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# **Housing and first births in Sweden, 1972-2005**



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*Arbetsrapport/Institutet för Framtidsstudier; 2009:15*

*Working Paper/Institute for Futures Studies; 2009:15*

Stockholm 2009

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#### *Abstract*

The aim of this study is to explore to what extent housing is a constraint for first births in Sweden 1972-2005. Three characteristics of housing are studied: housing type, tenure, and size of dwelling. The occurrence of childbearing is measured as the event of the birth itself and the time 16 months prior to the birth, i.e. initiation of conception. The main finding is that the size of the dwelling seems to be the housing factor with the strongest association with first-birth intensities. The effect of housing on childbearing seems to be stronger if measured to capture time of any first birth than if measured so as to coincide with the situation 16 months prior to the birth. The more strong effects on first-birth risks than on initiation of conceptions suggest that there is also an effect of childbearing plans on housing and residential moves. A stronger association between being established on the housing market and the propensity to have a first child is found for the 1974 cohort compared with the older cohorts. One can naturally speculate about the degree to which young adults opportunities to establish themselves on the housing market were influenced by the rapid and significant policy changes during the early 1990s.

*Keywords:* first births, housing, housing policy, cohorts

#### *Sammanfattning*

Syftet med denna studie är att undersöka i vilken omfattning boende är ett hinder för benägenheten att få första barnet i Sverige 1972-2005. Tre boendefaktorer studeras: bostadstyp, upplåtelseform och antal rum. Barnafödande definieras för det första som tidpunkten för födseln och för det andra som tidpunkten för födseln minus 16 månader. Huvudresultatet är att antal rum verkar vara den boendefaktor som har starkast samband med benägenheten för förstabarnsfödslar. Effekten av boende på förstabarnsbenägenheten verkar vara starkare när barnafödande mäts vid tidpunkten för födseln jämfört med 16 månader innan födseln. Detta indikerar att det också finns en effekt av barnplaner på boende och flyttningar. Sambandet mellan grad av etablering på bostadsmarknaden och benägenheten att skaffa första barnet är starkare för kohorten född 1974 jämfört med kohorterna födda 1956 och 1964. Man kan spekulera om unga människors möjligheter att etablera sig på bostadsmarknaden under 1990-talet påverkades av de snabba och substantiella förändringarna av bostadspolitiken under samma period.

*Nyckelord:* förstabarnsfödslar, boende, bostadspolitik, kohorter

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The stereotype picture of a young family with children in a Western society includes spacious and functional housing. Regardless of how true this stereotype picture is, it seems reasonable to assume that housing is an important factor in the everyday life of families with children. It also seems reasonable to assume that the possibilities for young individuals to form new and independent households are directly linked to fertility (see e.g. Hobcraft & Kiernan, 1995; Mulder, 2006a). Naturally, this is a hypothetical association with many angles. For example, do individuals alter their housing situation prior to having children, or do they adjust their housing situation once children are born (Mulder, 2006b)? A perspective that suggests that individuals alter their housing situation prior to having children implies that housing may be a constraint for childbearing.

Naturally, childbearing is influenced by a number of factors apart from housing. A stable relationship, educational enrolment and attainment, and labor market attachment and income appear to be the most important factors (see also Hobcraft & Kiernan, 1995). These factors can all be related to the possibility of acquiring housing and acquiring housing of a certain standard. The majority of social science research on childbearing has focused on the associations between education, labor market attachment and childbearing (Hoem, 2000; Blossfeld & Huinink, 1991; Blossfeld & Jaenichen, 1992), while much less attention has been paid to the significance of housing (see however e.g. Sullivan & Murphy, 1985; Krishnan, 1988; Mulder & Wagner, 2001; Kulu & Vikat, 2007).

The aim of this study is to explore to what extent housing is a constraint for individual childbearing. More precisely I will study the relative impacts of (a) housing type; (b) tenure; and (c) size of dwelling on first-birth

propensities. I will use two definitions of the occurrence of childbearing: the event of the birth itself and the time 16 months prior to the birth, i.e. initiation of conception (16 months is chosen because it on average – depending on age – takes at least 6-7 months for a couple to conceive once childbearing plans are made (te Velde *et al.* 2000)). The society under study is Sweden 1972-2005. During this period, Swedish housing policy and housing markets have undergone fundamental changes. The material used is the Swedish Housing and Life Course Cohort Study (HOLK), a unique combination of survey and register data collected in 2005. Three birth cohorts are included in the study those born: 1956, 1964 and 1974.

### **Housing and childbearing**

In research on the associations of childbearing and housing, a core question is naturally whether there is evidence of causality between these two life domains. The transition to parenthood and higher parities is often synchronized with residential moves (Deurloo *et al.* 1994; Mulder & Wagner, 1998; Mulder, 2006a; Kulu & Vikat, 2007; Michielin & Mulder, 2008; see also see e.g. Grundy, 1986). However, the questions to pose is whether the arrival of children or the anticipation of childbirths induce changes in housing, or whether various housing factors (access, standard, etc) influence the likelihood of having children?

An ideal situation for a well-functioning housing market is where housing demand equals housing supply, and where households are able to access appropriate housing to reasonable costs. Naturally, a proportion of financially solid households are able to obtain the kind of housing they find suitable under almost any circumstances. However, a majority of households face financial constraints to various degrees. Thus, factors such as housing prices, housing supply and the possibility to obtain housing loans are of substantial significance for most households. A causal link running from housing to childbearing seems more likely than the opposite in a setting with scarce access to appropriate housing to reasonable costs. Such conditions should hypothetically delay the process of household and family formation (Mulder, 2006b). For example, high housing prices not only makes it difficult to buy a home but also to accumulate savings for down payment of a home (see also Malmberg, 2001). In a setting with high housing prices family formation and home-ownership may also be competing costs since childrearing is costly (see also Courgeau & Lelievre, 1992). In a situation with easy access to housing it seems more reasonable to consider a link from childbearing to housing.

In this study, the focus is on the link from housing to childbearing rather than the opposite. Scarce access to housing makes it more difficult for young individuals to form new households either as singles or couples. Given that the contemporary norm implies no more than one co-resident couple per dwelling unit (Hobcraft & Kiernan, 1995), postponement of the transition to an independent household implies a postponement of childbearing as well, and a reduced time-span for family formation. Thus, an increase in the age of leaving the parental home could influence fertility both at the individual and aggregate level (Mulder, 2006b). However, the interplay between childbearing and housing cannot be limited to the question of access to any housing. Rather, it should be extended to cover the access to appropriate housing, or formulated differently, access to housing that fulfils present norms or desires. In many countries, the normative picture of the ideal housing for families with young children seems to be a spacious detached house. Detached houses are more likely to be large enough for families with children, to be situated in what is perceived as child-friendly environments, in areas where schools, daycare etc. are close (Mulder & Wagner, 1998; Mulder, 2006a; Kulu & Vikat, 2007). This kind of housing is normally accessed through home-ownership.

