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The Dynamics of Participation in Subsidized Housing Programs in the U.S.

A dissertation submitted in partial satisfaction of the
requirements for the Degree Doctor of Philosophy
in Sociology

by

Yana Andreeva Kucheva

2012

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ABSTRACT OF THE DISSERTATION

The Dynamics of Participation in Subsidized Housing Programs in the U.S.

by

Yana Kucheva

Doctor of Philosophy in Sociology

University of California, Los Angeles, 2012

Professor Robert Mare, Chair

Over the course of its 80-year history, the main goal of the subsidized housing program in the United States has been to help poor households live in physically sound affordable housing. Over and above serving the immediate shelter needs of low-income households, an important but not always explicit justification for the program has been the belief that upgrading the housing conditions of the poor will yield broader benefits of social and economic advancement not only to the occupants of subsidized apartments but also to the neighborhoods around them. The various forms that the subsidized housing program has taken over the years have been closely linked both to attitudes towards the proper responses to address poverty and the role that governments can play in the operation of the housing market. My dissertation examines the experiences of residents of subsidized housing before, during, and after their involvement with the program with particular attention to the understanding of poverty and social stratification.

Specifically, Chapter 1 investigates the pathways that residents take to enter subsidized housing and exit subsidized housing. I use life table analysis and discrete time hazard modeling with data from two nationally representative panel surveys, the Survey of Income and Program Participation (SIPP), spanning the period 1990-2008, and the Panel Study of Income Dynamics (PSID), spanning the period 1969-2007. I find that the median time to entry into subsidized housing is 30 years, reflecting the fact that most individuals who are eligible for the subsidy never receive it. On the other hand, the median time to exit from subsidized housing ranges from 5 years for public housing to 3 or 4 years for other types of subsidized housing. The process of entering subsidized housing in a lot of ways mirrors the process of exiting subsidized housing. African Americans are the ones who are most likely to find themselves in subsidized housing and are also the ones most likely to stay in subsidized housing longer. While the amount of household earnings and welfare benefits does not have an overwhelming association with either entering or exiting subsidized housing, the local employment and housing conditions do have an effect on the process, with individuals living in places with higher unemployment rates and higher rents more likely to enter subsidized housing and also less likely to exit subsidized housing. My findings also confirm previous research showing that the residents of public housing programs live in some of the most distressed neighborhoods and any exit from the program improves their neighborhood conditions. My findings also show that the voucher program and the private subsidized housing program do not have the intended effect of providing residents with better neighborhood environments.

Chapter 2 examines an understudied aspect of the relationship between government subsidies and household structure, namely how entering subsidized housing, staying in subsidized housing and exiting into the private housing market interacts with the choices that

subsidy recipients make regarding the kind of households they live in. I use a multi-state life table, incorporating the monthly longitudinal housing subsidy and household composition histories of all individuals in the SIPP from 1990 through 2008. My results show that entries into subsidized housing are accompanied by changes in household arrangements that reduce the number of adults in households. Moreover, there is a distinct life course pattern to the entry into subsidized housing with younger individuals transitioning into subsidized housing as single parents with children and older individuals transitioning as single householders. On the other hand, individuals tend to exit subsidized housing in the same household arrangement as they were in subsidized housing, indicating that moves out of subsidized housing may be associated with other changing circumstances such as greater economic stability rather than changes in household composition. I find no strong evidence that marriages break up once individuals are in subsidized housing, but I do find that a single mother with a child is much more likely to exit subsidized housing altogether than to get married while in subsidized housing. My multi-state life table allows me to simulate what would happen to the composition of households in subsidized housing given a contraction or expansion of the subsidized housing program. My simulations suggest that the biggest changes in the subsidized program would occur with changes in the rates of entry into subsidized housing rather than the rates of exit from subsidized housing. Increasing the rates of entry into subsidized housing does not have the same multiplicative effect across different types of household arrangements. In fact, a policy that allows individuals across all ages to transition more frequently into subsidized housing would shift the programs towards housing single-person elderly households for longer periods of time compared to younger single parent or married couple households.

Chapter 3 is a detailed examination of how children who grew up in subsidized housing make the transition to adulthood. Specifically, I estimate the effect of subsidized housing on the timing of first marriage, first birth, and the establishment of an independent household. I also assess whether living in subsidized housing makes children less likely to complete high school, continue their education after high school, and complete college, and more likely to live in subsidized housing after age 18. I use propensity score matching to statistically match children who grew up in subsidized housing to ones who are similar on observable characteristics but did not live in subsidized housing. I use these “treatment” and “control” groups to derive race- and gender-specific estimates of the effect of subsidized housing on the transition to adulthood. I also assess whether these effects vary by the stage in childhood when the stay in subsidized housing occurred, i.e. early childhood, middle childhood, or adolescence. Using the PSID, I find that subsidized housing accelerates the first birth and the establishment of an independent household only for black girls who were in subsidized housing between the ages of 6 and 11. Moreover, white children who grew up in subsidized housing have consistently worse educational outcomes compared to similar white children who did not grow up in subsidized housing. The most consistent finding in this chapter across all racial and age groups is that children who grew up in subsidized housing during any stage in childhood are also much more likely to reenter subsidized housing as heads of households.

The dissertation of Yana Andreeva Kucheva is approved.

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2012

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Introduction

Over the course of its 80-year history, the main goal of the subsidized housing program in the United States has been to help poor households live in physically sound affordable housing (Newman 2008). Over and above serving the immediate shelter needs of low-income households, an important but not always explicit justification for the program has been the belief that upgrading the housing conditions of the poor will yield broader benefits of social and economic advancement not only to the occupants of subsidized apartments but also to the neighborhoods around them (Vale 2002). Unlike other forms of government assistance, such as food stamps and Medicaid, subsidized housing for the poor is not an entitlement and only a quarter of eligible household receive it (HUD 2008). Moreover, unlike other welfare programs, subsidizing housing has never been strictly a poverty issue, as the largest housing subsidies flow to homeowners in the form of mortgage interest deductions (Newman 2008).

Therefore, the various forms that the subsidized housing program has taken over the years have been closely linked both to attitudes towards the proper responses to address poverty and the role that governments can play in the operation of the housing market (Harloe 1995, Vale 2002). At the heart of the uneasy relationship between providing support for the poor and providing subsidies for housing has been the debate about “the form and purpose of state-subsidized neighborhoods in a society that places ideological value on individual homeownership” and pulling yourself up by your own bootstraps (Harloe 1995). Therefore, subsidized housing programs embody a deep ideological conflict between the need to care for the poor versus the desire to only reward worthy behavior, especially with the promise of homeownership (Vale 2002).

My dissertation examines the experiences of residents of subsidized housing before, during, and after their involvement with the program. Chapter 1 looks at both entries into and exits from subsidized housing as well as what happens to subsidized individuals after they decide to leave the program and find an apartment on the private market. Chapter 2 examines the household structure of subsidized individuals with particular attention to their child bearing, marital, and doubling-up decisions. Chapter 3 turns to the experiences of children who grew up in subsidized housing and asks if the program is reproducing itself by having those who were subsidized as children re-enter the program as adults.

In the following introductory paragraphs, I first present the history of subsidized housing in the United States. Second, I discuss how the program's development and current form relate to issues of urban sociology, social stratification, and debates about the poor. Third, I situate my dissertation research within our current knowledge of the subsidized housing program and present my contributions to the field.

The first U.S. federally sponsored subsidized program came after the collapse of the U.S. private housing market during the Great Depression. Even though most government efforts were aimed at saving middle class homes from mortgage foreclosures, money was also set aside for the provision of low-rent housing for working class people with steady sources of income (Harloe 1995). By 1940, 117,000 units were built under the Depression-era housing mandates, which constituted just over 8% of all new housing output (Harloe 1995). Virtually all new construction was in inner cities (Wright 1983, Vale 2002, Harloe 1995).

The next stage of public housing construction commenced with the Housing of Act of 1949 whose main emphasis was not on low-rent housing per se but on remaking the inner city in order to provide opportunities for business and real estate, to boost property tax revenues, and to

satisfy the aspirations of planning and design professionals (Wright 1983). Between 1949 and 1968, government funding for urban renewal led to the destruction of 425,000 low-rent mainly minority units that gave way to luxury apartments, office buildings, and cultural centers (Harloe 1995). Moreover, the urban renewal program produced the now infamous “tower in the park” look of public housing. Planning officials borrowed the design from Le Corbusier’s Ville Radieuse plan that consisted of steel and glass high rises surrounded by vast tracts of public space connected by expressways (Wright 1983, Garvin 2002). Planners and architects assumed that a change in scale would help slum residents break with their past social networks, reduce crime, and eliminate juvenile delinquency (Harloe 1995, Vale 2002).

The concern with urban poverty in the 1950s echoed the sentiments of late 19th century reformers who were preoccupied with the housing condition of the “dangerous classes” who had just arrived on American soil and were threatening the already established middle class way of life (Harloe 1995, Vale 2002). Public Housing Authorities (PHAs) in the 1950s and 1960s tried to administer subsidized properties using the same paradigm of social control developed at early 20th-century settlement houses where middle class values were taught to working class and poor city residents (Wright 1983, Harloe 1995, Vale 2002). PHAs controlled every aspect of residents’ lives: the keeping of pets, overnight guests, schedules for using the washing machines (Harloe 1995).

At the same time that poor residents of subsidized properties were supposed to embrace the middle class way of life, they were also presented with housing options diametrically opposed to the ideal detached single-family home (Wright 1983). The high-rise design was supposed to be the most efficient way of providing cheap housing options for the poor and of remaking the squalid image of inner-city slums (Harloe 1995, Vale 2002). However, the

maintenance of the projects proved difficult and costly because construction expenses were capped in order to discourage long-term residency (Vale 2002, Venkatesh 2002). Elevators often broke down, the long dark hallways became the perfect spot for drug trade, and the insufficient public recreational facilities were quickly amortized by high usage (Harloe 1995, Venkatesh 2002, Vale 2002, Popkin et al. 1995). Finding sites for new housing projects became more difficult and new construction started to cluster around existing public housing in minority neighborhoods that lacked the political organization to resist new subsidized units (Harloe 1995, Patillo 2007, Wacquant 2008). Public housing was placed away from grocery stores and organizations that could provide services to the community (Vale 2002, Venkatesh 2002). In some egregious cases, the development of expressways shielded surrounding neighborhoods from the supposed threat coming from subsidized individuals (Vale 2002, Venkatesh 2002).

By the late 1960s, the elderly became eligible for public housing and authorities discovered that these tenants were easier to manage than poor families (Harloe 1995). New construction of planned units slowed down and by 1967, only 674,000 of the 810,000 planned units had been completed (Harloe 1995). Public housing accounted for only 1.2% of the national housing stock and nearly half of new tenants lacked an employed member and half were single-parent households (Harloe 1995, Vale 2002). By the 1970s, public housing in major urban areas had become a form of highly stigmatized ghetto for the group within the poverty population which had the lowest incomes of all – black single mothers with children (Harloe 1995).

Section 8 of the Housing Act of 1974 tried to remedy the problems of subsidized housing by drawing private developers into the process of low-income housing construction (Harloe 1995). The 1974 Act also implemented a new type of subsidy – the voucher – that poor households could use on the private housing market. However, new units constructed under the

1974 Act tended to house mostly elderly white households skirting the problem of providing better options for poor black families (Harloe 1995). Moreover, voucher users rarely could find housing away from poor racially segregated neighborhoods, vitiating the original purpose of the program to deconcentrate subsidized individuals away from inner-city areas (Newman and Schnare 1997).

