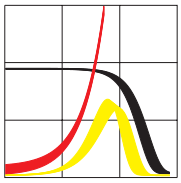

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Fertility and Spatial Mobility: Evidence from Austria

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Abstract

There is a growing body of literature looking at the interplay between an individual's residential and other careers in the life-course. Previous research has mostly studied the impact of partnership and employment changes on spatial mobility. This paper focuses on the effect of childbearing on migrations and residential moves. We base our study on retrospective event-history data from Austria and apply intensity regression. Our analysis shows, first, that the birth of a child triggers housing- and environment-related residential relocations. Second, it significantly reduces couples' wish and chances of moving over long distances for a job. The event of first conception also induces moves related to partnership formation.

Keywords: migration, residential mobility, fertility, life-course, event-history analysis, Austria

The emergence of the life-course approach (Mayer and Tuma, 1990; Willekens, 1999) and event-history analysis (Allison, 1984; Hoem, 1987; 1993; Yamaguchi, 1991; Courgeau, 1995) mark an important methodological development in population studies and analytical social sciences over the past two decades. Longitudinal data and the techniques of event-history analysis enable us to link demographic events to changes in various life domains of individuals, and thus to significantly advance our understanding of the causes of demographic behaviour. In research on spatial mobility, there is a growing literature looking at the effect of employment, educational, family and housing careers on an individual's geographical mobility. Previous studies show that long-distance moves are mostly prompted by job- and education-related factors (Wagner, 1990; Détang-Dessendre and Molho, 1999; Kulu and Billari, 2004), while changes in family size and housing considerations are major determinants of short-distance residential relocations (Davies Withers, 1998; Mulder and Wagner, 1998; Clark and Huang, 2003). Some life-events, like family formation, in turn, may equally lead to migration and residential mobility, especially for women (Mulder and Wagner, 1993; cf. Clark and Huang, 2003).

Studies looking at the impact of family events on spatial mobility usually focus on the effect of changing partnership/marital status (Speare and Goldscheider, 1987; Mulder and Wagner, 1993), whereas the role of childbearing receives less attention. Variables showing the size of the family or the presence of children are often included in the analysis among others, but a more detailed (and systematic) treatment of their impact is missing. This paper aims to fill the gap by providing an analysis of the effect of childbearing on spatial mobility. We use retrospective event-history data from Austria and apply intensity regression. We look at the effect of fertility on spatial mobility by parity across different settlements. We distinguish the impact of childbearing on migration and residential mobility. The structure of the article is as follows. First, we give an overview of previous research. We then describe the study context and form hypotheses for our research. Third, we introduce the data and methods. Fourth, we present the results of our analyses, followed by a discussion on the role of childbearing in shaping an individual's spatial mobility.

Previous research on the impact of fertility on spatial mobility

While research looking at the effect of family size on geographical mobility has a long history (Rossi, 1955; Long, 1972), studies based on longitudinal data

(and on event-history analysis) have only emerged over the past two decades. In their path-breaking study, Sandefur and Scott (1981) looked at the effect of age, family and career variables on inter-county and inter-state migration of the 1930–39 birth cohorts in the U.S. Their analysis showed that the rates of migration decreased significantly as family size increased. The authors concluded that two factors were responsible for diminishing migration intensities. First, the economic cost of a move rises with the number of persons in the family unit. Second, and more importantly, the presence of additional members in the family means that more ties must be broken at the place of origin and established at destination.

Courgeau (1989) focused on the interrelations between family formation and spatial mobility in France. As opposed to previous research, he distinguished the effect of fertility on rural (non-metropolitan) to urban (metropolitan) and urban to rural migrations. The analysis revealed that the probability of moving to cities decreased significantly after each successive birth, while that of moving to rural areas increased slightly with growing family size. Later, Baccaïni and Courgeau (1996) studied (also) how and whether the impact of childbearing on migration varies over time since birth, using the register data on the Norwegian post-war cohorts. The analysis showed a low probability of inter-regional migration after second birth, while the risk of moving from a region to another was relatively high in the year of first birth, and thereafter quickly decreased. However, these were net effects as authors did not distinguish the impact of childbearing across migration destination in this study.

Some other studies looking at the effect of childbearing on migration can also be found from the recent literature. White et al. (1995) focused on the interplay between fertility and migration in Peru. Although in a different context, their analysis to a large extent supports the previous results on the "average" effect of fertility on migration – the larger the family, the lower the risk of moving from one settlement to another. Similarly, the authors attributed decreasing mobility with increasing parity to the fact that the cost of relocating a larger family, including some children who may be of school age, is greater. Lindgren (2003), in turn, studied the determinants of urban to rural migration ('counter-urban' moves) using the Swedish register data. The analysis showed rising rural-bound mobility with the birth of a child, whatever the city of residence. The author concluded that the couples might have perceived the arrival of a new family member as the right time to leave the cities for a more pleasant environment in the countryside, a move that may have been planned for a long time. Several other recent studies have also looked at the impact of

fertility on migration (Fischer and Malmberg, 2001; Détang-Dessendre et al., 2002). However, an analysis based on cross-sectional data has not been sufficient in showing whether migration operates as an effect or cause of changing family size.

Turning to the residential mobility literature, Clark et al. (1984) looked at the determinants of residential mobility in the city of Tilburg in the Netherlands. Their analysis showed that for owners as well as renters in both the private and public sectors, the addition of a child stimulated moving within the city. The authors attributed increasing residential mobility with growing family size to adjustments in housing consumption. Courgeau (1985) reached very similar conclusions. His study on spatial mobility of the 1911–35 birth cohorts in France showed that for women (who had married at ages 15 to 22) moves following childbirth (or undertaken in the same year) were more numerous than the moves where no childbirth occurred. Similarly, the author explained the observed mobility patterns by the need of (young) married couples to adjust their dwelling size to their family size. Further analysis revealed that some moves were also undertaken in anticipation of an increase in family size.

More recently, the effect of family size and childbearing on moving to different housing types, especially to homeownership, has received attention. Davies Withers (1998) looked at the impact of household transitions to housing transitions in the U.S. Compared to others, (single) individuals living in nuclear households or couple households were less likely to move within the rental sector, while they were more likely to move to homeownership. She concluded that transitions to ownership are related to transitions to relatively stable household types (couples and nuclear families). In their comparative research on (West) Germany and the Netherlands, Mulder and Wagner (1998) looked at the effect of events in the family life-course on first homeownership. 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, as the authors argued, homeownership is increasingly pursued by childless couples, probably often in anticipation of having children.

Finally, a recent study by Clark and Huang (2003) on residential mobility in Britain also needs attention. Overall, their analysis supported previous results on the triggering effect of childbearing on residential mobility. However, further analysis revealed that 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. Clark and Huang also compared the results of their longitudinal and cross-sectional models. It appeared that the effects of trigger variables (marital change and birth of a child) were not adequately captured in the cross-sectional models.