In summary, there are arguments both for causality running from housing characteristics and housing change to childbearing, and from childbearing to housing. In addition, childbearing is influenced by a number of other factors, such as educational level of prospective parents, their labor market attachment, them having a stable relationship (see also Hobcraft & Kiernan, 1995). Furthermore, these factors and housing situation are highly interrelated. Empirical research based on Swedish data has shown that women's labor market attachment and incomes are positively related to the likelihood of having children (see e.g. Andersson & Scott, 2005; 2007; Hoem, 2000). A weak attachment to the labor market does not only influence childbearing in itself but also the possibilities of getting housing financed or a first hand tenancy contract.

Last but not least, the relationship between housing and childbearing is likely to be influenced by the historical context. Access to housing and relative housing costs varies between societies and time periods. Thus, individuals from different birth cohorts face different possibilities of acquiring independent housing during an early stage of adult life. Further, different birth cohorts will experience different conditions on the housing and labor markets, and possibly also different policy regimes. In their discussion of normative factors as prerequisites of childbearing in modern societies, Hobcraft and Kiernan (1995) suggest that "a sense of security" is

such a prerequisite. By this they refer to whether individuals consider themselves to have sufficient resources to provide for and raise a child from infancy to early adulthood. But they also refer to "...whether society (through its agent government) will also make provisions for the rising generation of young people" (Hobcraft & Kiernan, 1995:27). Housing policies is such a contextual factor that may influence the feeling of security. From this perspective, it is interesting to note that countries with housing policies implying restricted access to rental housing and very small possibilities for housing loans, such as several southern European countries, also are countries with very low fertility levels (MacLennan *et al.* 1998; Billari *et al.* 2001; see also Pinelli, 2001; Mulder, 2006b).<sup>1</sup>

### **Previous research**

A number of international studies examine the relationship between childbearing and housing from different perspectives (e.g. Felson & Solanus, 1975; Curry & Scriven, 1978; Krishnan, 1988; 1995; Sullivan & Murphy, 1985; Mulder & Wagner, 2001; Kulu & Vikat, 2007). Although the results are not completely congruent, more or less all of these studies report associations between childbearing and housing characteristics. The following summary of previous research will be organized in three themes: tenure, type and space.

In most societies, *home-ownership* is considered to be a stronger manifestation of being established on the housing market than is renting. Detached and spacious housing is often accessed through home-ownership (Mulder, 2006a). Mulder and Wagner (2001) find that couples in the Netherlands postpone the birth of the first child subsequent to becoming home-owners. Still the acquisition of a home is not necessarily closely followed by the arrival of the first child. For West Germany, the authors find that couples tend to postpone the acquisition of a home until parenthood is close in time. Murphy and Sullivan (1985) find comparatively strong associations between tenure type and childbearing in Great Britain. Home-owners are older at the time of marriage formation, postpone their first birth longer, and have fewer children than tenants. In contrast, Krishnan (1988) finds that home-owners in Canada on average have more children than tenants. A later study by Krishnan (1995) also suggests that home-owners have children more closely spaced than tenants do. A Swedish study (Statistics Sweden, 2005:1) reports that tenant-owners have

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<sup>1</sup> Naturally, low fertility levels in Southern Europe cannot be ascribed to scarce opportunities for access to housing alone. These countries also have family policy models dominated by support from the family rather than state support (Esping Andersen, 1990).



a lower propensity of having the third child compared to others. Thus, it is difficult to find any clear patterns that are similar across different countries or types of countries based on micro-level data. However, on the macro-level, Mulder (2006a) concludes that the three European countries with the highest levels of home-ownership (Italy, Spain and Greece) also are the three countries with the highest ages at leaving the parental home and the lowest fertility levels. However, causal conclusions are not readily made from these findings since these countries also have family policy models dominated by support from the family rather than the state (Esping Andersen, 1990; Mulder, 2006a).

Regarding *type* of housing, in many countries the normative image of ideal housing for families with young children is a spacious detached house. Detached houses are more likely to be situated in child-friendly environments, to be large enough for families with several children and to be situated in areas where schools, daycare etc. are close (Mulder & Wagner, 1998). Kulu and Vikat (2007) find elevated risks of first births among Finnish couples living in terraced or detached houses compared with those living in apartments. In addition, moving regardless of type of housing at destination was associated with higher first birth risks. The results remain after controls for demographic factors such as union duration and educational attainment. Murphy and Sullivan (1985) found that independent of tenure, couples living in detached one-family dwellings had a higher fertility compared with couples living in apartments. This is supported by Felson and Solauns' (1975) finding that apartment-living in Bogotá, Colombia, reduced fertility. Further, Paydarfar (1995) found that in Iranian cities living in a detached house was associated with a substantially higher fertility. On the other hand, using a sample of the US Mid-West urban population, Curry and Scriven (1978) find that apartment-living is not associated with reduced fertility. For Sweden, a zero-relationship between type of housing and second-birth propensities has been reported (Statistics Sweden, 2005:1). Thus, in spite of cultural differences, a majority of studies indicate that living in a detached house is associated with a higher propensity for childbearing. It is also interesting to note the zero-relationship found for second births in Sweden, a nation characterized by high housing standard also for apartments.

It is possible that the associations between housing type and fertility are more a reflection of an association between *the size* of the dwelling and fertility. In general, terraced and detached houses tend to be larger than apartments. Studies that analyze the impact of housing size on fertility are scarce. However, Peled (1969) using Israeli data report that access to more

spacious dwellings it related to increased fertility. This is supported by Curry and Scriven's (1978) finding that more rooms in the dwelling increase fertility. From a Swedish perspective, it is important to note that one long-term goal of housing policy and housing allowances is to make it possible for families with children to live in dwellings that offer each child a room of their own (prop. 1986/87:48; Boverket, 2004). Thus, a highly reasonable assumption seems to be that people want the size of their dwelling to be compatible with the size of their family.

### **The Swedish case**

Sweden is typically used as the prime example of the generous welfare state: the state provides a comparatively extensive safety net in areas such as social insurance (Esping-Andersen, 1990), childcare, and up until recently, housing. One core characteristic of the universalistic welfare state is the ambition to make it possible for both men and women to combine work- and family life. This has been promoted through, e.g., a generous parental leave insurance and extensive daycare for children. Perhaps not surprisingly, Sweden has among the highest levels of female labor force participation in the Western world. Among other features of the Swedish welfare state is financial support to students, which makes independent housing possible at relatively young ages.