As the Housing Act of 1974 did not produce much of the desired deconcentration of subsidized households, the housing program once again changed in 1992 with the introduction of HOPE VI grants for new construction, aimed at attracting higher-income families to public housing neighborhoods and at promoting better architectural designs and defensible public spaces. This approach has yet to prove its viability, as the new smaller developments on the sites of razed large public housing projects decrease the number of subsidized units and use the old strategy of fighting urban poverty only one building at a time (Vale 2002, Patillo 2007). The presence of middle class white residents in some of the redeveloped properties has sparked conflict between low-income subsidized households and newcomers to the neighborhood over the appropriate uses of public space (Patillo 2007). Moreover, displaced public housing residents need to pass stringent criminal checks and drug tests, which disqualify a lot of them for entry into the new projects (Patillo 2007). Therefore, critics of the HOPE VI program and the mixed-income approach in general have pointed out that instead of deconcentrating public housing, new policies continue to place subsidized buildings in older public housing neighborhoods and reduce the available stock of low-rent apartments while policing residents who have little organizing experience in order to fight back (Patillo 2007).

Currently the U.S. government spends \$34.8 billion on low-income housing assistance, supporting 4.7 million households across traditional public housing, mixed-income housing,

Housing Choice Vouchers, housing for the elderly and people with disabilities. This represents a larger government expenditure serving more people than the Temporary Assistance for Needy Families (TANF), the successor to Aid to Families with Dependent Children (AFDC) (Newman 2008). While 49% of all renter households have incomes low enough to be considered eligible for housing assistance, only 26% of all income-eligible renters actually receive rental subsidies (HUD 2008). Out of the total number of subsidized households, approximately 1.3 million live in public housing units, approximately 1.8 million receive assistance through vouchers, and approximately 1.7 million live in privately owned subsidized units (HUD 2008).

Compared to all income-eligible renters, subsidized individuals are more likely to be minorities, be older, have lower levels of education, live in female-headed household, be smaller in size and have lower incomes (HUD 2008). Census tracts with public housing are significantly poorer than the average environment experienced by a household with income below the poverty line (Newman and Schnare 1997). While the certificate and voucher programs appear to be successful in moving recipients out of the lowest-income areas, they have not been successful in promoting moves to middle-class neighborhoods (Newman and Schnare 1997). More than half of all public housing units are located in minority census tracts where at least 50 percent of the households have a black or Hispanic head, and 38 percent are located in tracts that are 80 to 100 percent minority (Newman and Schnare 1997). Voucher users do enjoy more integrated environments than public housing residents. However, they are not more likely than the poor in general to live in neighborhoods where the percent minority is less than 50 (Newman and Schnare 1997).

Given that only a quarter of eligible households end up in subsidized housing and that subsidized units are still located in racially and economically segregated neighborhoods, it is

important to examine who ends up in a subsidized apartment, how long these individuals live in subsidized units, how receipt of the subsidy interacts with the type of households in which subsidized individuals live, and what effect the program has on the life chances of individuals and especially children who grow up in the program. Although in recent years there has been a growing effort to examine the subsidized housing program, we know little about the recipients of subsidized housing that goes beyond the question of the relationship between housing subsidies and self-sufficiency. First, to my knowledge there has been no study of the determinants of entry into subsidized housing, which tracks longitudinally the population at risk of entering subsidized housing. Second, the last studies of the determinants of exit from subsidized housing use data prior to the mid-1990s and focus only on the outcomes of heads of households as opposed to all residents of the subsidized unit. Third, while we know cross-sectionally in what types of families subsidized individuals live and we know that single mothers in subsidized housing have low probabilities of marriage, it is not clear how the household arrangements of subsidized individuals evolve over time and what effect the events of entry into and exit from subsidized housing have on the decisions of individuals with whom to live. Fourth, we do not know what effect the program has on the transition to adulthood of children who grew up in subsidized housing, nor do we know the degree of intergenerational continuity in subsidized housing receipt. Therefore, my dissertation examines the experiences of residents of subsidized housing before, during, and after their involvement with the program, taking a comprehensive look at the determinants of entries into and exits from subsidized housing, the family arrangements of subsidized households, and the transitions to adulthood of children who grew up in subsidized housing.

Specifically, Chapter 1 investigates the pathways that residents take to enter subsidized housing and exit subsidized housing. I use life table analysis and discrete time hazard modeling with data from two nationally representative panel surveys, the Survey of Income and Program Participation (SIPP), spanning the period 1990-2008, and the Panel Study of Income Dynamics (PSID), spanning the period 1969-2007. I find that the median time to entry into subsidized housing is 30 years, reflecting the fact that most individuals who are eligible for the subsidy never receive it. On the other hand, the median time to exit from subsidized housing ranges from 5 years for public housing to 3 or 4 years for other types of subsidized housing. The process of entering subsidized housing in a lot of ways mirrors the process of exiting subsidized housing. African Americans are the ones who are most likely to find themselves in subsidized housing and are also the ones most likely to stay in subsidized housing longer. While the amount of household earnings and welfare benefits does not have an overwhelming association with either entering or exiting subsidized housing, the local employment and housing conditions do have an effect on the process, with individuals living in places with higher unemployment rates and higher rents more likely to enter subsidized housing and also less likely to exit subsidized housing. My findings also confirm previous research showing that the residents of public housing programs live in some of the most distressed neighborhoods and any exit from the program improves their neighborhood conditions. My findings also show that the voucher program and the private subsidized housing program do not have the intended effect of providing residents with better neighborhood environments.

Chapter 2 examines an understudied aspect of the relationship between government subsidies and household structure, namely how entering subsidized housing, staying in subsidized housing and exiting into the private housing market interacts with the choices that

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Chapter 3 is a detailed examination of how children who grew up in subsidized housing make the transition to adulthood. Specifically, I estimate the effect of subsidized housing on the timing of first marriage, first birth, and the establishment of an independent household. I also assess whether living in subsidized housing makes children less likely to complete high school, continue their education after high school, and complete college, and more likely to live in subsidized housing after age 18. I use propensity score matching to statistically match children who grew up in subsidized housing to ones who are similar on observable characteristics but did not live in subsidized housing. I use these “treatment” and “control” groups to derive race- and gender-specific estimates of the effect of subsidized housing on the transition to adulthood. I also assess whether these effects vary by the stage in childhood when the stay in subsidized housing occurred, i.e. early childhood, middle childhood, or adolescence. Using the PSID, I find that subsidized housing accelerates the first birth and the establishment of an independent household only for black girls who were in subsidized housing between the ages of 6 and 11. Moreover, white children who grew up in subsidized housing have consistently worse educational outcomes compared to similar white children who did not grow up in subsidized housing. The most consistent finding in this chapter across all racial and age groups is that children who grew up in subsidized housing during any stage in childhood are also much more likely to reenter subsidized housing as heads of households.

My study of the subsidized housing program has several implications for the understanding of poverty and social stratification. First, I show that similarly to spells in other welfare programs, spells in subsidized housing are relatively short lasting between 3 and 5 years. Moreover, I demonstrate that local employment and housing conditions have a significant impact on the process of entering and exiting subsidized housing. Therefore, my results imply that stays

in subsidized housing on average do not conform to the stereotype of lifelong reciprocity. I also show that the recent push by local housing authorities to provide job training and other support services aimed at increasing the self-sufficiency of subsidized housing recipients may be unsuccessful if local housing markets are unaffordable and local job opportunities are missing.

Second, I demonstrate that while subsidized households tend to have lower number of adults, this does not mean that the program breaks up families. In fact, a majority of married couples with children enter subsidized housing as a married couple, while there is no indication that once married, parents separate while in subsidized housing. Indeed, the program may be a way for single parents with children to live away from overcrowded conditions or away from unsatisfactory relationships with cohabitators. My simulations also indicate that a policy aimed at speeding the transitions of individuals out of subsidized housing would not change the amount of time that individuals spend in subsidized housing without any corresponding changes in the rates of entry into subsidized housing.

Finally, I find that the subsidized program does not seem to help nor does it seem to harm most transitions to adulthood of children who grew up in subsidized housing. Nevertheless, I also find a high degree of intergenerational continuity in the receipt of subsidized housing. While my results do not necessarily imply that there is a causal link between the receipt of subsidized housing of parents and the receipt of subsidized housing of children, this finding is still troubling. Despite efforts to deconcentrate the location of the subsidized program through smaller scattered-site housing and the provision of vouchers, a majority of subsidized individuals still live in some of the worst neighborhoods in terms of high poverty, high crime, and lack of neighborhood service organizations. As Wilson argued in *The Truly Disadvantaged*, the rise of the ‘urban underclass’ was a direct consequence of the isolation of poor families in inner-city

communities with limited job opportunities, inadequate municipal services, and a lack of middle- and working-class residents to serve as role models and to support local institutions. If the housing program leads to the return of children in great numbers to these types of neighborhoods, it may indeed be creating a marginalized population that is not able to transmit the needed human and social capital to the next generation, so that stays in subsidized housing do not occur generation after generation.

References

- Harloe, Michael. *The People's Home? Social Rented Housing in Europe and America* (Studies in Urban and Social Change). Oxford: Blackwell Publishers.
- Marcuse, Peter. 1995. "Interpreting Public Housing History." *Journal of Architectural and Planning Research* 12 (3): 240-258.
- Newman, Sandra. 2008. "Does Housing Matter for Poor Families? A Critical Summary of Research and Issues Still to Be Resolved." *Journal of Policy Analysis and Management* 27(4): 895-925.
- Newman, Sandra and Ann Schnare. 1997. "And A Suitable Living Environment: The Failure of Housing Programs to Deliver on Neighborhood Quality." *Housing Policy Debate* 8 (4): 703-741.
- Patillo, Mary. 2007. *Black on the Block: The Politics of Race and Class in the City*. Chicago: University of Chicago Press.
- Popkin, Susan, Lynn Olson, Arthur Lurgio, Victoria Gwiasda and Ruth Carter, 1995. "Sweeping Out Drugs and Crime: Residents' View of the Chicago Housing Authority's Public Housing Drug Elimination Program." *Crime and Delinquency* 41: 73-99.
- Schill, Michael and Susan Wachter. 1995. "Housing Market Constraints and Spatial Stratification by Income and Race." *Housing Policy Debate* 6 (1): 141-167.
- Sugrue, Thomas. 1996. *The Origins of the Urban Crisis: Race and Inequality in Postwar Detroit*. Princeton, NJ: Princeton University Press.
- US Department of Housing and Urban Development, Housing and Demographic Analysis Division. 2008. *Characteristics of HUD-Assisted Renters and Their Units in 2003*. Office of Policy Development and Research. www.huduser.org
- Vale, Lawrence. 2000. *From the Puritans to the Projects: Public Housing and Public Neighbors*. Harvard University Press.
- Venkatesh, Sudhir A. 2002. *American Project: The Rise and Fall of a Modern Ghetto*. Harvard University Press.
- Wilson, William Julius. 1987. *The Truly Disadvantaged: The Innercity, the Underclass, and Public Policy*. Chicago: University of Chicago Press.
- Wright, Gwendolyn. 1983. *Building the Dream: A Social History of Housing*. New York: Pantheon Books.