The major findings of previous research can thus be summarised as follows. First, childbearing is an important trigger of housing- and environment-related moves. These are mostly moves within a labour market area or migrations from urban regions to surrounding rural areas. The need for additional space or the desire for a more pleasant environment to raise the children are major determinants why families decide to change their residence. Second, growing family size diminishes couples' chances to make (job-related) long-distance moves, especially to urban destinations. The major reason seems to be that the economic and psychological costs of moving from one region to another rise as the family grows, especially when some children are of school age.

Clearly, there is room for further studies on the topic, especially for a systematic analysis of how childbearing shapes spatial mobility patterns. First, the effect of fertility on migration and residential mobility needs to be analysed in comparison. Second, the influence of childbearing on migrations from various origins to different destinations should be studied in more detail. Third, the effect of fertility needs to be analysed across parity. Finally, the possible time-varying impact of childbearing should also be considered. Next, we briefly describe the trends in spatial mobility in Austria and thereafter present hypotheses for our research.

Spatial mobility in Austria during the post-war period

During the first two post-war decades, movements toward major urban centres and suburbanisation were dominant trends in Austria. While suburbanisation was modest until the 1970s, it thereafter increased and many who left the cities moved beyond the borders of urban regions, especially that of Vienna (Sauberer, 1981, 22–23; SA, 2004b). Moreover, the net (internal) migration of larger cities became negative in the 1990s due to increasing out-migration from the cities, thus allowing us to conclude that sub- and counterurbanisation gradually replaced urbanisation that dominated during the first post-war decades in Austria. However, the patterns of spatial mobility have differed

across age as expected. While major cities increasingly loose young families and part of their population of other age-groups, they still continue to attract adolescents and young adults (SA, 2004a; cf. Sauberer, 1981, 23).

In order to gain deeper insight into the patterns of spatial mobility, we next move from aggregate-level statistics to individual-level data. We use the data from the Austrian Family and Fertility Survey from 1995–96 on 5,056 individuals (3,833 women and 1,223 men) born 1941–76. (The data-set will be described in more detail in the section after the next.) We look at the share of people who have changed their district of residence across birth cohorts, gender and the settlement type. Our analysis shows that about 36% of the members of all birth cohorts have left their childhood district by age 30 (Figure 1). Significant differences exist across gender and residence at age 15: The share of migrants is (somewhat) higher among women (results are not shown) and the residents of rural and small urban areas (Figure 2).

The results on the second (inter-district) migration are more colourful. We see first that 33% of migrants born 1941–54 have moved (within ten years since first migration) at least twice, while the corresponding figure for those born 1965–76 is 58% (Figure 3). A further analysis reveals that the cohort differences can largely be attributed to increasing urban to rural migrations among younger cohorts. Second, we notice that the share of those who have changed their district of residence is the lowest among migrants in rural areas and the highest among those in major cities (Figure 4). The difference mostly results from significant return migration from the cities of people who come from rural areas. Thus, the recent trends of population deconcentration in Austria can be explained (partly at least) by the fact that the share of people who leave the cities after studies or marriage has increased among younger generations of rural origin. Whether the causes of these changing patterns are economic, technology- or life-style-related (cf. Champion, 2001), however, needs a separate investigation.

Hypotheses on the impact of fertility on spatial mobility

Our hypotheses come from the previous two sections, and are as follows. First, we assume decreasing migration intensities to urban areas, especially to cities, with growing parity, as couples with children are (for several reasons) less willing to make (job-related) long-distance moves than those without children or singles. Migration from urban to rural areas, however, may rise with parity, as some couples with children decide to leave cities for the (neighbouring) countryside where the environment is more children-friendly and housing is

better. Second, we assume that the probability of changing residence within a settlement (or labour market area) increases with the birth of a child, as couples usually wish to adjust their housing size to their family size. However, the effect of childbearing on local moves may vary across settlements. In large cities where the housing market is tight, the couples may have less of a chance than in smaller settlements to fulfil their desire for larger housing after the birth of a child (and some of them may leave the city). In the rural areas, the likelihood of couples to change their residence may also diminish with growing parity, as many are able to afford relatively large housing (single-family house) already with first childbirth, thus avoiding later residential moves.

Third, the effect of childbearing on spatial mobility may also vary across generations. It is particularly interesting to see if couples from younger cohorts are more likely than those from older generations to leave larger cities for the countryside after the birth of a child. This would allow us to gain further insight into the mechanisms behind recent population deconcentration in Austria. Finally, we assume that the impact of childbearing varies over time since birth. Moreover, we follow the risk of spatial mobility since the beginning of pregnancy to see exactly when families time their move within a settlement/region or between them.

Research data and variables

Our data come from the Austrian Family and Fertility Survey. The Austrian FFS was carried out in 1995 and 1996 among 4,581 women and 1,539 men between the ages of 20 and 54 (Prinz et al., 1998, 1, 53). The overall response rate was 72%, which is rather good for a study of this content in present-day Austria (Hoem et al., 2001, 252). As a part of the Europe-wide FFS program, the survey is based on the collection of event-histories. All major demographic events that took place in the life of respondent were identified (to the accuracy of a month), including births and residential changes since age 15. In the FFS program, the collection of residential histories was optional. Austria was one country among the few that implemented this module.

Our research population consists of 3,833 women and 1,223 men born 1941–76. We have excluded from the sample foreign-born people and those who lived abroad at age 15. In addition, individuals with incomplete data, those who gave first birth before age 15 or adopted a child or experienced birth of twins have been removed from the sample. We study the impact of first, second and third (and higher-order) births on migration and residential mobility of the Austrian population. We define migration as a residential change crossing the

border of a district (*Politischer Bezirk*). Residential changes within a district or settlements are considered as residential moves. There are 2,555 migrations and 5,927 residential moves in our data set.

We go beyond the traditional rural-urban-dichotomy and distinguish three types of settlements: rural areas, small towns and large cities. Urban areas over 100,000 inhabitants are considered as large cities, whereas urban settlements below 100,000 people are defined as small towns. The distinction between small towns and rural areas is more difficult as information is available only on the district of residence (but not commune or settlement). We define as rural areas those Austrian districts where the population of the largest settlement does not exceed 20,000 people. This criterion turned out to be the most appropriate (among many others) when we compared our results with information on the type of settlement at interview that the data-set contains[1]. Finally, the issue of the cities' borders needs to be solved. Recent data show that all major Austrian cities extend beyond their administrative borders (Fuchs 1997). However, we define only for Vienna, and not for other cities, the neighbouring districts as part of the city. We proceed from the fact that the majority of events we look at in our study took place from the 1960s to the 1980s, when suburbanisation was not as spread as in present-day Austria.

We build multi-episode data-sets separately for migrations and residential moves. Individuals are at risk since age 15 (for the first event) or since the previous migration or residential move. The final censoring takes place at interview. Residential episodes outside the country and with missing information on the settlement of residence are excluded from the analysis. If migration or a residential move occurs in the same month of conception, birth or union formation, we assume that residential change occurs first. If migration or residential move coincides with union dissolution, we assign residential change to take place last. Although one may feel that residential changes should always be treated as events occurring last, we follow (for comparative purposes) the logic we applied in our previous study on the impact of migration on childbearing (Kulu, 2004).