From the first formalization of housing policy in Sweden in the 1930s until the early 1990s, Swedish housing policy was characterized as "social" and universal. The first formalization was intimately linked to the appointment of a government commission (Bostadssociala utredningen) in 1933. The appointment was a consequence of housing shortage and low housing standards at that time, and the aim was to formulate a sustainable housing policy. The final report (SOU 1945:63) was delivered in 1945 and among the first measures to be implemented was support to the construction of dwellings targeted at families with small children and low incomes (barnrikehus). The housing policy was a universalistic policy, aiming at providing housing for all, where the public and cooperative housing companies played central roles.

Up until the 1960s, the housing shortage increased despite high levels of housing construction. During this time, the cohorts born during the 1940s grew up and were in need of independent housing. The solution was the "million program", enacted at the Social Democrat party's congress in 1964 and by the Swedish Parliament in 1965. The aim was to build one million new family dwellings in ten years time. In the last years of the "million program" the demand for housing decreased, and for the first time since the

Second World War there was a housing surplus in the urban areas. The birth cohort of 1956 – which is the oldest cohort included in the empirical analyses in this study – benefited from this relative housing surplus.

Re-building and reconstruction characterized the 1980s (Bengtsson, 2006). New housing areas were less large-scale and more varied as compared to the housing areas built during the “million program”. The cohort born in 1964 – the middle cohort included in the empirical analyses in this study – entered their childbearing age during the economic boom of the later part of the 1980s and early 1990s. This cohort also experienced bolting housing prices during the same period. As part of a tax reform in 1990 housing subsidies were cut, too (Bengtsson, 2006). The conservative government appointed in 1991 immediately begun the process of de-assemble the previous social democratic housing policy. Both the Ministry of Housing and substantial components of housing policy were abolished. The majority of the cohort born in 1974 – the youngest cohort included in this paper – graduated from high school at age 18-19 in 1993. Their entry into the housing market thus coincided with the deregulation of the housing market.

Based on historical traits, the Swedish housing market is characterized by three different tenures: home-ownership, owner-tenant and tenants. Home-ownership is synonymous to detached or terraced housing since apartments cannot be owned by an individual in Sweden. Terraced houses can also be accessed through owner-tenancy<sup>2</sup>. This is defined as the right to use the dwelling during indefinite time, while an association of tenant owners in the building is the formal owner of all dwellings in the real estate. Apartments are accessed through either owner-tenancy or tenancy. Tenancy is divided between public and private companies originating in the social housing policy described above. A tenancy contract between the tenant and the landlord is a long-term agreement including possession rights. In the inner cities in particular a tenancy contract is indicative of a strong establishment on the housing market. Dwellings accessed through first hand contracts can be sublet to a third person. Sub-tenancy implies a much weaker establishment on the housing market as compared to a first hand contract. The distribution between the tenures in 2004 was 40 percent home-ownership, 17 percent owner-tenancy, and 43 percent rental tenancy (Bengtsson, 2006).

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<sup>2</sup> A very small number of terraced houses (or “rowhouses” i.e. dwellings situated in a building with three or more houses in a row that share a wall with at least one adjacent neighbor) are accessed through rental tenancy.

### **The Swedish Housing and Life Course Cohort Study**

Up until now, in Sweden the only way to study the significance of housing for families and family formation has been to use large register based data or census data. However, censuses have not been carried out in Sweden since 1990. Furthermore, register based studies are characterized by several limitations. One of them is that information on unregistered moves is missing. Further, they lack information on tenant holder for rental apartments. This means that we have no information on whether individuals have tenancy contracts or sublet. It is also difficult to get a true picture of how many individuals actually live in a particular residence. Another constraining characteristic of register data is that we lack information on cohabiting, unmarried, couples without children. This is because individuals in Sweden are not registered as domiciled by dwelling units, but by the building where they live. People who live in buildings with several apartments can therefore not easily be linked to each other in registers, unless they are married or have children together. Thus, we don't know under what circumstances individuals are "under risk" of childbearing, i.e., we cannot distinguish cohabitants from true singles among those who are childless and in childbearing ages. These limitations hold for registers, but not for census data. However, census data is not longitudinal but collected at distant cross-sections of time of which the last was carried out in 1990. The alternative to these data is survey data in which a partner and marriage biography is included. Existing surveys in Sweden (e.g. the Level of Living Surveys and Surveys on Living Conditions) in general measure housing situation at cross-sections only, which is not sufficient for a life-course approach in family-demographic research. For example, with cross-sectional data it is difficult to determine the temporal order, i.e. what comes first: changes in housing situation or childbirths.

However, during 2005 the Swedish Institute for Futures Studies collected a data set designed to study housing conditions and childbearing: The Swedish Life Course and Cohort Study (HOLK). This data is used in the empirical analyses of this study. The HOLK-data are a combination of survey and register data (Brandén and Ström, forthcoming). The sample consists of 3 600 individuals born in Sweden, and is divided between three birth cohorts born in 1956, 1964 and 1974. The cohorts are selected in order to reflect different historical periods in Swedish housing policy and labor market (see above). The data collection was carried out during the spring of 2005 and was administered by Statistics Sweden in Örebro. The method of collection was postal questionnaires with one postal follow-up and a subsequent telephone follow-up. The response rate was 62 percent or 2 242

individuals. As a whole, the data provides a clear picture of partner biographies, education and labor market attachment, childbearing and last but not least housing biographies. Register data have been linked with additional information on the respondents, their legally married partners, and for unmarried cohabitants with children the child's remaining parent. Not only register data on current partners, but such data on all partners that can be detected in the registers have been linked to the survey data. The central part of the questionnaire is the housing biographies. Such biographies have never before been collected as detailed as here. The housing biographies have been complemented with register data on registered moves with information on year, month and location of the move. Another important component is the partner- and marriage biographies that enables us to determine under what family conditions individuals are "under risk" for childbearing. These self-reported biographies have been complemented with register data on registered changes in civil status.

Information on education for both respondents and their partners has been gathered from register data (for any current partner also through the questionnaire). Extensive register data on incomes and transfers have also been linked. This makes it possible to follow individuals' labor market attachment from the entry into the labor market and onwards. One way to operationalize this is to measure the proportion of the total income that comes from earnings from work. When possible (mostly from the 1990s and onwards) register data on occupation and workplace have been linked, too. Finally, data on biological and adopted children have been linked. In addition, a number of attitudinal questions and questions directly linked to family, children and housing are included in the questionnaire. One example is a question on whether the respondent experienced that the family became crowded or that the housing standard was insufficient subsequent to the birth of each child. In summary, the data are unique both in Swedish and an international perspective.