Chapter 1. Pathways into and out of Subsidized Housing

Introduction

Do families in subsidized housing transition into the private housing market? According to lawmakers who overhauled the structure of the subsidy in the 1990s, subsidized housing communities had turned into a trap for low-income families who had few role models and little hope of ever making it on their own (Pear 1996). As subsidized tenants were rarely required to take any steps towards self-sufficiency, such as finding a job, critics blamed the program for creating a life-long culture of welfare dependence amongst its recipients (Alvarez 1997). Thus when in 1998, the federal government passed comprehensive legislation overhauling the structure of subsidized housing, it gave local public housing authorities (PHAs) considerable discretion to select new tenants not based on financial need but rather on enrollment in training programs or on stable work histories (Popkin et al. 2004, Kleit and Rohe 2005). By 2000, almost 90 percent of PHAs had adopted new criteria for admission into subsidized housing (Devine et al. 2000). Moreover, due to a concurrent redistribution of federal housing subsidies, voucher recipients surpassed the number of people served by public housing (Popkin et al. 2004). Are there differences in the amounts of time that public housing residents as opposed to voucher recipients utilize housing subsidies? What are the most common routes into and out of subsidized housing and have rental subsidies helped in the upward mobility of their recipients?

I answer these questions using longitudinal individual data from the Survey of Income and Program Participation, spanning the period 1990-2008, and the Panel Study of Income Dynamics, spanning the period 1969-2007. My study expands the knowledge on U.S. subsidized

housing programs in several important ways. First, I pay close attention to the quality of self-reports on subsidized housing receipt by comparing the consistency of self-reports to administrative data on the receipt of building-based subsidies and to the residential moves of households. Second, my study is the first one to model longitudinally the entry into subsidized housing from the population at risk of getting the subsidy. Third, I compare the dynamics of participation in public housing programs versus other types of housing programs. Finally, I present how the socioeconomic circumstances of individuals change as they enter the subsidized housing programs and as they exit the program. Therefore, my study is one of the few non-experimental ones that presents a description of the socioeconomic circumstances of individuals before, during and after the program and the only one to my knowledge that shows the social and neighborhood conditions of subsidized individuals before they enter the program and after they exit it.

Subsidized Housing and Length of Stay

Turnover amongst the subsidized housing population is as dynamic as that of the welfare population in general (Freeman 1998, Hungerford 1996, O'Neill et al. 1987). Nevertheless, substantial differences in estimated lengths of stay exist depending on the dataset used for the analysis. For instance, longitudinal panel surveys put the average stay of households in subsidized housing at about a year (Freeman 1998, Hungerford 1996, Blank and Ruggles 1992). However, estimates utilizing HUD administrative records range from 3 years for voucher recipients to more than 5 years for people in public housing (Cortes et al. 2008, Freeman 2005). Median length of stay also varies based on household type. For families with children median

tenure is about 3 years both in public housing and voucher programs, while for families with disabled or elderly heads tenures in public housing are 4 and 8 years respectively and tenures in voucher programs are 3 and 5 years respectively (Lubell et al. 2003). The distribution of spell lengths in all studies shows a uniform pattern of a large proportion of short-term participants tapering off to a few households with long tenures (Freeman 1998, Susin 1999, Freeman 2005, Lubell et al. 2003).

Multivariate analyses of the determinants of length of stay in public housing show that longer stays are associated with limited involvement with the labor force (Hungerford 1996; Rohe 1995, Rohe and Kleit 1997). Household composition also explains some of the exits from subsidized housing programs (Freeman 1998). Households with young children spend more time in subsidized housing while the presence of male teenagers shortens spells in the program (Freeman 1998, Hungerford 1996, Ryzin et al. 2001, Cortes et al. 2008). In fact, up to 56 percent of exits from subsidized housing are associated with family composition changes such as the birth of a child or a marriage (Susin 1999). Households with elderly and disabled heads have the lowest likelihoods of exit from subsidized housing programs (Olsen et al. 2005). Nevertheless, in some instances the local employment context is a better predictor of the exits from public housing than individual demographic and economic attributes (Freeman 1998). Higher unemployment rates in the areas where public housing projects are located lower the odds of moving out, because finding a job is difficult (Freeman 1998, Rothenberg et al. 1991). In addition, higher prevailing rents exacerbate the problem of lack of good employment opportunities, as public housing residents would need to pay substantially higher rents should they give up their subsidized apartments (Freeman 1998, Rothenberg et al. 1991).

Apart from residents' socioeconomic characteristics and local economic and housing conditions, new federal policies have also changed the utilization of subsidized housing programs. HUD administrative data show that entrants into subsidized housing programs in the 2000s are more likely to use vouchers to find an apartment and to have infants or toddlers in the household compared to households who entered subsidized housing in the 1990s (Cortes et al. 2008). Moreover, some site-specific case studies of welfare reform do not show a reduced average length of stay in subsidized housing for mothers with children who receive TANF-like assistance compared to mothers with children who receive AFDC-like assistance (Lee et al. 2005). A North Carolina demonstration self-sufficiency program registered little reduction in the receipt of housing assistance for the experimental group compared to the control group even though single mothers in experimental group experienced large employment gains and received extensive home search counseling (Rohe and Kleit 1997). Moreover, a tracking study of former public housing residents who were relocated with vouchers to other neighborhoods, as their original projects were being demolished, showed almost 60 percent of respondents having difficulty paying for rent, utilities and food (Buron et al. 2002). Therefore, the shift to providing housing assistance predominantly through vouchers, the shift in new tenant composition as well as the changes in welfare provision after 1996 raise the question of whether changes in federal subsidized housing policies coupled with welfare reform might in fact prolong the stay of households in subsidized apartments (Shroder 2002).

Contribution to the Literature on Subsidized Housing

My research project extends the literature on subsidized housing in several important ways. First, all estimates of the length of stay in subsidized housing cited above use panel survey data prior to 1994. Moreover, the latest estimates based on administrative data are as of 2004 and either use case studies limited to particular cities or fail to model the exit from subsidized housing using relevant local socioeconomic conditions that might influence how long individuals take advantage of the subsidy. My study uses information from the Survey of Income and Program Participation (SIPP) that spans the period between 1990 and 2008 and compares these estimates to survey data from the Panel Study of Income Dynamics (PSID) for the period between 1968 and 2007. Thus, it takes a comprehensive look at the subsidized housing program and its residents under different policy regimes. The level of geographic detail available in the SIPP and the PSID allows me to hone in on the general economic conditions of the local housing and labor markets of subsidized individuals. Moreover, the level of geographic detail in the PSID allows me to examine where these individuals live down to the neighborhood level.

Second, all studies cited above use household heads as the unit of analysis. I use information on all individuals in subsidized households. In this way, I am able to trace the behavior not only of the official person who holds the lease for a subsidized apartment but also children growing up in subsidized units and individuals who may not necessarily be on the lease. Therefore, my study takes a comprehensive look at all individuals who have experiences with the subsidized program and takes advantage of the full household rosters available in survey data but not necessarily in administrative records.

Third, I look at individuals before they enter the program as well as after they leave the program. To my knowledge, there is no study modeling the process of entering subsidized

housing from the population at risk of getting the subsidy. Moreover, there is very limited research on what happens to individuals once they leave the program with virtually all of it focusing only on employment outcomes (Shroder 2002, Newman and Harkness 2002). Despite efforts to deconcentrate the location of subsidized residents through smaller scattered-site new housing as well as housing vouchers, a majority of subsidized tenants still live in some of the worst neighborhoods in terms of high poverty, high crime and lack of neighborhood service organizations (Newman and Schnare 1997). Therefore, a move out of subsidized housing might mean a better living environment for those who manage to pay rent without government subsidies. Still, most research to date only shows what happens to public housing residents once they move to another neighborhood using a voucher subsidy, e.g. the Moving To Opportunity (MTO) experiment (Popkin and Cunningham 2000, Kling et al. 2005, 2007). In comparison, there are few studies that describe how moving out of a subsidized housing affects the life chances of individuals once they no longer receive any rental subsidy (Newman and Harkness 2002; Newman et al. 2009). Understanding how households fare after exiting subsidized housing has implications for the debate about the best strategies to help low-income families transition out of poverty. Therefore, my research addresses an important omission in the literature on housing assistance by following individuals after they leave the subsidized housing program and assessing whether or not using the subsidy translates into better living conditions and neighborhood attainment.

Fourth, I conduct my analyses of housing assistance with particular attention to the measurement quality of the dependent variable, i.e. the measurement of receipt of subsidized housing. Survey responses to questions about housing assistance have been known to produce inaccurate data as recipients of housing subsidies have had trouble answering the question of

whether or not their building is owned by a Public Housing Authority (Shroder 2002). For example, the 1993 American Housing Survey reported public housing numbers almost double the number found in HUD administrative data (Shroder 2002). As the group of interest in my study is a small fraction of the total survey population, even a small amount of measurement error in the dependent variable can lead to large biases in the estimates of length of stay in subsidized housing as well as the coefficients in multivariate analyses. In particular, using national surveys such as the SIPP or the PSID could lead to overestimating the fraction of housing assistance spells that are short (Susin 1999). Therefore, I investigate the extent to which reports of receipt of subsidized housing are consistent with reports of changing residential locations in the SIPP and the PSID. Moreover, I use matched administrative data from the PSID that codes the receipt of subsidized housing using HUD and local housing agencies' address records. While the administrative records do not contain information on the location of voucher users, they allow me to investigate the degree of consistency between self-reports and administrative records for individuals who report using building-based subsidies, such as public housing, Low Income Housing Tax Credit properties, and Section 8 Substantial Rehabilitation properties.

General Research Model and Hypotheses

My project specifically models the mechanisms through which households enter and exit subsidized housing and describes the economic hardship of individuals after they leave the program. First, I hypothesize that given the changes in preferences of Public Housing Authorities towards admitting residents already in training programs and with employment histories, the

overall length of stay in subsidized housing has decreased. However, given the shift in federal priorities from subsidizing buildings to subsidizing tenants, some of the population that would have ended up in public housing is now served by vouchers instead. Thus, I also expect an increase in the relative length of stay of voucher recipients compared to public housing recipients. Second, I hypothesize that the presence of young children increases significantly the probability of entering subsidized housing while changes in household composition such as marriage and the aging of children constitute the major pathways out of subsidized housing. Third, I hypothesize that high local unemployment rates and prevailing rents increase the length of stay of households in subsidized programs. Fourth, I hypothesize that entering a subsidized apartment or leaving one is not necessarily associated with upgrades in one's social environment as both subsidized apartments and landlords who accept vouchers tend to be clustered in low-income neighborhoods while residents who exit the program may have few available affordable options outside the ones where housing subsidies are already prevalent.

Methods

I start my analysis by assessing the data quality of subsidized housing self-reports in the SIPP and the PSID. Following Susin (1999), I first examine the prevalence of short stays in subsidized housing and the prevalence of stays that do not start or end with an associated change in physical address. Second, with regards only to the PSID, I compare the administrative matched data of subsidized housing receipt of PSID respondents to the self-reports of subsidized housing receipt of PSID respondents.

Next, I conduct life table analyses to describe entries into subsidized housing and exits from subsidized housing. I disaggregate stays in subsidized housing into two categories: stays in public housing and stays in other types of subsidized housing¹. Since the same household can use both types of subsidies over the course of being observed in the survey, I complement the first set of life table statistics with multi-state life table analysis showing the flows of households between the public housing program, other types of subsidized apartments and private-market apartments (Figure 4). This analysis allows me to compute transition rates not only for entries into and exits out of subsidized programs but also between different types of subsidized housing programs.