Variables reflecting an individual fertility history hold a central position in our models. We include into our analysis variables showing the time since conception by birth parity. Table (1) provides the distribution of the events of spatial mobility and the time individuals are under the risk across parity (discriminating the episodes of pregnancies and births) and settlement of residence (or the place of origin for migrations). We control for several demographic and socioeconomic variables when looking at the effect of childbearing on spatial mobility. First, we include into our analysis individual

age and time since the previous migration or residential move (for second and higher-order events)[2]. Second, we control for partnership status. Third, we include into our analysis birth cohort and gender. Next, we control for educational enrolment, the level of education and the employment status. We also control for the number of siblings an individual has and her/his degree of religiosity. Finally, we include into our analysis the number of migrations and residential moves, and the residence at age 15 (for migrants). Previous research has shown that all variables listed are important determinants of spatial mobility.

Research methods

We use intensity regression or multivariate indirect standardisation as a research method (Hoem, 1987; 1993). Our migration model can be formalised as follows:

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

This is a competing risk model, where $\mu_{im}{}^{R}(t)$, $\mu_{im}{}^{S}(t)$, $\mu_{im}{}^{L}(t)$ denotes the intensities of *m*th migration to rural, small urban and large urban destinations for individual *i*[3]. $y(t)$ denotes a piecewise linear spline that captures the impact of the baseline duration on the intensity. $z_k(u_{imk} + t)$ denotes the spline representation of the effect of a time-varying variable that is a continuous function of t with origin u_{imk}. x_{imj} represents the values of a time-constant variable and $w_{iml}(t)$ represents a time-varying variable whose values can change only at discrete times. We also assign to each equation a common person-specific residual ε_i^{M} with the aim to control for the clustering of events within the individuals and possible unobserved determinants of migration (cf. Davies, 1993; Lillard, 1993).

We also build a model for residential moves, which can be formalised as follows:

$$(2)\quad \ln \mu_{in}^{RM}(t) = y^{RM}(t) + \textstyle\sum_k z_k^{RM}(u_{ink}+t) + \sum_j \alpha_j^{RM} x_{inj} + \sum_l \beta_l^{RM} w_{inl}(t) + \varepsilon_i^{RM} \ ,$$

where $\mu_{in}^{RM}(t)$ denotes the intensities of the *n*th residential move for individual *i*. Again, we assign to the equation a person-specific residual ε_i^{RM} to control for the clustering of events within the individuals and to capture the impact of unobserved determinants of residential mobility.

Effect of fertility on spatial mobility

We begin our analysis looking at the effect of childbearing on migration by destination (independently of origin) and residential mobility. While the data allows us to compare the intensities of residential mobility during each pregnancy and after subsequent birth, the risk of migration before and after birth can only be studied for the first birth. We begin with the effect of fertility on migration. It appears that the event of first conception increases an individual's intensity of moving to rural destinations times 5.5 (Table 2, Figure 5). However, the risk is high only in the middle of pregnancy, it thereafter decreases and a few months after the birth reaches a level close to that prevailing before the pregnancy. The second and third conception (and birth) seems to reduce the probability of moving to rural settlements.

The results on the effect of fertility on migration to small and large urban areas are also interesting. We see that the first conception raises the intensity also of moving to small towns, although significantly less than that to rural settlements. Again, the risk drops remarkably during the second half of the pregnancy, and a few months after the birth the likelihood of moving for young parent(s) to small urban areas is even lower than before the first conception. The second and third birth reduces the risk of moving to small towns for couples by around 46% and 56%, respectively[4]. The intensity of moving to large cities, however, does not show any increase with first conception. Rather, the risk decreases dramatically with growing parity: While the event of first conception slightly reduces an individual's risk of moving to the cities (the slope coefficient becomes statistically significant when we remove the node at 0.375 years), the birth of the second and third child diminishes the propensity of moving to the cities as much as 70% and 82% correspondingly.

Finally, the patterns of residential mobility after childbearing also exhibit a specific character. We see that the events of first and second conception significantly raise an individual's intensity of moving locally: by 5 and 2.5 times, respectively (Table 2, Figure 6). Again, the risk of mobility drops significantly during the second half of the pregnancy, and the decrease continues also after the birth. The third pregnancy and a subsequent birth, in

turn, do not change a couple's likelihood of changing residence within the city, town or rural district. Still, as the child becomes older the risk of residential mobility gradually diminishes. We also see that the propensity of moving locally is the highest in large cities and the lowest in rural areas (Table 2).

To sum up, our analysis shows the following results. First, the event of first conception raises an individual's risk of moving to a rural and small urban destination and of changing residence within a settlement or district. The likelihood of moving locally is also high during the second pregnancy. Second, the analysis reveals decreasing migration intensities with the second and third birth, especially when the destination for migration is an urban area.

We have outlined the effect of childbearing on residential mobility and migration across destinations. However, previous research gives us a reason to believe that the patterns may vary across the settlements of origin (in some cases, at least). Next, we study whether the data support this assumption or not. Our analysis shows that, first, the intensity of moving to rural destinations after the second and third birth varies across settlements (Table 3). More specifically, while the birth of the second and third child reduces a couple's risk of moving from one rural settlement to another, they significantly increase the likelihood of leaving large cities for rural areas, thus implying an important urban to rural migration stream of families with children. Second, we see that the effect of first and second conception on residential mobility varies across settlements (Table 3, Figure 7). While both conceptions elevate the risk of changing residence in all settlements, the rise is the largest in rural areas and the smallest in the large cities. Still, we should keep in mind that the intensity of residential mobility after the first and second conception is similar in various settlements. Third, conception, in turn, only triggers residential moves within small towns.

Finally, we study if the effect of childbearing on migration and residential mobility varies across partnership status, generations and gender. For partnership status, we only look at the impact of first conception/birth as there are very few events of second and third birth outside the union. The analysis shows that the likelihood of moving to rural and small urban areas after first conception differs for singles and for those in union (Table 4, Figure 8). While singles in all settlements have a high intensity of leaving for rural settlements and small towns during the first pregnancy, only couples from large cities display an elevated risk of moving to rural destinations. Clearly, most migrations we observe during the first pregnancy are obviously related to union formation. Singles also exhibit a high risk of residential mobility during the first pregnancy, although those in union are also prone to move locally before

the birth of their first child (Table 4, Figure 9). Concerning a possible variation across gender and generations, our analysis shows that, overall, the effect of childbearing on spatial mobility is rather similar for different cohorts, and for men and women. However, the data-set is too small for a detailed analysis.

Thus, our further analysis has shown that, first, in most cases second and third birth reduces the intensity of moving from one settlement/district to another, while the two events increase the risk of leaving large cities for rural destinations. Next, the events of first and second conception raise the intensity of residential mobility in all types of settlements, but the increase is the largest in rural areas and the smallest in large cities. Third, the high risk of moving during the first pregnancy can mostly be attributed to moves by single individuals.