### **Methods and variables**

The focus in this study is the transition from being childless state to becoming a parent. The most appropriate way to study this transition is to use intensity regression. The dependent variable used in the empirical analyses is the hazard rate:

$$h(t / X(t)) = \lim_{\Delta t \rightarrow 0} \frac{P(t, t + \Delta t \mid T \geq t, X(t))}{\Delta t}, \quad (1)$$

where  $T$  is the time of the birth of the respondent's first child (or the time of the birth minus 16 months),  $t$  is any fixed point in time under risk, while  $p(t, t+\Delta t)$  is the probability that the event occurs in the interval  $[t, t+\Delta t)$ , and  $x(t)$  is a vector of covariates, given that the event has not occurred before  $t$ . The primary interest for us is whether housing affects child-bearing. Thus, we are interested in any changes in housing that takes place prior to childbirth. Here, the analyses are restricted to first births. The analyses are performed in two steps; the first using the year and month of the first birth as the event under study, and the second using the year and month of the first birth but subtracting 16 months from that event. 16 months prior to the birth is chosen because it on average takes 6-7 months for a couple to conceive once childbearing plans are made (te Velde *et al.* 2000). Respondents who remain childless are censored 16 months prior to the end of the observation period. Analyses are performed separately for the three cohorts. The observation window opens when the respondent leaves the parental home, and closes either at the time of the first birth or at the time of the data collection. Basic time is defined as age 16, and all observations occurring prior to age 16 are excluded. Changes in housing status, union status, income (measured annually) and age are treated as time-varying covariates.

The year and month of first birth of the respondents has been collected through register data from Statistics Sweden. Adopted children are included in the analyses, but the respondent is censored at the time of adoption which is not counted as a birth. Births of twins and triplets are treated as single-child births. Type of dwelling is divided into four categories: apartment, terraced, detached, and other. Tenure is also divided into four categories: home-owner (including tenant-owner), tenancy contract, sublets, and other. Number of rooms is included as a categorized variable with four categories: one room, two rooms, three rooms, and four or more rooms. Year of moves, type of dwelling, tenure and number of rooms are self-reported. Each self-reported move has been matched to register data on moves from Statistics Sweden in order to obtain information on month and geographical locality (see also Brandén and Ström forthcoming). Living in a metropolitan area is defined as living in the Stockholm, Göteborg or Malmö areas. Time since moving to the present

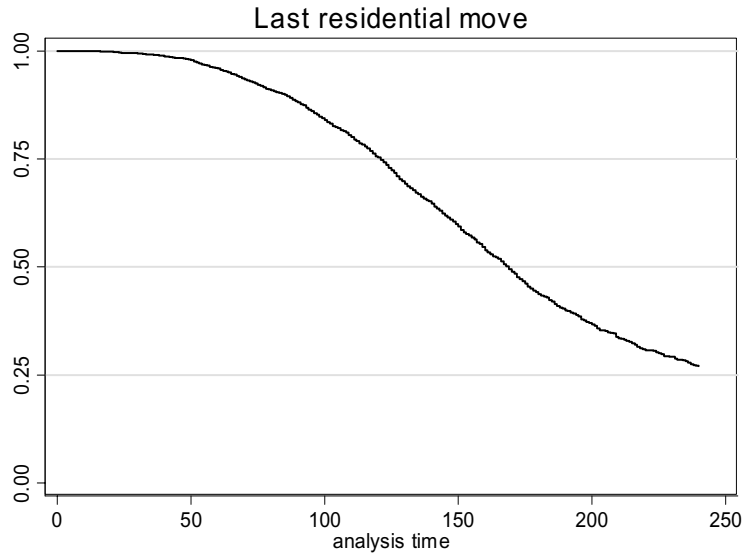
dwelling is included as a categorized variable with three categories and is a combination of self-reported information and register data (see above).

Information on gender and age has been collected through register data from Statistics Sweden. Union status is self-reported and includes both marriages and consensual unions. Household income is defined as income from employment and includes income from both partners in a union if they are married or otherwise can be linked in the registers. Otherwise the income is recorded for the respondent only. For partners, information on income is included from the year of entering shared residence. For singles and co-residing couples that cannot be linked to each other household income is defined as the respondent's income multiplied by two. Information on household income has been collected from taxation registers maintained at Statistics Sweden, and has been divided into three groups based on percentiles of earnings (low, middle, high). Income is lagged by one year when the event under study is first births, and by two years when the event under study is initiation of conception. Income is among other things used as a proxy for education and occupation. Previous research indicates that these factors are of substantial importance for fertility. (For descriptive statistics, see Appendix.)

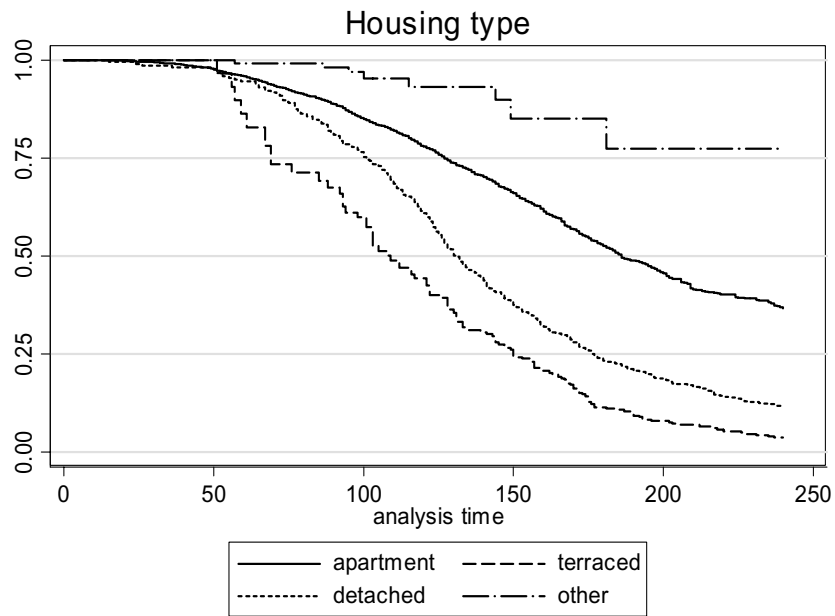
## **Results**

In the analyses presented below, the focus is on the impact of housing on first birth rather than vice versa. Figures 1-4 show Kaplan-Meier survivor curves of childlessness by time since move to the current dwelling for childless persons, by type of dwelling, tenure and number of rooms. The event under study is first birth. A new move sets the analysis time back again to zero, so that the curves show entry into parenthood by time since last residential move.