Individuals who are at risk of entering subsidized housing are those who live in an apartment on the private housing market and whose family incomes fall below the income threshold for submitting a subsidized housing application for their particular metropolitan area or non-metropolitan part of a state. By definition, individuals who are currently in subsidized housing are not at risk of entering subsidized housing². HUD calculates the income limit by household size on a yearly basis, using the median family income within a metropolitan area or

¹ In principle the U.S. subsidized housing program has three main categories: public housing managed by local Public Housing Authorities, privately-built building-based housing managed by private developers, and person-based subsidized housing in the form of vouchers that households can use on the private housing market as long as they can find a landlord who would accept the subsidy. The SIPP has added a question about the receipt of vouchers starting with the 2004 panel of the data. The PSID has added the respective question starting with the 2007 wave of data. Therefore, in order to use consistent subsidized housing categories over time, I choose to present my results using two categories of subsidized housing: 1) public housing and 2) other types of subsidized housing. This dichotomy does not reflect the fact that some subsidies are tied to places while some subsidies are tied to people. Unfortunately, due to the question wording in the SIPP and the PSID, I cannot examine all three categories of subsidized housing separately over the whole period under consideration.

² They may, however, become eligible to enter subsidized housing if they leave the program and if their income falls below the local threshold.

within the non-metropolitan portion of each state. In order to establish eligibility, local housing authorities disregard the portion of the family income that comes from Social Security. However, they do take into consideration income from all other government transfer programs such as AFDC/TANF. Therefore, for the purposes of this analysis I subtract from the total money income of a family the portion received from Social Security.

In the life table estimates of entries into subsidized housing, individuals become right-censored if their family incomes rise above the local income threshold or if they exit the survey before entering subsidized housing. Individuals are allowed to have multiple spells of being at risk of entering subsidized housing, meaning that they return to the analysis if their incomes fall below the threshold in subsequent years. This implies that the clock in the analysis resets every time household income increases above the local threshold. All left-censored spells, or those spells for individuals who entered the survey with incomes already below the threshold, are dropped from the analysis. In addition, individuals who have left-censored spells in subsidized housing are also dropped from the analysis³.

I estimate the hazard of exiting subsidized housing separately for individuals in public housing versus other types of subsidized housing. Again, all left-censored spells in either type of subsidized housing are dropped from the analysis. Individuals become right-censored if they are still in subsidized housing in the last wave that they were in the survey. Similarly to the analysis above, individuals are allowed to have multiple spells in either public housing or other types of subsidized housing. In all analyses of the SIPP data, individuals are at risk of exiting subsidized

³ Stays in subsidized housing become self-reported only with the 1986 wave. Therefore, in order to preserve the prospective nature of the data, I do not use information prior to 1986 for those who report being in subsidized housing in 1986 if I do not have a corresponding administrative record that establishes their first year in subsidized housing prior to 1986.

housing in monthly intervals. In all analyses of the PSID data, individuals are at risk of exiting in yearly intervals⁴.

My estimates of time-to-entry into subsidized housing have some limitations. First, given the timeframe of collection of administrative data on the receipt of subsidized housing and self-reports of subsidized housing in the PSID, I do not have information on people who received vouchers between 1975 and 1986. The administrative data, which overlaps with this period, only codes building-based subsidized housing. Therefore, if a person entered voucher housing between 1975 and 1986 and exited before 1986 when they could self-report on that receipt, I would mark them as not being in subsidized housing and thus would overestimate the time that it takes individuals to enter subsidized housing.

Second, the entry into subsidized housing involves the decision to apply for the subsidy as well as the approval of the application by the local housing authority. Waitlists for subsidized housing are notoriously long and in recent years have been closed for all big local housing agencies. Therefore, even if a household wanted to apply for subsidized housing, in a lot of large metropolitan areas that may not be possible. Moreover, local housing authorities are allowed to pick their tenants, given local priorities for who is the most “needy” applicant. Thus, my analysis of entries into subsidized housing groups together the decision of households to apply for the subsidy, the availability of subsidized housing units and the decision of the local housing authority to admit the applicant. Moreover, I assume that each individual shares equally in the

⁴ Since the PSID has been collecting data on a biennial basis starting with the 1999 wave, I use the dates of previous residential move and next residential move to estimate the time spent in subsidized housing on a yearly basis. For example, if an individual moved into subsidized housing in June 1999 and exited in March 2003, they would be observed as being in subsidized housing only in the 2001 panel of the data. The same applies for an individual who enters subsidized housing in January 2001 and exits in January 2002. The total stay of the first person would be 3 years. For the second person, it would be only a single year.

family income and becomes eligible as long as the total family income is below a certain threshold. In practice, a single mother with a child may be living with her parents in a household that earns enough money income to be above the application threshold. However, if she applied for housing as a single mother, she may be below the threshold. While I do not expect this to be the case for many individuals, the fact that family units may break up upon entry into subsidized housing complicates the decision of who is and who is not at risk of entering subsidized housing. Nevertheless, given lack of longitudinal data on the decision to apply for subsidized housing, more complicated analyses of entry into subsidized housing are not possible at this time.

Despite these limitations, an analysis of who enters subsidized housing is still valuable as the program at any time houses only a quarter of the eligible population. Moreover, it is important to know if the process of entering subsidized housing mirrors that of exiting subsidized housing in terms of the socioeconomic characteristics of who ends up in the program and who leaves the program.

After my life table analysis of entries into and exits from subsidized housing, I implement discrete time hazard models of entries into subsidized housing and exits from subsidized housing, with exits from public housing and exits from other types of subsidized housing being modeled separately. My discrete time hazard models take advantage of the longitudinal nature of the panels by showing how changes in the socioeconomic conditions of respondents and the areas where they live affect the likelihood of transition either into subsidized housing or back into the private housing market. This type of analysis involves the estimation of hazard functions, which give the conditional probabilities of an individual leaving a particular state at time t , given that the individual has been in that state up to time $t-1$ (Allison 1983, 1984). As the SIPP collects monthly information on its recipients, my model takes a discrete time approach in

which the probability of exiting a particular state is computed for discrete month intervals. For the PSID, I use discrete yearly or biennial intervals.

The discrete time hazard rate is estimated as:

$$P_i(t) = \text{Prob}[T_i = t \mid T_i \geq t, X_i(t)], \quad (1)$$

where T_i is a discrete random variable for uncensored spell lengths, and $X_i(t)$ are covariates at time t . The likelihood function is the product of two individual likelihood pieces. Persons with complete spells contribute the probability that the spell was exactly of length t :

$$\text{Prob}[T_i = t \mid X_i(t)] = P_i(t) \prod_{j=1, t-1} [1 - P_i(j)] \quad (2)$$

Persons with right-censored spells, or those who do not exit a particular state before the end of the period during which they are observed, contribute the probability that the spell is of at least length t :

$$\text{Prob}[T_i > t \mid X_i(t)] = \prod_{j=1, t-1} [1 - P_i(j)] \quad (3)$$

(Allison 1982)

Along with my dependent variable, my independent variables are measured monthly for the SIPP and yearly/biennially for the PSID and their values change as household circumstances change. All time-varying covariates are lagged for one observation period with respect to the dependent variable. In all regressions, I include the household type in which individuals live, the race of each respondent, the education of respondent in the SIPP models⁵ or education of the household head in the PSID models, whether there are any extended family members present in the household, and the number of children below 6 years of age in the household. I also control

⁵ Since the SIPP collects monthly information on the educational attainment and labor force participation of everyone who is on the household roster, I choose to enter these variables into my models at the level of the individual as opposed to at the level of the household head. The respective variables in the PSID are collected with greater detail only for the household head and his wife/long-term cohabitor.

for the employment status of the individual in the SIPP models or the employment status of the household head in the PSID models, the disability status of the individual in the SIPP models or the disability status of the household head in the PSID models, the total amount of household wage-based earned income⁶, the total amount of household transfer income, and in the SIPP models the monetary amount of in-kind benefits⁷.

In addition, I use state- and county-level statistics to control for the unemployment rate in the locality where individuals live and metropolitan-level statistics to control for the Fair Market Rent for a two-bedroom apartment in the MSA/PMSA where individuals live. In the regressions describing exits from subsidized housing, in addition to the variables mentioned above, I also include the age at which the individual entered subsidized housing and the year in which the individual entered subsidized housing.

Finally, I examine how the socioeconomic and neighborhood conditions vary for individuals before they enter the program, while they are in subsidized housing and after they leave the program. I also look at individuals who transition from the public housing program to other types of subsidized housing programs. I present the family arrangement of individuals before, during, and after the program, their household labor and transfer incomes and their participation in welfare programs. I also trace whether entering or exiting subsidized housing is associated with a corresponding upgrade in neighborhood conditions.

In sum, I investigate how long individuals take to enter the subsidized housing program, and how long they stay in subsidized housing by subsidy type. I link the length of stay of individuals in subsidized housing to their socio-economic characteristics as well as their social

⁶ All income variables are in constant 2000 dollars.

⁷ In-kind benefits include food stamps, WIC, Medicaid, rental assistance, energy assistance, and free or reduced-price lunches and breakfasts.

environments. Lastly, I investigate whether an exit from subsidized housing is associated with an upgrade in the environments of formerly subsidized individuals.

Data

I implement all analyses described above using data from the 1990, 1991, 1992, 1993, 1996, 2001 and 2004 panels of Survey of Income and Program Participation (SIPP) covering the period between 1990 and 2008, and data from the Panel Study of Income Dynamics, covering the period 1968-2007 (see Table 1 for a comparison between the two datasets). The SIPP is a nationally representative, longitudinal survey of the U.S. civilian non-institutionalized population. It was designed to measure the effectiveness of federal, state, and local programs and to collect measures of economic wellbeing. Each SIPP panel lasts between 3 and 4 years. Interviews are conducted every four months with information available for each of the preceding four months. The PSID is a nationally representative, longitudinal survey of U.S. households, which started in 1968. It was conducted annually through 1997 and biennially thereafter. The PSID contains a rich set of household structure and socioeconomic variables, with an oversample of low-income families.

The SIPP has been asking householders whether they live in public housing or whether they receive any other help from federal, state or local sources in paying their rent in every wave of each panel. The PSID has been asking the same questions in every wave since 1986, providing for the same dichotomy between public housing and other types of subsidized housing. Moreover, out of concern for the quality of information obtained by asking respondents about their receipt of housing subsidies, each PSID family in every year from 1968 through 1995 has

been identified as living in a subsidized unit by matching its address to HUD and local Public Housing Agencies' administrative records (Newman et al. 2009)⁸.

In addition to the SIPP and the PSID, I use the following sets of data to characterize the socioeconomic conditions of respondents at different levels of geographic detail: 1) Bureau of Labor Statistics monthly and yearly county unemployment rates⁹; 2) annual MSA/PMSA Fair Market Rents for a two-bedroom apartment, as calculated by the Department of Housing and Urban Development (HUD)¹⁰; 3) annual Income Limits for submitting an application for a housing subsidy as calculated by HUD¹¹. I also merge into the PSID census tract socioeconomic

⁸ Currently, there is a project to update the matching of addresses from 1996 through 2009. These data are not available at this time. Therefore, after 1996, I rely exclusively on the self-reports of household heads to determine subsidized housing status.

⁹ The BLS provides unemployment rates at the county level starting in 1990. Before 1990, I used the U.S. Census for the years 1960, 1970, 1980 and 1990 to arrive at county unemployment rates. I used a linear interpolation to arrive at the values between census years.