Impact of other variables

Next, we briefly report our results on the impact of other variables. The analysis to a large extent supports the findings of previous studies. As expected, the intensity of spatial mobility is the highest at late adolescence, when the majority of people complete their (secondary) education and either continue their studies (usually in the major cities), enter the labour market or leave the parental home for other reasons (Sauberer, 1981, 22; Rogers et al., 1983, 15–16) (Table 2). Our analysis also shows an increasing risk of spatial mobility during the first year(s) after residential relocation, and relatively stable levels or some decrease thereafter (cf. Gordon and Molho, 1995; Kulu, 2005). The fact that people in a union have a lower intensity of spatial mobility than singles corresponds to expectations, as many moves of singles simply result from union formation (Mulder and Wagner, 1993). The high mobility of divorced individuals, in turn, is a logical outcome of the process of separation. Younger cohorts exhibit a significantly higher intensity of residential mobility, but we do not observe much variation in the migration risk across generations, although one would have expected to do so. Still, our further analysis reveals that the cohorts born 1965 and later have a higher propensity of moving twice and more (results not shown). Males exhibit lower levels of spatial mobility, which is not surprising, as women move more often than men with union formation, especially at long distances (Mulder and Wagner, 1993, 72–73).

The lower intensity of migration during studies and employment corresponds to expectations (Fischer and Malmberg, 2001, 265). Increasing spatial mobility (especially migrations to large cities) as the individual gains higher educational qualifications is not surprising either. It points to wider

options and resources due to education and a larger dispersion of jobs for more educated individuals (Courgeau, 1985, 159). As expected, the presence of siblings raises the likelihood of (the first) migration or residential move (leaving the parental home) (Courgeau 1989, 136), and religious people have a lower propensity of moving to large cities. Concerning the effect of the settlement of residence, we see that the intensity of moving to rural destinations is the highest among residents of large cities, while the risk of leaving for cities is the largest in rural areas. The former (as our previous analysis showed) mostly results from out-migration of families with children from cities. The probability of changing residence locally, in turn, increases with the size of settlement. Our analysis also reveals declining mobility with a growing number of migrations and residential moves. Among migrants, those with a rural background are the most prone to move to rural destinations, and those who come from small towns and large cities more often (than others) leave for small urban and large urban destinations, correspondingly, thus pointing to the existence of significant return migration streams. We also see that the standard deviations of person-specific residuals of both models are significantly different from zero. Briefly, our analysis reveals that there exist unobserved characteristics that shape an individual's spatial mobility.

Summary and discussion

Let us now summarise the major results of our study on Austria and then discuss the role of childbearing in shaping the patterns of spatial mobility. We began our analysis by examining the effect of fertility on migration to various destinations and residential mobility. Our analysis showed that, first, the event of first conception significantly raises an individual's intensity of moving to rural and small urban destinations, and of changing residence within a settlement. The risk of moving locally is also high during the second pregnancy. Second, we observed a decreasing migration risk with the second and third birth, especially to urban destinations. We studied next if the effect of childbearing on spatial mobility varies across the places of origin. Our analysis supported that, overall, the birth of the second and third child significantly reduces the intensity of moving from one settlement to another, whereas they increase the risk of leaving large cities for rural areas. Similarly, the first and second pregnancy raises the propensity of moving locally, but the increase is the largest in rural settlements and the smallest in the large cities. Finally, our analysis of the patterns across partnership status revealed that most migrations and many residential moves during the first pregnancy are made by single

individuals. Only couples in the large cities display a high risk of leaving cities for rural areas after first conception.

Thus, our analysis to a large extent supports the hypotheses based on previous research. Overall, families are significantly less prone to make inter-district moves than singles or couples without children, and this corresponds to expectations. First, the economic and psychological costs of changing daily activity spaces (Hägerstrand, 1970; cf. Roseman, 1971) increase with the number of individuals in the family, especially when some children are of school age. As a significant amount of migrations (to similar or larger places, at least) are job-related, there must be remarkable long-term (economic and other) rewards to cover the various costs that the relocation initially brings to most family members. Second, low migration intensities after second and third birth may also result from the fact that most couples have "settled down" by that time. They have established themselves in the labour market (or the male partner has done so, at least), and many of them have already moved to (or stayed at) the region they would like to work in, live in and raise their children in. (Part of this effect is controlled by an individual's age in our models, but not all.)

Migration from large cities to rural destinations of couples with children still is not surprising. While the presence of children in the family reduces the wish and chances of people to make (job-related) long-distance moves, an increase in family size may trigger migrations that lead to improving housing conditions and a more pleasant environment. Obviously, many couples who decide to move from large cities to rural destinations perceive the arrival of children (and the changing family stage) to be the right time to fulfil their long-term dream about the "rural idyll" (Boyle and Halfacree, 1998, 308). Many couples originally come from the rural areas and small towns, whereas others have a city background and are of the nature and family-type. However, the share of "real" counter-urban movers remains unclear from this research. Although moves from the cities to surrounding (suburban) areas have been counted as residential moves in this study, a rising number of cars per household and improving public transportation over time have increased commuting distance to major cities. At the same time, the spread of the service sector to smaller places and improved telecommunications have made it possible for people to leave their jobs in the cities and continue in similar occupations even in remote areas.

Many couples change their residence within the settlement/district when waiting for their first and second child to be born and this corresponds to expectations. The moves are mostly housing-related ones with the aim to adjust

the housing size to the (expected) family size. Interestingly, most of the residential moves take place during pregnancy, pointing to the fact that people organise new housing before childbirth, thus avoiding residential moves when the child is small. Many couples move within rural and small urban areas when waiting for the second child to be born, but relatively few move within large cities. This seems to support the interpretation that in an expensive and tight housing market people have difficulties to meet their desires for better housing (Clark and Huang, 2003, 335). The fact that some couples leave the cities for rural areas after second conception/birth further supports this interpretation. However, we have to keep in mind that, on average, the intensity of residential mobility is much higher in large cities than in small towns and rural areas. On the one hand, this may result from the fact that the share of renters is large in cities (and renters tend to move more often than owners). On the other hand, it may also reveal that the housing market in the cities offers people various options within short distance (cf. Strell, 1999; Matznetter, 2002).

The patterns of spatial mobility after childbearing did not vary across generations (and gender). Thus, our research does not support the hypothesis that the recent trends of population deconcentration in Austria (and possibly elsewhere in Europe) could simply be attributed to increasing migration of couples with children from large cities to rural areas. The analysis, however, showed that the effect of childbearing on spatial mobility differs by partnership status. Most migrations and many residential moves during first pregnancy were made by single individuals, which is not surprising. These are obviously the cases where conception leads to union formation or determines the timing of union, at least (Baizan et al., 2004). The importance of such a pattern has increased over time, although Austria has a traditionally high proportion of women who experience first pregnancy and birth outside union/marriage (Prinz et al., 1998, 29).

Research on the effect of childbearing on spatial mobility could be extended to take the following directions. First, the variables reflecting housing conditions before and after residential change should be included in the analysis. This would provide us with further information about the nature of various migrations and residential moves. Second, the possibly varying impact of childbearing on spatial mobility across generations and gender should be studied in greater detail. Much larger data-set, however, are needed than used in this study. The register data from the Nordic countries would be an attractive option, no doubt. Finally, research should also be extended beyond a one country case. Comparing the effect of fertility on spatial mobility in two or

three countries would enable us to gain deeper insight into the patterns of spatial mobility after childbearing and their causes.