**Figure 1. Kaplan Meier survival curves, last residential move.**  
**The Swedish Housing and Life Course Cohort Study, 1972-2005**

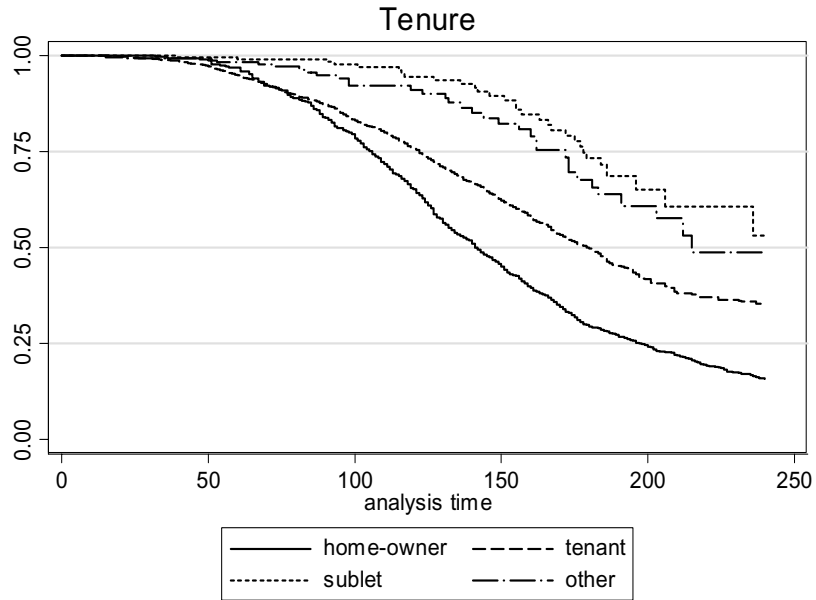


**Figure 2. Kaplan Meier survival curves, last residential move, by housing type.**  
**The Swedish Housing and Life Course Cohort Study, 1972-2005**

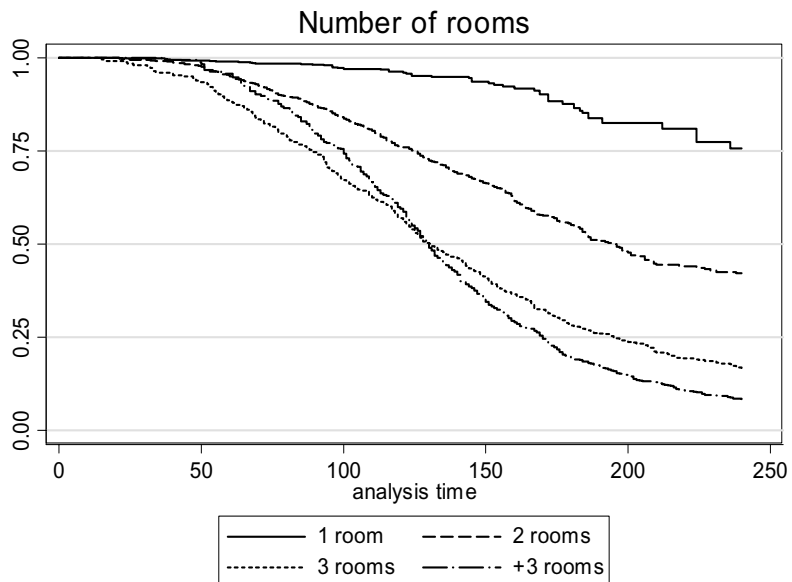




**Figure 3. Kaplan Meier survival curves, last residential move, by tenure. The Swedish Housing and Life Course Cohort Study, 1972-2005**



**Figure 4. Kaplan Meier survival curves, last residential move, by number of rooms. The Swedish Housing and Life Course Cohort Study, 1972-2005**



As is shown in Figure 2, those who live in either terraced or detached houses have faster exit rates compared to apartment-dwellers. Figure 3 indicate that home-owners have faster exit rates compared to those with tenancy contracts or who sublets. Figure 4 shows that respondents living in dwellings with one or two rooms have slower exit rates from the childless state compared with those living in dwellings with three or more rooms.

Tables 1 and 2 present hazard regressions of the timing of the first birth. Table 1 provides model results for the timing of any first birth. The analyses have been carried out in two steps: the first includes only factors related to housing, while the second adds demographic and economic control variables. Model 1 for the cohorts born in 1956 and 1964 indicates that living in a terraced house (or "rowhouse" i.e. a dwelling situated in a building with three or more houses in a row that share a wall with at least one adjacent neighbor) is associated with higher first birth propensities compared to living in a detached house. For the 1974 cohort, apartment-living is associated with lower first-birth propensities compared with living in a detached house. Focusing instead on tenure, the results indicate some interesting cohort differences. For the 1956 cohort, being a first hand tenant is positively related to first-birth propensities compared to being a home-owner. Among the two younger cohorts, being a tenant of any kind or having an undefined tenure (such as lodging or living in a student accommodation) is associated with lower first birth propensities as compared to being a home-owner. Number of rooms in the dwelling is consistently and positively related to first birth propensities.

The extended Model 2 yields non-significant estimates for *housing type* for all cohorts. Effects are still largely in the same directions as in Model 1. Concerning *tenure*, for the 1956 and 1964 cohorts the results found in Model 1 become insignificant when controlling for other factors while for the 1974 cohort the results remain. It is also clear that the propensity for the first birth is lowest for lodgers and others, i.e. the category with the weakest establishment on the labor market. For all cohorts, the results indicate that *number of rooms* is positively and significantly related to first birth propensities. In addition, a positive effect of living in a dwelling with four or more rooms is only evident for the 1964 cohort. No effect of metropolitan residence is found while the effect of time since moving to current dwelling is stronger the closer in time the move has occurred. Living with a partner – either married or in a consensual union – has a strong positive effect on first birth propensities. An effect of income, when housing standard is controlled for, is found; having a high or medium household income is

**Table 1 Piece-wise constant hazard regression of first births.  
The Swedish Housing and Life Course Cohort Study 1972-2005.  
Hazard ratios. \* p>0.01, \*\*p>0.05**