¹⁰ Official annual Fair Market Rents are only available for the period 1983-2012. For the period before 1983, I use the 1960, 1970, and 1980 decennial census public IPUMS files to arrive at metropolitan area Fair Market Rents, following HUD's procedure for calculating the cut-offs (HUD 2012). HUD generally sets the Fair Market Rent for a two-bedroom apartment at 40% of the median rent for recent movers. For metropolitan areas, the rent is set within the boundary of the respective metropolitan region. For non-metropolitan areas, the rent is set at 40% of the median rent for that particular state's non-metropolitan regions. For years between decennial censuses, HUD adjusts the FMR using the Consumer Price Index (CPI) rent and utility indexes. For certain housing markets where rental costs are especially high, in years between decennial censuses, HUD also conducts a random telephone survey of rents and adjusts the FMR accordingly. I was able to compute the FMR from the IPUMS files for metropolitan areas and non-metropolitan areas within states that are identifiable in the public data. For those areas that are not identifiable (such as Rhode Island and Washington, DC), I do not have FMR before 1983. I implemented a linear interpolation to arrive at the values between census years.

¹¹ HUD supplies official estimates of the income limits by family size only for the period 1991-2012. For years before 1991, I estimated the income limits within metropolitan and non-metropolitan areas using a procedure as close as possible to HUD's official estimates. HUD sets the income limit for a four-person household at 80% of the median family income within a metropolitan area or the remainder non-metropolitan area for a state. I used the 1960, 1970, 1980 and 1990 U.S. Census to compute the respective values of median family income for every

characteristics for the neighborhood of residence of all respondents¹². I use the US Census for 1960, 1970, 1980, 1990 and 2000 and the American Community Survey for the 2005-2009 period. I linearly interpolated census tract values for years between the decennial censuses and the 2000 decennial census and the 2005-2009 ACS.

Results

Quality of Self-Reported Subsidized Housing Data

I conduct my analyses of housing assistance with particular attention to the measurement quality of the dependent variable, i.e. the measurement of receipt of subsidized housing. Survey responses to questions about housing assistance have been known to produce inaccurate data as recipients of housing subsidies have had trouble answering the question of whether or not their building is owned by a Public Housing Authority and whether or not the government is helping them pay for rent (Shroder 2002). Given the concern regarding the reliability of self-reports of subsidized housing assistance, I first look at the consistency of residential moves and entries into and exits from subsidized housing. I do that both for the SIPP and the PSID. Second, I compare self-reports of subsidized housing recipients to data coming from official administrative records.

Due to data availability, I do that only for the PSID. Please refer to Appendix A for a full

metropolitan area in the US and for non-metropolitan parts of states. I used a linear interpolation to arrive at values between census years. Then, I multiplied the respective income limits by HUD's official family-size factors to arrive at the income limit by family size by metropolitan/non-metropolitan area.

¹² The SIPP does not provide census tract information on its respondents over time even in its internal confidential files. While the Census Bureau does have address information on all SIPP respondents over the course of each panel, they have not geocoded those addresses for any wave except for the first one in each panel.

discussion of the comparison between self-reports, self-reports edited for residential moves, and administrative data.

For the purposes of my paper, I choose to implement all analyses for the SIPP dataset using the self-reports edited for residential moves. I also choose to implement all analyses for the PSID using the administrative data combined with the self-reports edited for residential moves. In this way, I can use all available years of data and explore what difference it makes to examine the subsidized housing program across different datasets.

Life-Table Analysis

In this section, I present life table estimates of entries into subsidized housing and exits from subsidized housing. First, median time to entry into subsidized stands at 30 years (Table 2), meaning that half of the individuals with incomes low enough to qualify for subsidized housing would enter subsidized housing within 30 years of first becoming eligible to apply for subsidized housing. Moreover, only 10 percent of eligible recipients enter subsidized housing within their first three years of eligibility (Table 2). The hazard of entry into subsidized housing grows for the first 8 years, remains constant for approximately the next 12 years and drops off after that (Figure 1). These estimates reflect the fact that there are many more eligible recipients of the benefit compared to available slots.

Second, median time to exit from public housing is 5 years in the PSID and 3 years in the SIPP (Tables 3 and 4). The respective numbers for other types of subsidized housing are 4 and 3 years (Tables 5 and 6). As discussed in the appendix to this chapter, the PSID estimates are closer to HUD published estimates by subsidy type that use the Department's internal recipient records. The hazards of exiting both public housing and other types of subsidized housing have

somewhat similar shapes with the hazard first quickly rising and gradually falling for the rest of the period at risk (Figures 2 and 3).

Finally, multi-state life table estimates of transitions between public housing, other types of subsidized housing and the private housing market reveal that for the population at risk of using the subsidy over a 41-year period on average 16 person-years are spent in subsidized housing, 13 person-years are spent in other types of subsidized housing and 11 person-years are spent in private-market housing. Graphing all possible transition probabilities between the different types of subsidized housing and the private housing market reveals that the probability of entering subsidized housing from the private market is quite low over the entire period under study (Figure 5). The probability of exiting public housing either to the private market or another type of subsidized housing rises over time (Figure 5). On the other hand, the probability of exiting other types of subsidized housing to either public housing or the private market rises initially but drops subsequently (Figure 5).

Discrete-Time Hazard Analysis: Entries into Subsidized Housing

Next, I discuss my discrete-time models of entries into and exits from subsidized housing that control for the socioeconomic characteristics of recipients and their households. As mentioned in the Methods section, all socio-economic controls are lagged one-period with respect to the dependent variable¹³. Table 7 shows the estimates of five models of entries into subsidized housing using the PSID. I first fit only the baseline hazard and subsequently add to that model the household demographic and social characteristics, the household economic characteristics and the local employment and housing market characteristics. I fit the baseline

¹³ All time-varying covariates are marked with an asterisk in the tables.

hazard using a quartic polynomial for the SIPP and cubic splines with two knots for the PSID¹⁴.

In the subsequent discussion, I present in detail only the results of Model 5, which includes all household demographic and social characteristics and all local characteristics. The standard errors in all models are adjusted for the clustering of observations within individuals.

First, in Model 5 individuals living in married-couple families have lower hazards of entering subsidized housing than those living in other types of households, controlling for the socioeconomic characteristics of the household. Second, whites have the lowest hazard of entering subsidized housing while blacks have the highest hazard of entering subsidized housing. In fact, blacks have three times higher odds of entering subsidized housing compared to whites. Third, the effect of education on the hazard of entering subsidized housing follows a U-shape. Individuals living in households where the household head has either only some high school education or a high school diploma have the highest hazard of entering subsidized housing. Fourth, the presence of extended family members in the household does not seem to have an effect on the hazard of entering subsidized housing, but the number of children under the age of 6 has a positive and statistically significant relationship with entering subsidized housing. Every additional child in the household raises the odds of entering subsidized housing by 22 percent.

Fifth, household earnings and mean-tested benefits do seem to decrease the hazard of entering subsidized housing, but those effects are quite small, compared to the effects of race, household type and education. For every additional \$1000 of household earnings, an individual's

¹⁴ This specification of the time variable does not fit the baseline hazard as well as a specification where all months/years are entered as dummy variables. Nevertheless, it is impractical to specify the baseline hazard with dummy parameters for each month/year. Therefore, I relied on a visual inspection of the shape of the baseline hazard and picked the one that most closely resembles the shape of the dummy specification. In analyses, not presented here, I also experimented with specifying the baseline hazard with a linear parameter, polynomials of different degree, linear splines every 4 months (for the SIPP) and every 5 years (for the PSID), and cubic splines with different numbers of knots.

odds of entering subsidized housing are only 1 percent lower. It should be noted, however, that the population in this regression is selected for its eligibility to enter subsidized housing based on total household money income minus any portion coming from Social Security. Therefore, the small association between earnings and entering subsidized housing shows that among individuals who are already eligible to apply for subsidized housing, earnings do not make a big difference in the actual process of entering subsidized housing.

Sixth, individuals living in households where the head is unemployed are more likely to enter subsidized housing than those living in households where the head is employed. For example, individuals living in households where the head of household is unemployed but looking for work have 45 percent higher odds of entering subsidized housing, while those living in households where the head is not in the labor force have 11 percent higher odds of entering subsidized housing. Disability status does not seem to have a statistically significant effect net of the other controls in the model. However, previous spells in subsidized housing increase the hazard of entering subsidized housing. Individuals with at least one previous spell have 62 percent higher odds of entering subsidized housing compared to individuals with no previous spells in subsidized housing.

Finally, the county unemployment rate and the Fair Market Rent both have positive and statistically significant effects on the hazard of entering subsidized housing. A one percent increase in the county unemployment rate is associated with a two percent increase in the odds of entering subsidized housing, while a \$100 increase in the FMR is associated with a 14 percent increase in the odds of entering subsidized housing.

Discrete-Time Hazard Analysis: Exits from Public Housing

Next, I discuss exits from subsidized housing both within the context of the SIPP and the PSID. I also examine separately exits from public housing and exits from other types of subsidized housing. Again, I discuss only the results of Model 5, which includes all covariates.

Table 8 shows the results of exits from public housing using the SIPP dataset. The PSID estimates are in Table 9. The results across the two tables are quite similar in terms of direction and also in terms of statistical significance. Individuals living in married couple families have a lower hazard of exiting subsidized housing compared to individuals living across other types of family arrangements. Whites have the highest hazard of exiting subsidized housing, while all other minority groups have lower hazards than whites of exiting public housing. For example, blacks in the SIPP have 38 percent lower odds of exiting public housing compared to whites. Those living in families where the household head has at least some high school education have a higher hazard of exiting public housing compared to those with less than 8 years of education¹⁵. Extended family members in the household increase the hazard of exiting public housing, while the number of children under 6 in the household decreases the hazard of exiting public housing.

The age at which the individual first entered subsidized housing does make a difference in the hazard of exiting public housing. Older individuals, and especially those who entered subsidized housing above the age of 65, have significantly lower hazards of exiting public housing. For example, in the SIPP regressions, an individual who entered public housing above the age of 65 has 84 percent lower odds of exiting public housing compared to an individual who entered public housing before the age of 18. Moreover, individuals who entered subsidized

¹⁵ The education coefficients in the SIPP regressions as a group are not statistically significant when the household economic variables are entered into the model (Model 1 vs. Model 5).

housing in more recent decades appear to have a higher hazard of exiting public housing compared to those entering prior to 1980. For example, in the PSID regressions, an individual who entered public housing in the 2000s has 25 percent higher odds of exiting public housing compared to an individual who entered public housing in the 1970s.

Household earnings in the PSID have a positive relationship with the hazard of exiting public housing, while the amount of mean-tested benefits is not statistically significant. In the respective SIPP Model 5, household earnings have a negative but not statistically significant relationship with exits from public housing. However, the amount of means-tested benefits significantly reduces the hazard of exiting public housing. For every additional \$1000 of means-tested benefits, an individual has 24 percent lower odds of exiting public housing. On the other hand, the monetary amount of in-kind benefits appears to significantly reduce the time in public housing. For every additional \$1000 of in-kind benefits, an individual has 42 percent higher odds of exiting public housing.

In the SIPP regression, the employment status of individual does not have a statistically significant relationship with the hazard of exiting public housing. In the respective PSID regression, only those individuals who live in a household where the head is both unemployed and not looking for work have a lower hazard of exiting public housing. In particular, they have 14 percent lower odds of exiting public housing compared to individuals who live in households where the household head is employed. Previous spells in the subsidized housing program also decrease the hazard of exiting the current spell in public housing both in the SIPP and the PSID models.

