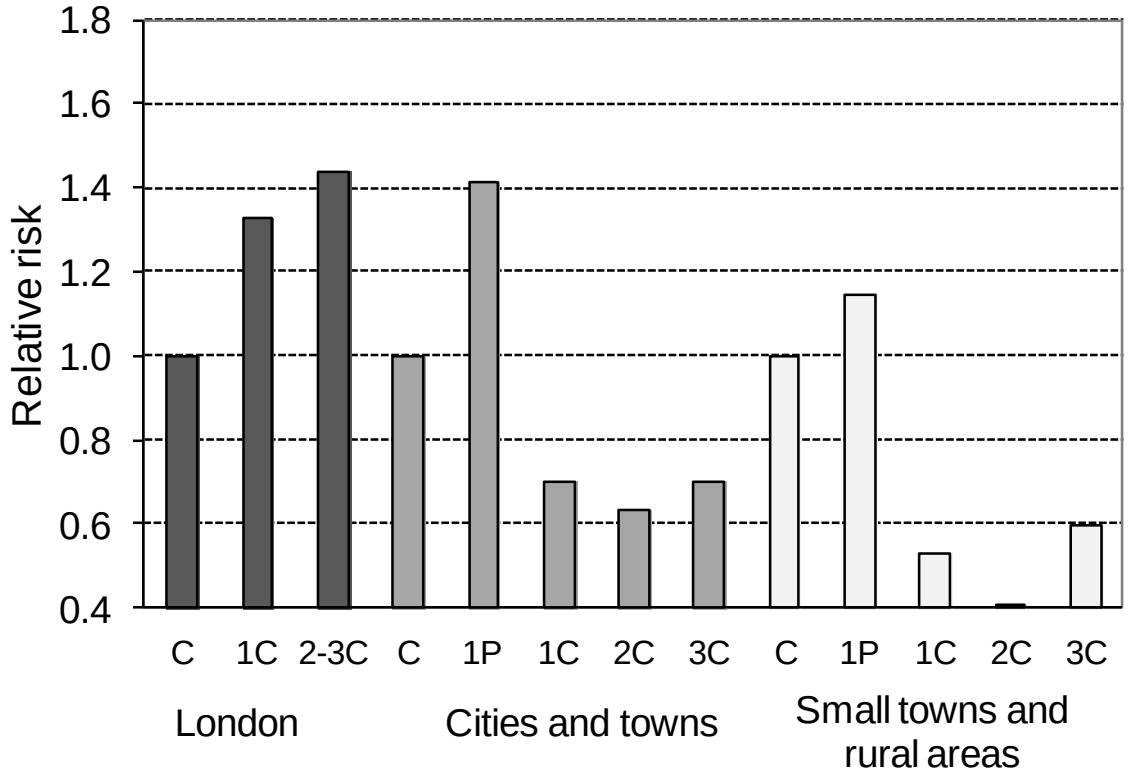

Figure 6. Relative Risks of Moving Between LMAs by Residential Context.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.

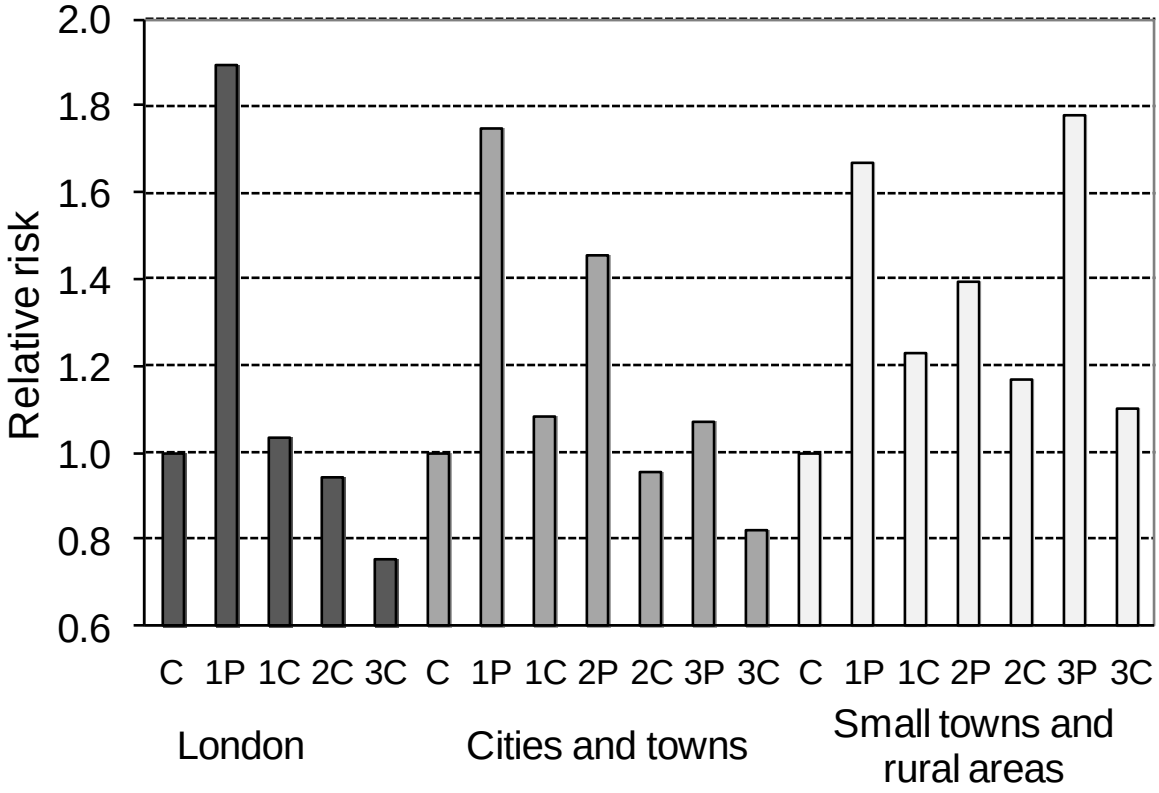

Figure 7. Relative Risks of Moving Within LMAs by Residential Context.

Controlled for the women's age, time since move (if any), the number of moves, calendar period, partnership status, educational level, activity status, ethnic origin, place of residence, housing type, the number of rooms, tenure, woman-level random effect.
Data: British Household Panel Study, 1991–2008.