|                           | Cohort 1956    |                | Cohort 1964    |                | Cohort 1974    |                 |
|---------------------------|----------------|----------------|----------------|----------------|----------------|-----------------|
|                           | Model 1        | Model 2        | Model 1        | Model 2        | Model 1        | Model 2         |
| <b>Age</b>                |                |                |                |                |                |                 |
| 16 – 19                   | ref            | ref            | ref            | ref            | ref            | ref             |
| 20 – 23                   | <b>1.60**</b>  | <b>1.71**</b>  | 1.74           | 1.18           | 0.97           | 0.62            |
| 24 – 27                   | <b>2.13***</b> | <b>2.69***</b> | <b>3.60***</b> | <b>2.82***</b> | <b>2.57***</b> | 2.03            |
| 28 – 33                   | <b>2.50***</b> | <b>4.28***</b> | <b>4.17***</b> | <b>4.38***</b> | <b>2.94***</b> | <b>3.41***</b>  |
| 34 – 37                   | 1.52           | <b>2.95***</b> | <b>2.32**</b>  | <b>2.89***</b> | NA             | NA              |
| 38 – 41                   | <b>0.50**</b>  | 1.16           | 1.58           | <b>2.96***</b> | NA             | NA              |
| 42 – 49                   | <b>0.13***</b> | <b>0.32**</b>  | NA             | NA             | NA             | NA              |
| <b>Housing type</b>       |                |                |                |                |                |                 |
| Apartment                 | 1.13           | 1.09           | <b>1.31**</b>  | 1.16           | <b>0.64***</b> | 0.76            |
| Terraced                  | <b>1.72***</b> | <b>1.68***</b> | <b>1.77***</b> | 1.25           | 1.32           | 1.28            |
| Detached                  | ref            | ref            | ref            | ref            | ref            | ref             |
| Other                     | 0.78           | 0.94           | 0.76           | 0.71           | 0.87           | 1.33            |
| <b>Tenure</b>             |                |                |                |                |                |                 |
| Home-owner                | ref            | ref            | ref            | ref            | ref            | ref             |
| Tenant                    | 1.00           | 0.91           | <b>0.73***</b> | <b>0.76***</b> | <b>0.72***</b> | <b>0.70***</b>  |
| Sublet                    | <b>0.39***</b> | <b>0.43**</b>  | <b>0.45***</b> | 0.65           | <b>0.34***</b> | <b>0.41**</b>   |
| Other                     | <b>0.45***</b> | 0.66           | <b>0.32***</b> | 0.66           | <b>0.11***</b> | <b>0.31***</b>  |
| <b>No of rooms</b>        |                |                |                |                |                |                 |
| 1 room                    | <b>0.14***</b> | <b>0.46***</b> | <b>0.12***</b> | <b>0.28***</b> | <b>0.03***</b> | <b>0.10***</b>  |
| 2 rooms                   | <b>0.46***</b> | <b>0.74***</b> | <b>0.41***</b> | <b>0.59***</b> | <b>0.44***</b> | <b>0.58***</b>  |
| 3 rooms                   | ref            | ref            | ref            | ref            | ref            | ref             |
| 4+ rooms                  | 1.27           | 0.99           | <b>1.79***</b> | <b>1.62***</b> | 1.00           | 1.03            |
| <b>Months in dwelling</b> |                |                |                |                |                |                 |
| > 12                      |                | ref            |                | ref            |                | ref             |
| 12 – 32                   |                | <b>1.42***</b> |                | <b>1.87***</b> |                | <b>1.67***</b>  |
| < 32                      |                | <b>1.57***</b> |                | <b>1.71***</b> |                | <b>1.41**</b>   |
| <b>Metropolitan (yes)</b> |                | 1.05           |                | 0.92           |                | 0.85            |
| <b>Union (yes)</b>        |                | <b>9.36***</b> |                | <b>8.02***</b> |                | <b>11.80***</b> |
| <b>Gender (female)</b>    |                | <b>1.22**</b>  |                | <b>1.29***</b> |                | 1.12            |
| <b>Household income</b>   |                |                |                |                |                |                 |
| Low                       |                | ref            |                | ref            |                | ref             |
| Middle                    |                | 0.91           |                | <b>0.71***</b> |                | <b>0.49***</b>  |
| High                      |                | <b>0.54***</b> |                | <b>0.64***</b> |                | <b>0.27***</b>  |
| n (individuals)           | 769            | 730            | 701            | 693            | 748            | 733             |
| n (observations)          | 11483          | 9949           | 10518          | 9598           | 10324          | 8701.00         |
| n (events)                | 616            | 584            | 570            | 559            | 350            | 348             |
| -2 LL                     | -727.15        | -462.19        | -505.33        | -282.63        | -425.99        | -231.68         |

**Table 2. Piece-wise constant hazard regression of initiation of conception, first births. The Swedish Housing and Life Course Cohort Study 1972-2005. Hazard ratios. \* p>0.01, \*\*p>0.05**

|                           | Cohort 1956    |                | Cohort 1964    |                | Cohort 1974     |                 |
|---------------------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
|                           | Model 1        | Model 2        | Model 1        | Model 2        | Model 1         | Model 2         |
| <b>Age</b>                |                |                |                |                |                 |                 |
| 16 – 19                   | ref            | ref            | ref            | ref            | ref             | ref             |
| 20 – 23                   | <b>2.34***</b> | <b>1.76***</b> | <b>2.44***</b> | 1.23           | <b>7.00***</b>  | <b>4.85***</b>  |
| 24 – 27                   | <b>3.64***</b> | <b>2.45***</b> | <b>4.61***</b> | <b>1.94***</b> | <b>17.15***</b> | <b>12.42***</b> |
| 28 – 33                   | <b>2.94***</b> | <b>2.34***</b> | <b>3.88***</b> | <b>1.98***</b> | <b>6.54***</b>  | 1.92            |
| 34 – 37                   | 0.96           | 0.89           | <b>2.24***</b> | 1.29           | NA              | NA              |
| 38 – 41                   | <b>0.48**</b>  | 0.48           | <b>4.33***</b> | 0.33           | NA              | NA              |
| 42 – 49                   | <b>2.48***</b> | <b>0.04***</b> | NA             | NA             | NA              | NA              |
| <b>Housing type</b>       |                |                |                |                |                 |                 |
| Apartment                 | 1.09           | 1.11           | 1.28           | 1.17           | 0.75            | 1.01            |
| Terraced                  | 1.02           | 1.10           | 1.31           | 0.99           | 0.99            | 1.44            |
| Detached                  | ref            | ref            | ref            | ref            | ref             | ref             |
| Other                     | 0.76           | 0.64           | 1.33           | 1.39           | 0.53            | 0.89            |
| <b>Tenure</b>             |                |                |                |                |                 |                 |
| Home-owner                | ref            | ref            | ref            | ref            | ref             | ref             |
| Tenant                    | 0.96           | 0.90           | 0.83           | 0.87           | 0.81            | 0.83            |
| Sublet                    | <b>0.51**</b>  | 0.59           | 0.87           | 1.01           | 0.73            | 0.92            |
| Other                     | 0.66           | 0.70           | 0.66           | 0.96           | <b>0.36***</b>  | 0.81            |
| <b>No of rooms</b>        |                |                |                |                |                 |                 |
| 1 room                    | <b>0.41***</b> | <b>0.67**</b>  | <b>0.37***</b> | <b>0.56***</b> | <b>0.28***</b>  | <b>0.52***</b>  |
| 2 rooms                   | <b>0.62***</b> | 0.83           | <b>0.64***</b> | <b>0.78**</b>  | <b>0.68***</b>  | 0.85            |
| 3 rooms                   | ref            | ref            | ref            | ref            | ref             | ref             |
| 4+ rooms                  | 0.87           | <b>0.63***</b> | 1.15           | 1.07           | 0.81            | 0.95            |
| <b>Months in dwelling</b> |                |                |                |                |                 |                 |
| > 12                      |                | ref            |                | ref            |                 | ref             |
| 12 – 32                   |                | <b>0.36***</b> |                | <b>0.34***</b> |                 | <b>0.51***</b>  |
| < 32                      |                | <b>1.48***</b> |                | <b>1.34***</b> |                 | 1.21            |
| <b>Metropolitan (yes)</b> |                | 0.97           |                | 1.06           |                 | <b>0.77**</b>   |
| <b>Union (yes)</b>        |                | <b>1.95***</b> |                | <b>1.99***</b> |                 | <b>2.47***</b>  |
| <b>Gender (female)</b>    |                | 1.12           |                | <b>1.34***</b> |                 | <b>1.31**</b>   |
| <b>Household income</b>   |                |                |                |                |                 |                 |
| Low                       |                | ref            |                | ref            |                 | ref             |
| Middle                    |                | <b>0.69***</b> |                | <b>0.55***</b> |                 | <b>0.30***</b>  |
| High                      |                | <b>0.51***</b> |                | <b>0.47***</b> |                 | <b>0.40***</b>  |
| n (individuals)           | 701            | 662            | 658            | 644            | 716             | 701             |
| n (observations)          | 10509          | 9026           | 8602           | 7836           | 8286            | 7079            |
| n (events)                | 581            | 474            | 536            | 487            | 321             | 295             |
| -2 LL                     | 767.65         | -559.46        | -663.08        | -501.81        | -512.72         | -365.08         |