Finally, in the PSID regression both the local unemployment rate and the Fair Market Rent have a negative and statistically significant relationship with the hazard of exiting public

housing. A one percent increase in the county unemployment rate is associated with a 5 percent decrease in the odds of exiting public housing, while a \$100 increase in the Fair Market Rent is associated with a 3 percent decrease in the odds of exiting public housing. In the SIPP regression, these variables are not statistically significant¹⁶.

Discrete-Time Hazard Analysis: Exits from Other Types of Subsidized Housing

The regressions of exits from other types of subsidized housing generally reveal the same patterns as those of exits from public housing (Tables 10 and 11). One exception is that in the SIPP regression female-headed households do not have a statistically different hazard of exiting other types of subsidized housing compared to married couple families. Moreover, in the PSID regressions, there does not appear to be a trend in the hazard of exit from other types of subsidized housing depending on the year when the individual entered the subsidized unit. Finally, none of the employment variables have a statistically significant relationship with the hazard of exiting other types of subsidized housing once I control for the socio-demographic characteristics of individuals and their households.

Before and After Subsidized Housing

Finally, I present descriptive statistics of the characteristics of individuals in the PSID, their households and the types of neighborhoods where they live the year before entering subsidized housing versus their first year in subsidized housing. I estimate the same statistics for the last year in subsidized housing versus the first year outside of subsidized housing, and for the

¹⁶ Please note that in future work, I will re-estimate the SIPP models using internal Census microdata, where the county and metropolitan area of residence of SIPP respondents is not suppressed.

year before transitioning from public housing to another type of subsidized housing versus the year after transitioning from public housing to another type of subsidized housing. I compare these estimates to the ones observed in the SIPP; however, I am unable to compute any changes in neighborhood-level characteristics as the SIPP does not provide time-varying census tract information even in the internal version of the Census Bureau files.

As discussed above, there is very limited research on what happens to individuals once they leave the program with virtually all of it focusing only on employment outcomes (Shroder 2002, Newman and Harkness 2002). Moreover, most research to date on the geographic mobility of public housing residents shows what happens once individuals switch from public housing to a voucher subsidy (Popkin and Cunningham 2000, Kling et al. 2005, 2007). In comparison, there are few studies that describe how moving out of a subsidized housing affects the life chances of individuals once they no longer receive any rental subsidy (Newman and Harkness 2002; Newman et al. 2009). Therefore, I use the PSID and the SIPP to compute descriptive statistics of the changes in the socioeconomic characteristics of individuals, their households, and their neighborhoods that go along with changes in subsidized housing status.

In the PSID, a transition into public housing from the private housing market involves a corresponding increase in the proportion of individuals living in single-headed households (Table 12)¹⁷. It also involves a decrease in family size and a decrease in whether or not extended family members are present. Household labor income decreases by about \$4,000. Nevertheless, the proportion of individuals living in households where the household head is employed increases by about 5 percentage points. What changes most in terms of the neighborhood conditions of individuals transitioning into public housing is the poverty rate of the census tract

¹⁷ While most of the differences in Tables 11 through 20 are statistically significant, I discuss the ones of the largest magnitudes as those are also the ones that are substantially interesting.

where they live. On average, the year after individuals transition into public housing, residents find themselves in neighborhoods that are 4 percentage points poorer compared to the year before public housing.

On the other hand, a transition from public housing to the private market involves a slight decrease in family size and the number of children under the age of 6 in the household (Table 13). It is also accompanied by an increase of earned income of about \$2,500 and eleven percentage points decrease in the proportion of individuals receiving food stamps. In addition, individuals move to neighborhoods that are less black, less poor and where there are less single-headed households with children.

The transition into other types of subsidized housing involves similar changes in household and neighborhood circumstances as the transition into public housing. The proportion of individuals in single-headed households increases, family size decreases, and household labor income also decreases. Nevertheless, the types of neighborhoods where individuals move to after transitioning into other types of subsidized housing are about the same as their previous neighborhoods. Moreover, the transition from other types of subsidized housing into the private market also does not involve any big changes (Table 15). Household income increases by less than \$1,000, while the neighborhood poverty rate decreases by only two percentage points.

The SIPP analysis of changes in the circumstances of individuals before and after entries into public housing and other types of subsidized housing reveals similar trends as the PSID analysis in that individuals tend to live in neighborhoods with a greater proportion of single-headed households, in smaller households and households with less income (Tables 17 and 19). Exits from public or other types of subsidized housing do not seem to produce big changes in individual circumstances except for increases in monthly income of about \$200. The transition

from public housing into other types of subsidized housing, on the other hand, does not change individual circumstances in a significant way.

Discussion

In this paper, I investigate the pathways that residents take to enter subsidized housing and exit subsidized housing. In addition, I trace whether exits from the program involve upward mobility for the ones who transition into the private housing market. My research speaks directly to concerns of critics of the subsidized housing program of whether or not it creates a dependent class of people with little hope of transitioning out of poverty. It also takes seriously the quality of information on subsidized housing receipt available in national panel surveys by comparing estimates across two datasets and across survey and administrative data.

I find that the median time to entry into subsidized housing is 30 years, reflecting the fact that most individuals who are eligible for the subsidy never receive it. On the other hand, the median time to exit from subsidized housing ranges from 5 years for public housing to 3 or 4 years for other types of subsidized housing. The process of entering subsidized housing in a lot of ways mirrors the process of exiting subsidized housing. African Americans are the ones who are most likely to find themselves in subsidized housing and also the ones most likely to stay in subsidized housing longer. While the amount of earnings and benefits does not have an overwhelming association with either entering or exiting subsidized housing, the local employment and housing conditions do have an effect on the process of entering and exiting subsidized housing, with individuals living in places with higher unemployment rates and higher rents more likely to enter subsidized housing and also less likely to exit subsidized housing.

For the public housing program, the elderly and those out of the labor force are those least likely to exit subsidized housing. Moreover, entrants into the public housing program in the 1990's and 2000's are more likely to exit it compared to those who first entered the program in the 1970's. I do not find a similar trend for participants in other types of subsidized housing programs. While my analysis does not explicitly show why more recent entrants into the housing program are also more likely to exit it, the reorganization of the public housing program starting in the 1990's could be partially responsible. For example, a lot of large local housing agencies destroyed their most distressed public housing units and provided vouchers to some of the displaced residents to find an apartment on the private housing market. Moreover, some local housing agencies stepped up eviction proceeding for households with even minor violations of the lease agreement or for households who have members with arrest records even if those arrests did not result into a conviction. Therefore, some of the exits from public housing in the 1990's and 2000's could be due to the changing policies of local housing authorities either through the vouchering-out of public housing projects or through evictions. In future research, I plan to implement a competing risks model of exits from public housing disaggregating the exit from public housing to an exit to a private market apartment and to an exit to an apartment subsidized through a different type of program. This analysis would allow me to look into any important differences in exits that involve leaving the subsidized housing program altogether and exits that involve a change in subsidies.

Comparing the household and neighborhood circumstances of individuals before and after entering subsidized housing shows that entries into subsidized housing are associated with decreases in household income while entries into public housing are also associated with living in poorer neighborhoods. On the other hand, exits from subsidized housing are associated with

increases in household income and some decrease in the poverty rate of the neighborhoods where individuals live. Moreover, there is some indication that transitioning from public housing to other types of subsidized housing is also associated with a decrease in the poverty rate of the neighborhoods where individuals live. Nevertheless, entries into other types of subsidized housing are not associated with changes in the types of places where individuals live, showing that the newer scattered site housing built by private developers and the voucher program do not help individuals move to better places at least in their first year in these programs. My findings confirm previous research showing that the residents of public housing programs do live in some of the most distressed neighborhoods and any exit from that program does improve the neighborhood conditions of residents. They also show that other types of subsidized housing programs do not have the intended effect of providing residents with better neighborhood environments.

Appendix A. *Quality of Self-Reported Subsidized Housing Data*

I conduct my analyses of housing assistance with particular attention to the measurement quality of the dependent variable, i.e. the measurement of receipt of subsidized housing. Survey responses to questions about housing assistance have been known to produce inaccurate data as recipients of housing subsidies have had trouble answering the question of whether or not their building is owned by a Public Housing Authority (Shroder 2002). For example, in the 1993 American Housing Survey 2.2 million respondents answered that they lived in public housing, which is double the number found in administrative records (Shroder 2002). Some of this problem undoubtedly arises out of the fact that many individuals in public housing are not on the official lease (Venkatesh 2002). Another part of the problem is that respondents do not distinguish between public housing, privately built subsidized housing and voucher subsidies. For example, a match between AHS addresses and HUD administrative records shows that 91% of households in public housing answered correctly the question of whether or not they lived in public housing. Only 37% of voucher recipients and 30% of tenants in private building-based housing identified their subsidy in the correct category (Casey 1992). 33% of voucher users and 42% of tenants in private building-based housing answered that they lived in public housing (Casey 1992). Moreover, while only 3% of public housing recipients answered that they did not receive any housing subsidy, 17% of voucher users and 13% of tenants in building-based private housing said that they do not receive a housing subsidy (Casey 1992). On the other hand, a full 20% of unsubsidized households said that they live in a subsidized unit (Casey 1992). However, this estimate could be much lower, as a later study revealed that only 50% of false positives are indeed false positives because of omissions in the official HUD administrative records (Gordon et al. 2005).

Given the concern regarding the reliability of self-reports of subsidized housing assistance, I first look at the consistency of physical address changes and entries into and exits from subsidized housing. I do that both for the SIPP and the PSID. Second, I compare self-reports of subsidized housing recipients to data coming from official administrative records. Due to data availability, I do that only for the PSID.

Data on physical address moves should in principle be more reliable than data on subsidized housing receipt. In the SIPP, all data on physical moves are not self-reported but are recorded by the interviewer who is required to track down the respondents to their new locations and to start a new control card for the new household unit¹⁸. Both the SIPP and the PSID have extensive internal procedures in place to ensure that movers are not lost to follow-up and make available multiple variables indicating who moves given the household rosters of the previous and current waves. Therefore, matching subsidized housing self-reports to move histories is a good way of checking the consistency of self-reports to an event that should be recorded with great accuracy and should be highly consistent with entries into and exits from subsidized housing.

Entries into subsidized housing and exits from subsidized housing should in principle result in a change of address. When a household moves into a building-based subsidized housing unit that move should always be accompanied by a change in address. There are no government programs that convert market-rate units to building-based subsidized units without having the current occupants change addresses. Exits from some types of building-based programs, such as properties built by Low Income Housing Tax Credits, could theoretically result in losing the subsidy without physically moving. For example, Low Income Housing Tax Credit properties

¹⁸ Control cards are the portion of the survey forms that record basic information that is re-used each wave.

receive construction subsidies in return for keeping rents low for a period usually of up to 20 years. After that period, the owner of the property could opt out of the program with the end result usually being a conversion of the property into condos and the sale of all units. While in principle, subsidized tenants could purchase their units, in practice, this is a very rare occasion. Therefore, exits from building-based programs should in an overwhelming majority of cases also result in physical moves. For person-based subsidized housing programs, such as vouchers and certificates, entries into and exits from the program could happen at the same physical address with greater frequency. Nevertheless, the intent of the program is to allow residents to move to areas that would otherwise be too expensive. Therefore, I expect voucher users to actually move once they receive the subsidy but possibly stay in place once they no longer receive it.