Acknowledgements

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Notes

[1] – However, the category 'rural' also covers the smallest towns, mostly those with a population below 10,000. Our various experiments (with the size, density and sectoral composition of the populations) showed that the rural areas could not be distinguished from the smallest towns in Austria when information on migration origin and destination was available at the level of the district and not the commune. Thus, the variable constructed does not reflect the official urban-rural-distinction in every detail, but nevertheless captures the 'degree of urbanisation' of districts rather well.

[2] – An individual's risk of second and subsequent migration starts after previous migration, while the risk of residential move begins after the previous move or migration.

[3] – The reason behind considering the destination and not the origin of migration (and residential move) is that the effect of most variables is similar across the place of origin.

[4] – The relative change in the risk has been calculated as follows: $(\exp(\beta_l) - 1) \times 100\%$, where β_l is parameter estimate for the (second or third) conception/birth. The reference category is parity zero.

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Table 1. Person-months and events across birth parity and settlement of residence.

		Migrations to			Residential moves
		Rural areas	Small towns	Large cities	
	Person-months	Events	Events	Events	Events
No children in rural areas	297793	321	193	499	1377
No children in small towns	101427	118	81	137	600
No children in large cities	160120	219	80	115	1287
First pregnancy in rural areas	17578	58	19	24	315
First pregnancy in small towns	5566	17	7	0	98
First pregnancy in large cities	7578	40	9	2	132
First birth in rural areas	107039	94	32	39	598
First birth in small towns	36958	37	20	13	182
First birth in large cities	59300	76	15	9	318
Second pregnancy in rural areas	12610	8	2	5	103
Second pregnancy in small towns	3728	2	2	0	30
Second pregnancy in large cities	4420	13	5	0	37
Second birth in rural areas	138794	42	19	17	333
Second birth in small towns	38414	24	15	3	126
Second birth in large cities	54879	44	10	4	152
Third pregnancy in rural areas	6679	1	1	2	18
Third pregnancy in small towns	1852	3	2	0	11
Third pregnancy in large cities	1235	1	0	0	6
Third birth in rural areas	80454	20	11	4	118
Third birth in small towns	22764	5	3	0	48
Third birth in large cities	14151	13	0	0	38
Total	1173336	1156	526	873	5927

Table 2. Effect of fertility and control variables on migrations by destination and residential moves (parameter estimates and relative risks).

	Migrations to						Residential moves	
	Rural areas		Small towns		Large cities			
Linear splines								
Constant (baseline)	-5.00	***	-5.26	***	-3.83	***	-3.78	***
Age (baseline)								
15–19 years (slope)	0.26	***	0.17	***	0.29	***	0.30	***
20–24 years (slope)	0.00		-0.01		-0.17	***	0.00	
25–29 years (slope)	-0.08	***	-0.04		-0.04		-0.09	***
30+ years (slope)	-0.08	***	-0.10	***	-0.09	***	-0.04	***
Time since previous migration (baseline for second migration)								
0–1 years (slope)	2.27	***	1.91	***	2.62	***	0.05	
1–3 years (slope)	-0.12		0.17		-0.05		0.18	***
3–5 years (slope)	0.12		0.01		-0.01		0.01	
5+ years (slope)	0.01		-0.09	***	-0.07		0.02	**
Birth parity								
Time since first conception								
0–0.375 years (slope)	4.63	***	2.50	***	-0.25		4.34	***
0.375–1 years (slope)	-2.31	***	-2.10	***	-0.62		-1.78	***
1+ years (slope)	-0.03		0.00		-0.07		-0.07	***
Time since second conception								
Second conception (constant)	-0.21		-0.61	***	-1.19	***		
0–0.375 years (slope)							2.46	***
0.375–1 years (slope)							-1.18	***
1+ years (slope)							-0.06	***
Time since third conception								
Third conception (constant)	-0.37	*	-0.83	***	-1.74	***		
0–0.375 years (slope)							0.51	
0.375–1 years (slope)							-0.42	
1+ years (slope)							-0.06	***
Categorical variables								
Partnership status								
Single	1		1		1		1	
Cohabiting/married	0.41	***	0.50	***	0.33	***	0.53	***
Separated/divorced	1.81	***	2.51	***	1.46		1.83	***
Birth cohort								
1941–54	1		1		1		1	
1955–64	1.19	**	0.91		1.11		1.18	***
1965–76	1.07		0.98		0.98		1.19	***
Gender								
Female	1		1		1		1	
Male	0.76	***	0.66	***	0.62	***	0.82	***

Table 2. (continued).

Educational enrolment								
Not enrolled	1		1		1		1	
Enrolled	0.17	***	0.23	***	0.14	***	0.45	***
Educational level								
Basic	1		1		1		1	
Secondary	1.55	***	1.81	***	6.31	***	1.08	
Higher	2.61	***	2.36	***	4.26	***	1.39	***
Employment status								
Not employed	1		1		1		1	
Employed	0.54	***	0.69	***	0.34	***	1.06	*
Number of siblings								
0–1	1		1		1		1	
2+	1.20	**	1.38	***	1.09		1.18	***
Religiousness								
No	1		1		1		1	
Yes	1.04		0.95		0.66	***	0.86	***
Current residence								
Rural area	1		1		1		1	
Small town	1.18	*	1.12		0.75	***	1.27	***
Large city	1.54	***	0.79	*	0.36	***	1.80	***
Number of migrations								
0	1		1		1		1	
1	0.16	***	0.11	***	0.05	***	0.53	***
2+	0.07	***	0.06	***	0.04	***	0.51	***
Number of residential moves								
0	1		1		1		1	
1	0.42	***	0.49	***	0.34	***	0.50	***
2+	0.31	***	0.32	***	0.30	***	0.33	***
Residence at age 15 for migrants								
Rural area	1		1		1		1	
Small town	0.37	***	4.44	***	1.39		1.10	
Large city	0.57	***	0.69		2.77	***	0.96	
Standard deviation of residual			1.01	***			0.56	***
Log-likelihood			-20643				-39695	

Significance: '*'=10%; '**'=5%; '***'=1%.
Note: The time unit used for calculating intensities was a year.

Table 3. Effect of fertility on migrations to rural areas and residential moves by settlement (parameter estimates).