associated with lower first birth propensities compared to having a low household income.

An interesting question is also how the separate effects of each housing characteristic look like without including the others in the model. Such models could not be included here because of space limitations. However, results not shown here indicate that apartment-living is negatively associated with the propensity to have the first child as compared to living in a detached house for the two youngest cohorts when no other housing characteristics are included in the model. The results for number of rooms remain the same as presented in Table 1. One interpretation is that housing size matters more than housing type. Further, being a tenant or a lodger is negatively associated with first-birth propensities compared to being a home-owner when no other housing characteristics are included. This pertains to all cohorts.<sup>3</sup>

In the analyses presented in Table 2, the event is defined as time of the first birth minus 16 months. In this case, the anticipation of the first birth can be defined in several ways. First, it can naturally be defined as the time of the conception rather than the time of the birth (i.e. nine months prior to the birth). Second, a couple can also anticipate a birth in terms of planning for a future pregnancy.<sup>4</sup> Here, the intention is to examine what effect the housing status prior to both conception and birth has on first birth propensities.

No consistent effect of *housing type* on the initiation of childbearing is found in Table 2. A positive effect of *home-ownership* is found for most cohorts in both models, but few effects of tenure are significant. The effects of *number of rooms* are still substantial. For the 1956 cohort, living in a one-room dwelling or in a dwelling with four or more rooms is negatively related to first-birth propensities compared with living in a three-room dwelling. For the two youngest cohorts living in one- or two-room dwellings is negatively related to first-birth propensities compared with living in a three-room dwelling. The effect of months since moving to the present dwelling is by large identical to the results found in Table 1 however

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<sup>3</sup> It can also be argued that the two oldest cohorts should be censored at age 31. First, housing is likely to have different effects on childbearing in young adulthood compared to middle age. Second, the cohort born in 1974 is 31 by the end of the year of data collection (2005) and a substantial proportion of the respondents are thus not likely to have completed their fertility. Analyses for the age group 16-31 have been performed but are not presented here. The results are very similar to the ones presented in tables 1 and 2.

<sup>4</sup> Obviously the realization of pregnancy plans is not always guaranteed.

decreased in size. Finally, negative effects of high and medium incomes are found when housing standard is controlled for.

## **Discussion**

The point of departure of this study was to examine the relationship between housing and first births in Sweden during the period 1972-2005. This is a relationship with many angles. Here, the assumption is that housing might be a constraint for childbearing. Furthermore, many factors apart from housing affect childbearing. Previous research has indicated that education and labor market attachment appears to be important. The population under study was three Swedish birth cohorts: those born in 1956, 1964 and 1974. The focus is on three housing characteristics: type of dwelling, tenure and number of rooms. Detailed biographic information on these characteristics was provided by The Swedish Housing and Life Course Cohort Study (HOLK). The main finding is that the size of the dwelling seems to be the housing factor with the strongest association with first-birth intensities. Weak effects are found for housing type. The effect of housing on childbearing seems to be stronger if measured to capture time of any first birth than if measured so as to coincide with the situation 16 months prior to the birth. The more strong effects on first-birth risks than on initiation of conceptions suggest that there is also an effect of childbearing plans on housing and residential moves. This direction of the association between housing and childbearing is not covered in the present study.

A consistent result is that number of rooms in the dwelling is positively related to first birth propensities. This is an interesting finding, both from a policy and from a normative perspective. Is the stereotype of young parents as being home-owners and living in a detached house really a necessary image? The results of this study can be interpreted differently: it seems as if it is the number of rooms in a dwelling that matters for young families *in spe*, and not so much the type of housing. On average, detached or terraced houses are larger than apartments, and this characteristic may be decisive for a housing decision rather than other characteristics of such housing. Thus, it seems reasonable to raise the question discuss whether access to large dwellings regardless of housing type promotes fertility.

The more strong association between being established on the housing market and the propensity to have a first child for the 1974 cohort is also an interesting result. The 1974 cohort entered their young adulthood during a period of housing shortage in the metropolitan areas of Sweden in particular, during a period when the vast part of previous Swedish housing

policy had been de-assembled. This period of reorientation in Swedish housing policy coincided with recession and elevated unemployment. From previous research we know that both the individual attachment on the labor market and unemployment levels in large affect childbearing as well as the possibilities to obtain proper housing. One can naturally speculate about the degree to which young adults opportunities to establish themselves on the housing market were influenced by the rapid and significant policy changes during the early 1990s. An extension of this speculation is the issue about whether or not housing policies can promote fertility.

In the introduction parts of this study it was discussed to what extent housing affects childbearing and vice versa. The aim of this paper has been to explore the causal direction from housing to childbearing. The conclusion is that there seems to be an effect of housing on first-birth propensities. However, this relationship needs to be further explored. For example, exploring the importance of housing adjustment subsequent to childbearing initiation would contribute to the knowledge on the relationship between housing and childbearing (see also Kulu & Vikat, 2007). Furthermore, the cohort analyses presented in this study evokes the question to what extent differences in patterns across cohorts are attributable to policy changes, changes in the housing and labor markets, and changing normative frameworks among young adults in Sweden.