As mentioned above, for a majority of the data that I have from the SIPP and the PSID, I know if an individual is in public housing versus other types of housing, which could be both building-based and person-based. Therefore, due to the aggregation of building-based and person-based subsidies in the second category, it is hard to speculate whether the lack of a physical move in either survey is consistent with an entry into or exit from subsidized housing.

Both the SIPP and the PSID present multiple instances of individuals moving into and out of subsidized housing without switching addresses (Table A1). For example, in the SIPP 61% of public housing spells start without a corresponding change in address and 44% of public housing spells end without a corresponding change in address. For other types of subsidized housing in the SIPP, 55% of spells start without a corresponding move and 37% of exits occur without a corresponding move.¹⁹ A majority of the spells that start or end without a corresponding change

¹⁹ The 1996 SIPP panel is a special exception to this case where almost no one moves into public housing without switching addresses and no one moves out of public housing without switching

in address last for only 4 months, or the length of a single wave²⁰. A spell that lasts only four months is highly improbable given official administrative HUD estimates of length of stay in subsidized housing. This pattern might indicate either a wrong report on the part of the respondent. It could also be due to a keying error on part of the survey taker (Sussin 1999). Since only 5% of households in the SIPP are subsidized, even small coding errors could produce sufficient inflation in the number of one-wave spells that could in turn lead to an underestimate of the length of time that individuals use the subsidy (Sussin 1999).

In the PSID, the consistency of residential moves and subsidized housing receipt is much better with only 2% of public housing spells starting without a corresponding change in address and only 1% of public housing spells ending without a corresponding change in address (Table A1). For other types of subsidized housing, these numbers are 1% and 6% respectively (Table A1). Nevertheless, a comparison between the self-reports of PSID respondents and administrative data shows that there are inconsistencies between the two (Table A2). Out of the person-years lived in subsidized housing between 1986 and 1995, the years in which I have both self-reported and administrative data, 58% are present both in the self-reports and the administrative data. Only 1% of person-years are in public housing in the administrative data but not in the self-reports; 21% of person years occur in the self-reports but not in the administrative data. Only 6% of person years in other types of housing are in the administrative data but not in self-reports. 14% of person years in other types of housing are in the self-reports but not in the

addresses. I am not aware of a specific reason why the 1996 SIPP panel data appears to be consistent with residential moves.

²⁰ 64% of the spells in public housing and 49% of the spells in other types of housing that start without a corresponding residential move last for only a single wave. 73% of the spells in public housing and 57% of the spells in other types of housing that end without a corresponding move last for only a single wave.

administrative data. However, it should be mentioned that the administrative data do not contain information on the location of voucher recipients. Therefore, there is a high chance that some individuals answered the subsidized housing questions correctly but are not in the administrative data. There is also some chance that individuals answered that they were in public housing when they were actually using a voucher, therefore, still being subsidized but misclassified in the dichotomy between public housing and other types of housing. Therefore, a lack of consistency between the administrative data and self-reports is not necessarily an indication of an individual reporting erroneous data. These discrepancies could arise out of individuals reporting voucher use correctly in the “other” category or incorrectly in the “public housing” category.

In order to assess how much difference it makes to use self-reports versus administrative data, I implement a life-table analysis of stays in subsidized housing using only self-reports and only administrative data. I also recode all subsidized housing spells to start at the last residential move of the individual and to end at the next residential move of the individual. Then, I compare how different my life table estimates are once all subsidized housing moves are consistent with residential moves. For the SIPP, the recode of subsidized housing histories resulted in 20% of the person-months being recoded from non-subsidized to the public housing category and 15% of the person-months being recoded from non-subsidized to the other types of housing category (Table A3). For the PSID, the corresponding numbers were much lower at 0.5% and 2%, respectively (Table A3). In addition, I recoded respondents who switch between subsidies without switching addresses to have consistent subsidized spells under a single program. This involves moving respondents from one type of subsidy to another but not recoding non-subsidized periods to subsidized ones. While in principle it is possible for respondents to live in

private building-based subsidized housing and simultaneously use a voucher²¹, it is not possible for individuals to switch between public housing and other type of subsidized housing without switching addresses. Therefore, switching between subsidies, while possible, should also always occur with a corresponding address change. In the SIPP, this involved recoding 15% of the person-months. In the PSID, this involved recoding 4% of the person-months.

The administrative data in the PSID produces spells of the longest duration (Table A4). Median time in public housing according to the administrative data is 5 years. The corresponding number for other types of subsidized housing is 3 years. These estimates are consistent with HUD's published data on stays in subsidized housing (Cortes et al. 2008; Freeman 2005). On the other hand, the median time in subsidized housing according to PSID self-reports is only 2 years. In the SIPP, the median time is down to only 12 months. When I edit the self-reports for residential moves, the median time increases to 4 years in the PSID and to about 3 years in the SIPP. While I cannot verify the SIPP data with official administrative data, nor do I have data on administrative voucher use in the PSID, editing the self-reports in the surveys to correspond to residential moves brings my estimates of the median stay in subsidized housing much more in line with the ones computed off of the administrative data. Graphs 1A through 4A illustrate what happens to the survival curve of individuals in subsidized housing once I recode their spells to start and end at a residential move. For the SIPP, Graphs A1a and A1b show the preponderance of exits from subsidized housing only after 4 months. On the other hand, Graph A2a and A2b show that this tendency to exit after 4 months disappears once I edit for residential moves. While this type of pattern is not as obvious in the PSID, editing for residential moves has a similar effect in that individuals exit much less frequently after just a single year in subsidized housing

²¹ This type of doubling-up of subsidies occurs very frequently for properties that were built using Low Income Housing Tax Credits.

(Graphs A3a and A3b and Graphs A4a and A4b). Therefore, for the purposes of my paper, I choose to run all analyses for the SIPP dataset using the edited self-reports. I also choose to run all analyses for the PSID using the administrative data combined with the self-reports edited for residential moves. In this way, I can implement my substantive analyses on all available years of data and explore the subsidized housing program across different datasets.

Table 1. SIPP and PSID data comparison

	SIPP	PSID
Period coverage	1990-2008	1968-2007
Panels	1990, 1991, 1992, 1993, 1996, 2001, and 2004	no panels
Panel length	3 to 4 years	
Frequency of interviews	every 4 months	annually through 1997 and biennially thereafter
Frequency of data observations	monthly	yearly/biennially
Representativeness	civilian non-institutional population	U.S. individuals and the families in which they reside
Follow-up rule	all individuals who reside at a sampled address at the time of the first interview; sample persons who move are interviewed at their new address and any other persons who live with them are interviewed as long as they remain living with sample persons	all original-sample members; children born to original-sample members; ex-spouses and other adult sample members who move out of a PSID sample family unit
Data coverage	economic conditions of persons, families, and households in the U.S.; participation in government transfer programs; labor force status; assets and liabilities	demographic, socioeconomic, and health data on U.S. households, oversample of low-income families
Geographic detail	state and metropolitan area identifiers	state, metropolitan area, county and census tract identifiers
Subsidized housing questions	Asked in every wave	Asked in every wave since 1986; administrative data on receipt of building-based subsidized housing for 1968-1995

Table 2. Life table of entries into subsidized housing, administrative data and self-reports edited for residential moves (PSID)

Interval (years)		Beg. Total	Entries	Censored	Survival	Hazard
1	2	51,776	2,695	21,955	0.934	0.068
2	3	27,126	640	6,478	0.909	0.027
3	4	20,008	609	5,556	0.877	0.036
4	5	13,843	310	2,256	0.855	0.025
5	6	11,277	233	2,702	0.835	0.024
6	7	8,342	165	1,137	0.818	0.022
7	8	7,040	156	1,478	0.797	0.025
8	9	5,406	120	579	0.779	0.024
9	10	4,707	79	880	0.764	0.019
10	15	3,748	306	1,903	0.681	0.023
15	20	1,539	135	786	0.600	0.025
20	25	618	48	330	0.537	0.022
25	.	240	21	219	0.450	.

Table 3. Life table of exits from public housing, self-reports edited for residential moves (SIPP)

Interval (months)		Beg. Total	Exits	Censored	Survival	Hazard
0	5	7,317	348	990	0.949	0.011
5	10	5,979	595	879	0.847	0.023
10	15	4,505	460	787	0.752	0.024
15	20	3,258	280	695	0.680	0.020
20	25	2,283	150	802	0.626	0.017
25	30	1,331	92	473	0.573	0.018
30	35	766	54	365	0.520	0.019
35	40	347	23	194	0.472	0.019
40	45	130	8	76	0.431	0.018
45	.	46	0	46	0.431	.

Table 4. Life table of exits from public housing, administrative data and self-reports edited for residential moves (PSID)

Interval (years)		Beg. Total	Exits	Censored	Survival	Hazard
1	2	7,917	963	1,459	0.866	0.144
2	3	5,495	840	165	0.732	0.168
3	4	4,490	705	232	0.614	0.175
4	5	3,553	649	191	0.499	0.207
5	6	2,713	435	162	0.416	0.180
6	7	2,116	322	105	0.351	0.169
7	8	1,689	221	106	0.304	0.145
8	9	1,362	159	58	0.268	0.127
9	10	1,145	136	55	0.235	0.130
10	15	954	426	230	0.116	0.136
15	20	298	122	91	0.060	0.127
20	25	85	24	36	0.038	0.087
25	.	25	10	15	0.016	.

Table 5. Life table of exits from other types of housing, self-reports edited for residential moves (SIPP)

Interval (months)		Beg. Total	Exits	Censored	Survival	Hazard
0	5	3,672	212	446	0.939	0.013
5	10	3,014	331	496	0.826	0.026
10	15	2,187	194	512	0.743	0.021
15	20	1,481	157	313	0.655	0.025
20	25	1,011	84	329	0.590	0.021
25	30	598	50	223	0.530	0.022
30	35	325	20	151	0.487	0.017
35	40	154	7	79	0.457	0.013
40	45	68	2	52	0.436	0.010
45	.	14	0	14	0.436	.

Table 6. Life table of exits from other types of subsidized housing, administrative data and self-reports edited for residential moves (PSID)

Interval (years)		Beg. Total	Exits	Censored	Survival	Hazard
1	2	5,350	913	1,118	0.809	0.211
2	3	3,319	637	211	0.649	0.220
3	4	2,471	489	142	0.517	0.227
4	5	1,840	396	137	0.401	0.252
5	6	1,307	196	96	0.339	0.169
6	7	1,015	144	86	0.289	0.160
7	8	785	122	49	0.242	0.174
8	9	614	100	44	0.201	0.185
9	10	470	67	39	0.171	0.161
10	15	364	160	85	0.086	0.133
15	20	119	46	39	0.046	0.120
20	25	34	2	24	0.042	0.019
25	.	8	1	7	0.033	.