	Migrations to Rural areas		Residential moves	
Linear splines				
Time since first conception in rural areas				
0–0.375 years (slope)	4.32	***	4.91	***
0.375–1 years (slope)	-2.39	***	-1.72	***
1+ years (slope)	-0.03		-0.08	***
Time since first conception in small towns				
0–0.375 years (slope)	4.20	***	4.56	***
0.375–1 years (slope)	-2.17	***	-2.15	***
1+ years (slope)	-0.03		-0.04	**
Time since first conception in large cities				
0–0.375 years (slope)	5.18	***	3.18	***
0.375–1 years (slope)	-2.30	***	-1.62	***
1+ years (slope)	-0.03		-0.06	***
Time since second conception in rural areas				
Second conception in rural areas (constant)	-0.71	***		
0–0.375 years (slope)			3.06	***
0.375–1 years (slope)			-1.43	***
1+ years (slope)			-0.05	***
Time since second conception in small towns				
Second conception in small towns (constant)	-0.16			
0–0.375 years (slope)			2.33	***
0.375–1 years (slope)			-0.89	*
1+ years (slope)			-0.07	***
Time since second conception in large cities				
Second conception in large cities (constant)	0.39	**		
0–0.375 years (slope)			1.42	**
0.375–1 years (slope)			-0.89	**
1+ years (slope)			-0.08	***
Time since third conception in rural areas				
Third conception in rural areas (constant)	-0.75	***		
0–0.375 years (slope)			0.09	
0.375–1 years (slope)			-0.30	
1+ years (slope)			-0.05	**
Time since third conception in small towns				
Third conception in small towns (constant)	-0.44			
0–0.375 years (slope)			2.43	**
0.375–1 years (slope)			-1.06	
1+ years (slope)			-0.09	**
Time since third conception in large cities				
Third conception in large cities (constant)	0.38			
0–0.375 years (slope)			-0.40	
0.375–1 years (slope)			0.14	
1+ years (slope)			-0.07	*
Log-likelihood	-20628		-39658	
Improvement of model fit	p<0.01		p<0.01	

Significance: '*'=10%; '**'=5%; '***'=1%.
Note: Models with interactions contain the same control variables as the basic models presented in Table 2. The fit of the models is compared to that of models in Table 2.

Table 4. Effect of first birth on migrations to rural areas and small towns and residential moves by settlement and partnership status (parameter estimates).

	Migrations to				Residential	
	Rural areas		Small towns [a]		moves	
Linear splines						
Out of union						
Time since first conception in rural areas						
0–0.375 years (slope)	5.69	***			6.46	***
0.375–1 years (slope)	-2.60	***			-2.29	***
1+ years (slope)	-0.06				-0.09	***
In union						
Time since first conception in rural areas						
0–0.375 years (slope)	0.10				1.33	***
0.375–1 years (slope)	-0.61				-0.02	
1+ years (slope)	-0.01				-0.08	***
Out of union						
Time since first conception in small towns						
0–0.375 years (slope)	6.41	***	3.85	***	6.38	***
0.375–1 years (slope)	-3.63	***	-2.66	***	-3.43	***
1+ years (slope)	-0.07		-0.04		-0.01	
In union						
Time since first conception in small towns						
0–0.375 years (slope)	-0.56		0.68		2.21	***
0.375–1 years (slope)	0.47		-1.24	*	-0.86	*
1+ years (slope)	0.00		0.02		-0.07	**
Out of union						
Time since first conception in large cities						
0–0.375 years (slope)	6.75	***			4.80	***
0.375–1 years (slope)	-2.76	***			-2.40	***
1+ years (slope)	-0.22	**			-0.10	***
In union						
Time since first conception in large cities						
0–0.375 years (slope)	3.21	***			1.56	***
0.375–1 years (slope)	-1.61	**			-0.98	***
1+ years (slope)	0.03				-0.04	**
Log-likelihood	-20594				-39573	
Improvement of model fit	p<0.01				p<0.01	

Significance: '*'=10%; '**'=5%; '***'=1%.
Note: Models with interactions contain the same control variables as the basic models presented in Table 2. The fit of the models is compared to that of models in Table 3.
[a] – The effect of first birth on migrations to small towns does not vary across settlements. The parameter estimates thus reflect the impact of first birth on migrations to small towns independent of place of origin.

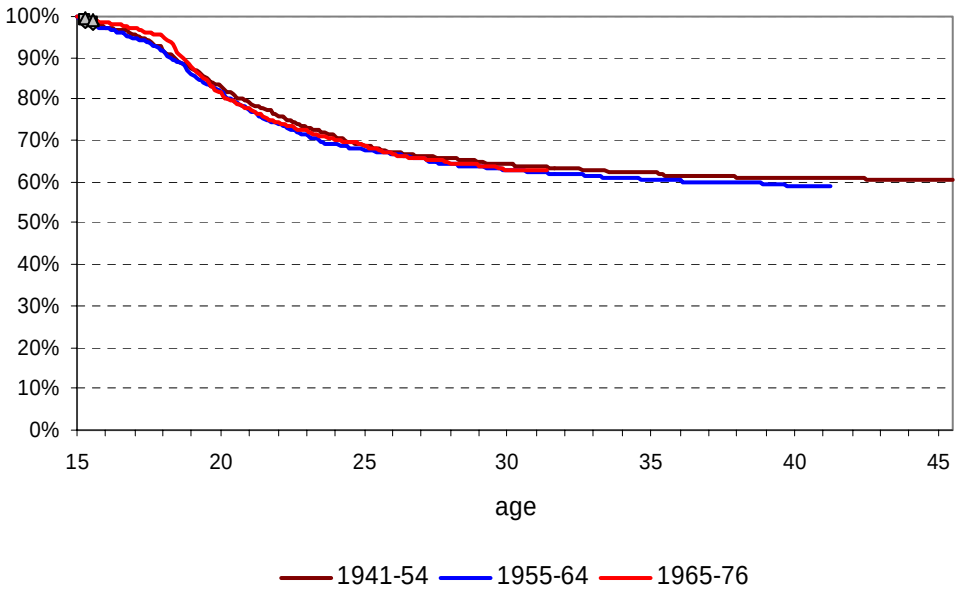

Figure 1. Share of non-migrants by birth cohort.

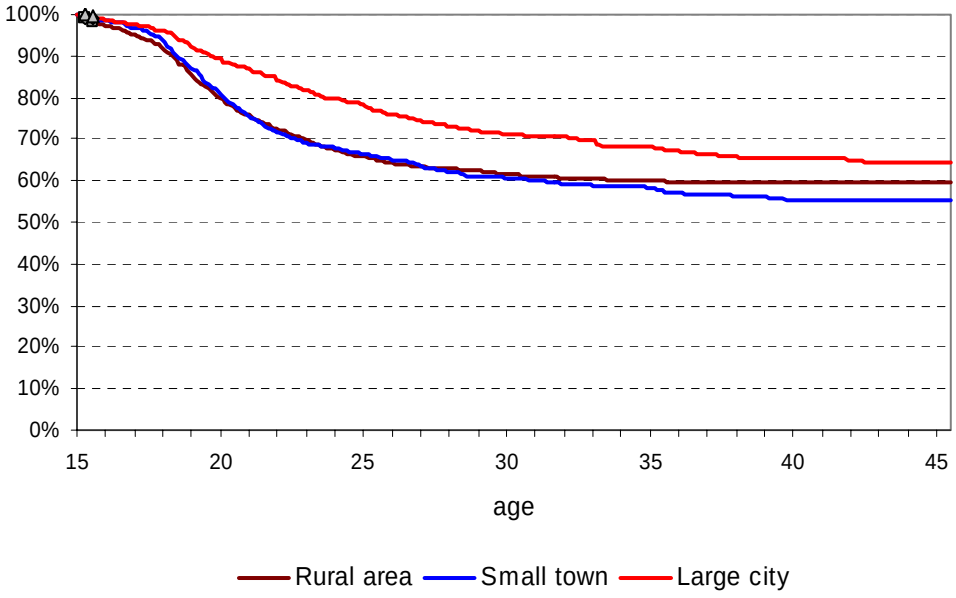

Figure 2. Share of non-migrants by settlement at age 15.