**Acknowledgements:**

I thank Clara Mulder, Nathan Lauster, Gunnar Andersson, and three anonymous referees for valuable comments, and Maria Brandén and Ingemar Kåreholt for assisting in the data preparation. Financial support from Byggnads, Folksam, HSB, Hyresgästföreningen Riksförbundet, Riksbyggen, and Svenska Byggnadsutvecklingsfonden (data collection), and FAS grant 2005-1101 (research work) is gratefully acknowledged.

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**Appendix. Exposures, The Swedish Housing and Life Course  
Cohort Study, 1972-2005. Percentage of person-months**

|   | Cohort 1956   |               | Cohort 1964   |               | Cohort 1974   |               |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
|   | Birth         | Initiation    | Birth         | Initiation    | Birth         | Initiation    |
| <b>Person-months</b>  | 146061        | 140192        | 126525        | 112300        | 119529        | 105095        |
| <b>Age</b>  |               |               |               |               |               |               |
| 16 – 19   | 10.11         | 16.74         | 9.48          | 18.78         | 9.13          | 21.38         |
| 20 – 23   | 29.61         | 27.17         | 33.67         | 33.73         | 40.95         | 43.24         |
| 24 – 27   | 21.36         | 17.15         | 24.25         | 20.41         | 29.43         | 26.34         |
| 28 – 33   | 16.64         | 14.86         | 19.78         | 16.51         | 20.49         | 9.05          |
| 34 – 37   | 6.84          | 7.35          | 7.54          | 7.65          | NA            | NA            |
| 38 – 41   | 5.65          | 7.23          | 5.28          | 2.92          | NA            | NA            |
| 42 – 49   | 9.79          | 9.50          | NA            | NA            | NA            | NA            |
| <i>Total</i>  | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> |
| <b>Housing type</b>   |               |               |               |               |               |               |
| Apartment   | 70.38         | 66.63         | 77.14         | 77.52         | 80.83         | 82.10         |
| Terraced  | 2.96          | 3.36          | 2.58          | 2.10          | 2.26          | 1.78          |
| Detached  | 21.29         | 24.83         | 17.17         | 16.91         | 12.87         | 11.52         |
| Other   | 5.37          | 5.18          | 3.11          | 3.47          | 4.05          | 4.60          |
| <i>Total</i>  | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> |
| 897 missing values, birth<br>761 missing values, initiation |               |               |               |               |               |               |
| <b>Tenure</b>   |               |               |               |               |               |               |
| Home-owner  | 32.22         | 35.51         | 28.39         | 27.07         | 22.89         | 20.03         |
| Tenant  | 56.71         | 53.37         | 57.41         | 57.92         | 57.77         | 58.68         |
| Sublet  | 5.03          | 4.96          | 7.83          | 8.23          | 10.09         | 10.96         |
| Other   | 6.03          | 6.16          | 6.38          | 6.78          | 9.25          | 10.33         |
| <i>Total</i>  | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> | <i>100.00</i> |
| 641 missing values, birth<br>561 missing values, initiation |               |               |               |               |               |               |

Appendix continued

|   | <b>Cohort 1956</b> |                   | <b>Cohort 1964</b> |                   | <b>Cohort 1974</b> |                   |
|---|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
|   | <b>Birth</b>       | <b>Initiation</b> | <b>Birth</b>       | <b>Initiation</b> | <b>Birth</b>       | <b>Initiation</b> |
| <b>No of rooms</b>  |                    |                   |                    |                   |                    |                   |
| 1 room  | 24.02              | 23.47             | 29.35              | 31.42             | 34.01              | 37.12             |
| 2 rooms   | 36.71              | 33.76             | 35.11              | 34.97             | 36.36              | 35.57             |
| 3 rooms   | 18.02              | 16.21             | 20.20              | 17.99             | 16.51              | 15.50             |
| 4+ rooms  | 21.25              | 26.56             | 15.34              | 15.63             | 13.13              | 11.81             |
| <i>Total</i>  | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     |
| 623 missing values, birth<br>425 missing values, initiation   |                    |                   |                    |                   |                    |                   |
| <b>Months in dwelling</b>                                     |                    |                   |                    |                   |                    |                   |
| > 12  | 41.13              | 37.36             | 44.03              | 44.22             | 51.67              | 52.99             |
| 12 – 32   | 20.43              | 19.29             | 23.39              | 22.34             | 25.59              | 24.93             |
| < 32  | 38.44              | 43.34             | 32.58              | 33.43             | 22.74              | 22.08             |
| <i>Total</i>  | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     |
| <b>Metropolitan area</b>                                      |                    |                   |                    |                   |                    |                   |
| Yes   | 62.60              | 63.49             | 55.56              | 56.43             | 52.86              | 53.85             |
| No  | 37.40              | 36.51             | 44.44              | 43.57             | 47.14              | 46.15             |
| <i>Total</i>  | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     |
| 3333 missing values, birth<br>3125 missing values, initiation |                    |                   |                    |                   |                    |                   |
| <b>Union</b>  |                    |                   |                    |                   |                    |                   |
| Yes   | 52.07              | 53.27             | 57.91              | 62.92             | 55.96              | 60.86             |
| No  | 47.93              | 46.73             | 42.09              | 37.08             | 44.04              | 39.14             |
| <i>Total</i>  | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     |
| 12 missing values, birth<br>12 missing values, initiation     |                    |                   |                    |                   |                    |                   |
| <b>Gender</b>   |                    |                   |                    |                   |                    |                   |
| Female  | 50.24              | 47.65             | 46.97              | 47.36             | 47.84              | 47.34             |
| Male  | 49.76              | 52.35             | 53.03              | 52.64             | 52.16              | 52.66             |
| <i>Total</i>  | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     |

Appendix continued

|                                | <b>Cohort 1956</b> |                   | <b>Cohort 1964</b> |                   | <b>Cohort 1974</b> |                   |
|--------------------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
|                                | <b>Birth</b>       | <b>Initiation</b> | <b>Birth</b>       | <b>Initiation</b> | <b>Birth</b>       | <b>Initiation</b> |
| <b>Household income</b>        |                    |                   |                    |                   |                    |                   |
| Low                            | 28.10              | 25.91             | 33.63              | 29.54             | 52.02              | 53.31             |
| Middle                         | 31.03              | 29.56             | 33.70              | 31.10             | 38.74              | 23.33             |
| High                           | 40.88              | 44.52             | 32.67              | 39.28             | 19.24              | 23.36             |
| <i>Total</i>                   | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     | <i>100.00</i>      | <i>100.00</i>     |
| 1401 missing values, birth     |                    |                   |                    |                   |                    |                   |
| 888 missing values, initiation |                    |                   |                    |                   |                    |                   |



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