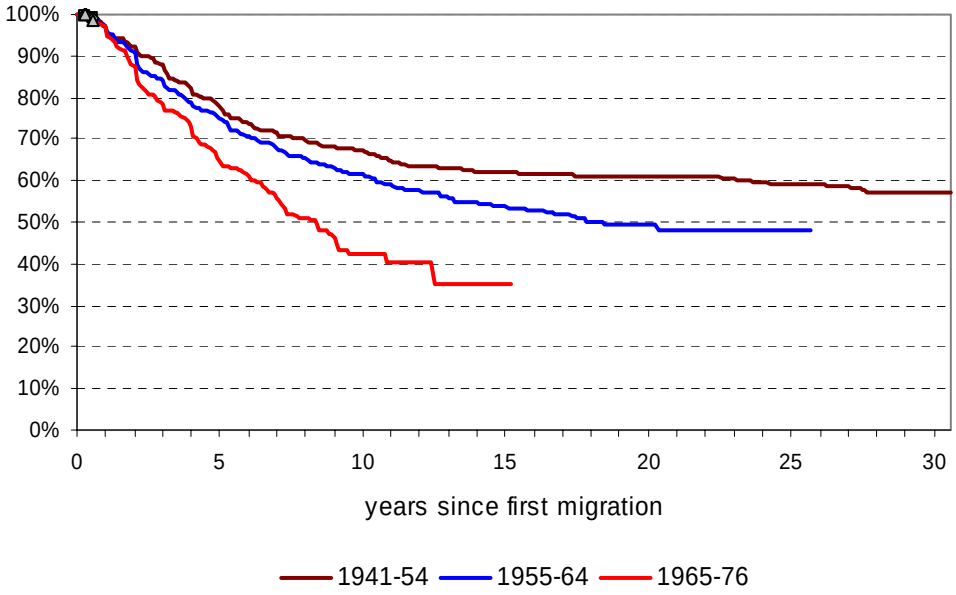

Figure 3. Share of stayers after first migration by birth cohort.

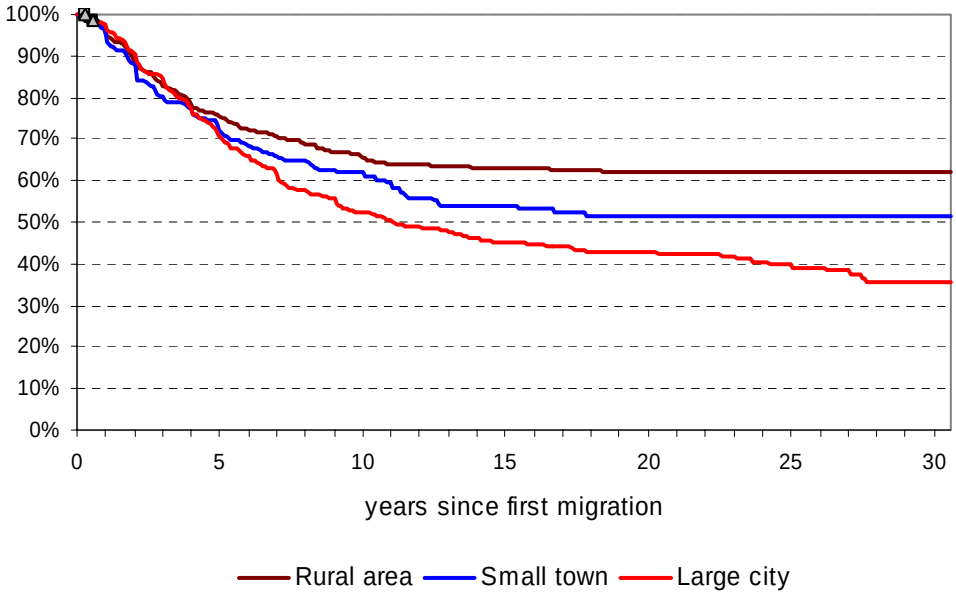

Figure 4. Share of stayers after first migration by settlement.

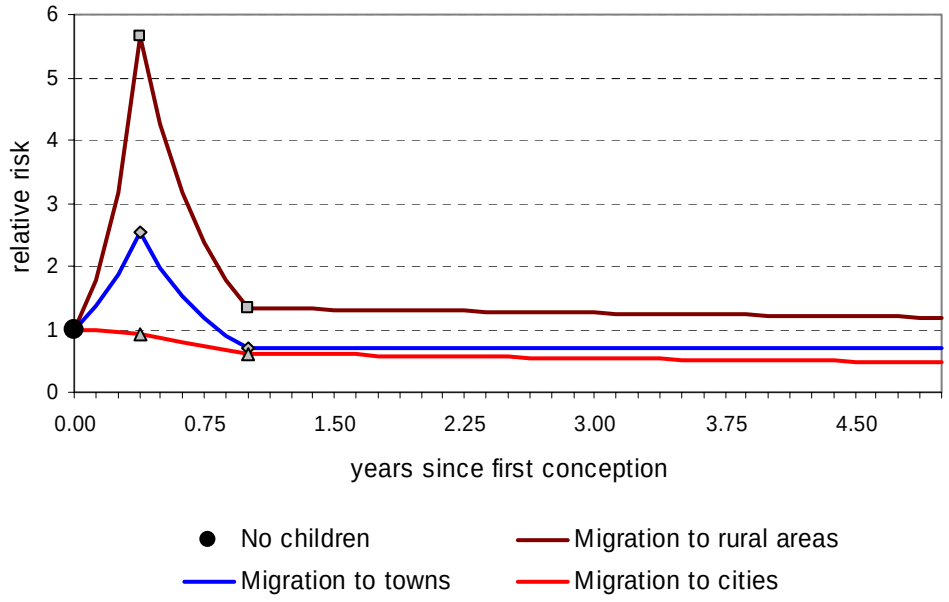

Figure 5. Effect of first birth on migrations by destination.

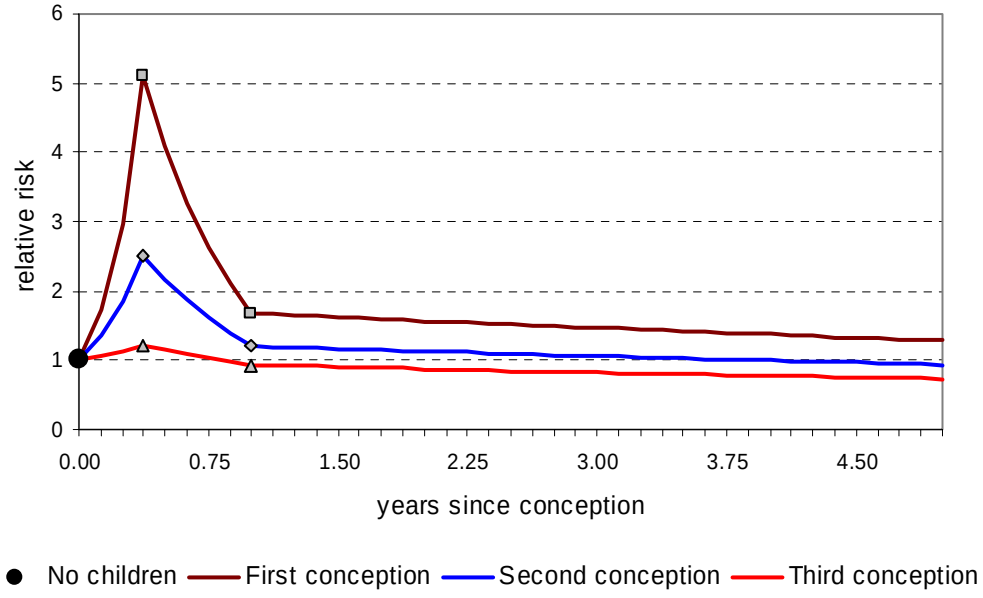

Figure 6. Effect of birth on residential moves.

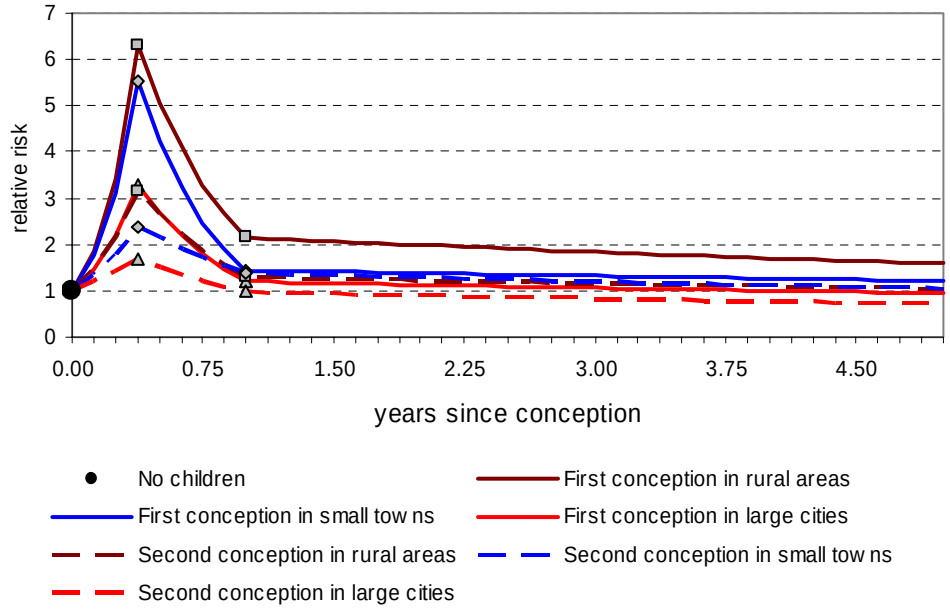

Figure 7. Effect of birth on residential moves by settlement.

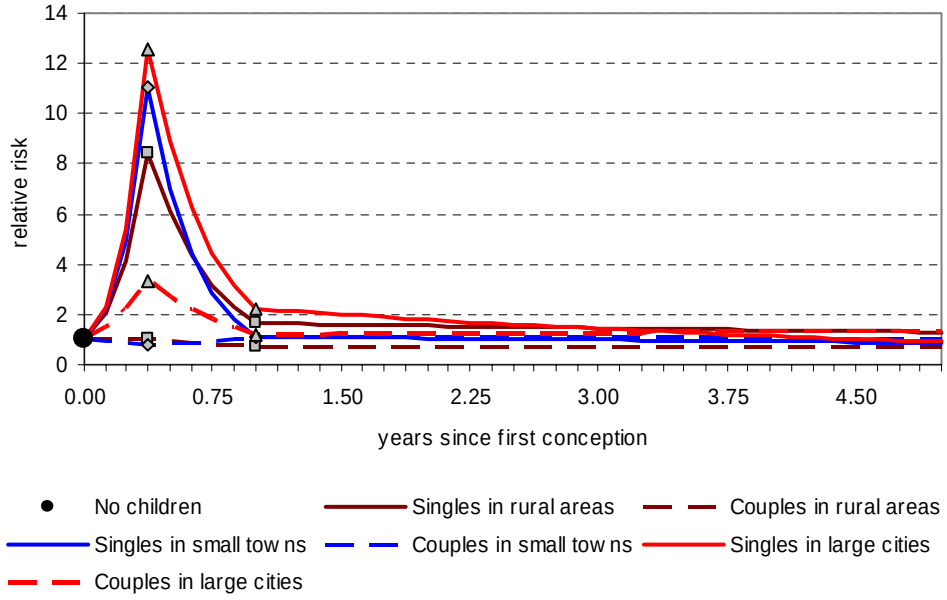

Figure 8. Effect of first birth on migrations to rural areas by settlement and partnership status.

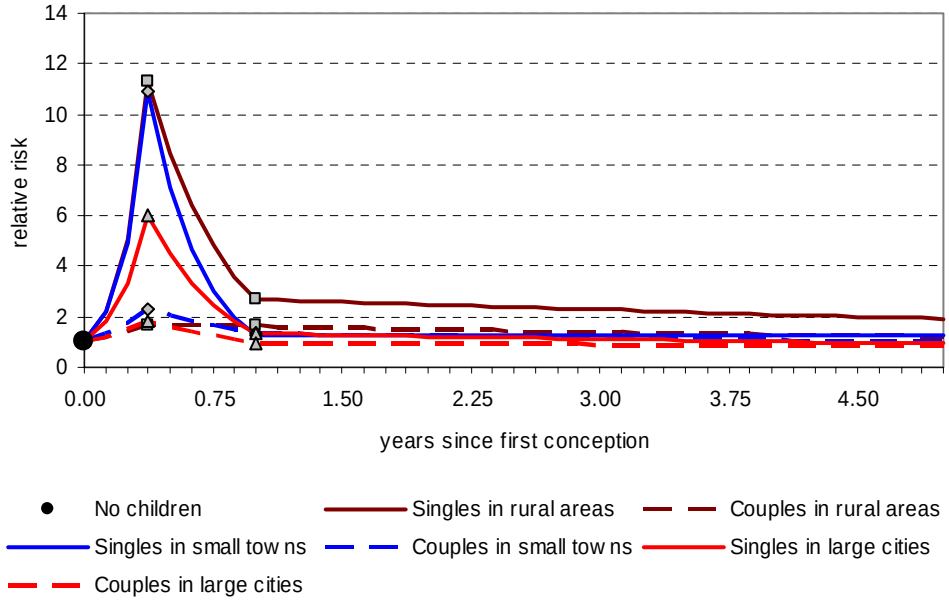

Figure 9. Effect of first birth on residential moves by settlement and partnership status.