Table 7. Discrete time logit estimates of entries into subsidized housing, PSID (Spells clustered within 25,258 individuals)

	Model 1	Model 2	Model 3	Model 4	Model 5
<u>Type of household (Married couple family omitted)*</u>					
Family - male head		0.40 (0.10)			0.21 (0.10)
Family - female head		0.64 (0.04)			0.41 (0.04)
Nonfamily - male head		0.70 (0.07)			0.45 (0.08)
Nonfamily - female head		0.67 (0.07)			0.40 (0.08)
<u>Race of head of household (White omitted)</u>					
Black		1.19 (0.04)			1.14 (0.04)
Other		0.70 (0.05)			0.48 (0.06)
<u>Education (8 years or less omitted)*</u>					
9-12 years, no diploma		0.48 (0.05)			0.45 (0.05)
High School Diploma		0.28 (0.05)			0.27 (0.06)
Some College		0.10 (0.06)			0.11 (0.06)
College Degree and Above		-0.17 (0.08)			-0.11 (0.08)
Education, missing		0.28 (0.11)			0.29 (0.11)
Extended family members present*		-0.02 (0.04)			-0.02 (0.04)
Number of children under 6*		0.20 (0.01)			0.20 (0.01)
Earnings/1000*			-0.02 (0.001)		-0.01 (0.001)
Means-Tested Benefits/1000*			-0.02 (0.003)		-0.02 (0.003)
<u>Employment (employed omitted)*</u>					
Unemployed looking for work			0.59 (0.05)		0.37 (0.05)
Unemployed, not looking for work			0.07 (0.05)		0.10 (0.05)
Unemployment status missing			0.64 (0.17)		0.39 (0.18)
Disability preventing work*			-0.22 (0.05)		-0.02 (0.05)
Disability (not in universe)*			-0.98 (0.24)		-0.87 (0.24)
Previous spells*		0.60 (0.07)			0.48 (0.07)
County unemployment rate*				0.06 (0.01)	0.02 (0.01)
Fair Market Rent/100*				0.12 (0.01)	0.13 (0.01)
Cubic Spline 1	-0.47 (0.02)	-0.57 (0.02)	-0.59 (0.02)	-0.47 (0.02)	-0.62 (0.02)
Cubic Spline 2	3.11 (0.20)	3.72 (0.19)	4.01 (0.19)	3.08 (0.20)	4.09 (0.19)
Cubic Spline 3	-5.14 (0.35)	-6.09 (0.34)	-6.63 (0.35)	-5.08 (0.35)	-6.70 (0.35)
Intercept	-1.80 (0.04)	-2.91 (0.06)	-1.01 (0.06)	-2.89 (0.07)	-3.23 (0.09)
Log-likelihood	-18928.59	-17618.63	-18554.82	-18753.09	-17409.35
N	140,364	140,364	140,364	140,364	140,364

Table 8. Discrete time logit estimates of exits from public housing, SIPP (Spells clustered within 7,137 individuals)

	Model 1	Model 2	Model 3	Model 4	Model 5
<u>Type of household (Married couple family omitted)*</u>					
Family - male head		0.06 (0.13)			0.05 (0.13)
Family - female head		0.19 (0.06)			0.15 (0.06)
Nonfamily - male		0.23 (0.11)			0.23 (0.11)
Nonfamily - female		0.27 (0.11)			0.26 (0.11)
Group Quarters		-0.32 (0.42)			-0.33 (0.41)
<u>Race (White omitted)</u>					
Black		-0.48 (0.06)			-0.48 (0.06)
Hispanic		-0.14 (0.08)			-0.10 (0.08)
Other		-0.46 (0.09)			-0.43 (0.09)
<u>Education (8 years or less omitted)*</u>					
9-12 years, no diploma		0.33 (0.09)			0.20 (0.14)
High School Diploma		0.26 (0.10)			0.12 (0.14)
Some College		0.21 (0.11)			0.07 (0.15)
College Degree and Above		0.20 (0.16)			0.08 (0.19)
<u>Age first entered subsidized housing (<18 omitted)</u>					
19-25		0.06 (0.10)			0.01 (0.10)
26-40		-0.20 (0.10)			-0.23 (0.10)
41-65		-0.65 (0.11)			-0.63 (0.12)
65+		-1.85 (0.22)			-1.86 (0.23)
Extended family members present*		0.24 (0.05)			0.26 (0.05)
Number of children under 6*		-0.06 (0.02)			-0.09 (0.03)
Earnings/1000*			-0.01 (0.01)		-0.03 (0.02)
Means-Tested Benefits/1000*			-0.29 (0.08)		-0.28 (0.08)
In-kind benefits/1000*			0.35 (0.11)		0.35 (0.12)
<u>Employment (employed omitted)*</u>					
Employed for part of month and laid off			0.002 (0.22)		-0.06 (0.22)
Unemployed looking for work			0.07 (0.12)		0.02 (0.12)
Unemployed, not looking for work			-0.27 (0.08)		-0.11 (0.08)
Unemployment (not in universe, age<16)			-0.15 (0.07)		-0.19 (0.12)
Disability preventing work*			-0.19 (0.09)		-0.18 (0.10)
Disability (not in universe, age<16, age>6)			-0.23 (0.08)		-0.07 (0.08)
Previous spells*		-0.18 (0.09)			-0.19 (0.09)
State unemployment rate*				0.03 (0.02)	0.02 (0.02)
Metropolitan Fair Market Rent/100*				-0.11 (0.04)	-0.09 (0.05)
Geography suppressed*				-0.49 (0.26)	-0.39 (0.27)
Month	0.42 (0.04)	0.43 (0.04)	0.42 (0.04)	0.42 (0.04)	0.43 (0.04)
Month^2	-0.04 (0.004)	-0.04 (0.004)	-0.04 (0.004)	-0.04 (0.004)	-0.04 (0.004)
Month^3	0.001 (.0002)	0.001 (.0002)	0.001 (.0002)	0.001 (.0002)	0.001 (.0002)
Month^4	-0.00001 (.000002)	-0.00001 (.000002)	-0.00001 (.000002)	-0.00001 (.000002)	-0.00001 (.000002)
Intercept	-5.25 (0.11)	-5.20 (0.13)	-5.04 (0.13)	-4.93 (0.29)	-4.61 (0.34)
Log-likelihood	-9890.56	-9738.82	-9854.39	-9884.78	-9718.90
N	106,913	106,913	106,913	106,913	106,913

Table 9. Discrete time logit estimates of exits from public housing, PSID (Spells clustered within 6,404 individuals)

	Model 1	Model 2	Model 3	Model 4	Model 5
<u>Type of household (Married couple family omitted)*</u>					
Family - male head		-0.19 (0.09)			-0.11 (0.10)
Family - female head		0.16 (0.03)			0.29 (0.04)
Nonfamily - male head		0.02 (0.07)			0.10 (0.07)
Nonfamily - female head		0.11 (0.07)			0.24 (0.08)
<u>Race of head of household (White omitted)</u>					
Black		-0.35 (0.04)			-0.34 (0.04)
Other		-0.43 (0.05)			-0.35 (0.06)
<u>Education (8 years or less omitted)*</u>					
9-12 years, no diploma		0.14 (0.05)			0.07 (0.05)
High School Diploma		0.20 (0.05)			0.10 (0.05)
Some College		0.30 (0.06)			0.17 (0.06)
College Degree and Above		0.29 (0.09)			0.14 (0.09)
Education, missing		0.37 (0.10)			0.27 (0.10)
<u>Age first entered subsidized housing (<18 omitted)</u>					
19-25		0.01 (0.04)			-0.01 (0.04)
26-40		-0.27 (0.04)			-0.27 (0.04)
41-65		-0.51 (0.07)			-0.47 (0.07)
65+		-0.87 (0.12)			-0.73 (0.12)
<u>Year first entered subsidized housing (1969-1980 omitted)</u>					
1981-1990		0.05 (0.03)			0.07 (0.03)
1990-2000		0.20 (0.04)			0.19 (0.04)
2001-2007		0.29 (0.07)			0.22 (0.07)
Extended family members present*		0.13 (0.04)			0.15 (0.04)
Number of children under 6*		-0.14 (0.02)			-0.13 (0.02)
Earnings/1000*			0.004 (0.001)		0.01 (0.001)
Means-Tested Benefits/1000*			-0.0001 (0.003)		0.0003 (0.003)
<u>Employment (employed omitted)*</u>					
Unemployed looking for work			0.003 (0.05)		0.07 (0.05)
Unemployed, not looking for work			-0.23 (0.05)		-0.14 (0.05)
Unemployment status missing			0.40 (0.15)		0.51 (0.15)
Disability preventing work*			-0.01 (0.05)		0.02 (0.05)
Disability (not in universe)*			-0.68 (0.19)		-0.54 (0.18)
Previous spells*		-0.05 (0.03)			-0.06 (0.03)
County unemployment rate*				-0.06 (0.01)	-0.05 (0.01)
Fair Market Rent/100*				-0.03 (0.01)	-0.03 (0.01)
Geography missing*				-1.55 (0.47)	-1.11 (0.47)
Cubic Spline 1	-0.24 (0.01)	-0.24 (0.01)	-0.24 (0.01)	-0.25 (0.01)	-0.25 (0.01)
Cubic Spline 2	0.04 (0.09)	0.03 (0.09)	0.01 (0.09)	0.06 (0.09)	0.04 (0.09)
Cubic Spline 3	0.19 (0.19)	0.21 (0.20)	0.24 (0.19)	0.16 (0.19)	0.20 (0.19)
Intercept	-0.03 (0.04)	0.14 (0.08)	-0.04 (0.05)	0.53 (0.08)	0.59 (0.11)
Log-likelihood	-10992.86	-10856.47	-10945.18	-10953.50	-10791.63
N	26,833	26,833	26,833	26,833	26,833

Table 10. Discrete time logit estimates of exits from other types of subsidized housing, SIPP (Spells clustered within 3,556 individuals)

	Model 1	Model 2	Model 3	Model 4	Model 5
<u>Type of household (Married couple omitted)*</u>					
Family - male head		0.51 (0.16)			0.69 (0.16)
Family - female head		-0.08 (0.08)			0.10 (0.09)
Nonfamily - male		0.25 (0.18)			0.35 (0.18)
Nonfamily - female		0.22 (0.19)			0.35 (0.20)
Group Quarters		0.94 (0.29)			1.13 (0.29)
<u>Race (White omitted)</u>					
Black		-0.28 (0.08)			-0.28 (0.08)
Hispanic		-0.40 (0.11)			-0.35 (0.11)
Other		-0.40 (0.15)			-0.34 (0.15)
<u>Education (8 years or less omitted)*</u>					
9-12 years, no diploma		0.30 (0.12)			0.23 (0.20)
High School Diploma		0.25 (0.14)			0.14 (0.20)
Some College		0.11 (0.15)			-0.03 (0.20)
College Degree and Above		0.43 (0.23)			0.15 (0.27)
<u>Age first entered subsidized housing (<18 omitted)</u>					
19-25		-0.06 (0.14)			-0.07 (0.16)
26-40		-0.28 (0.14)			-0.27 (0.16)
41-65		-0.79 (0.18)			-0.81 (0.20)
65+		-1.47 (0.31)			-1.44 (0.34)
Extended family members present*		0.60 (0.08)			0.58 (0.08)
Number of children under 6*		0.05 (0.03)			0.10 (0.03)
Earnings/1000*			0.11 (0.02)		0.09 (0.02)
Means-Tested Benefits/1000*			-0.12 (0.10)		-0.23 (0.10)
In-kind benefits/1000*			0.12 (0.19)		-0.43 (0.23)
<u>Employment (employed omitted)*</u>					
Employed for part of month and laid off			0.66 (0.26)		0.57 (0.26)
Unemployed looking for work			0.01 (0.18)		-0.10 (0.18)
Unemployed, not looking for work			-0.05 (0.11)		0.06 (0.12)
Unemployment (not in universe, age<16)			0.13 (0.10)		0.01 (0.24)
Disability preventing work*			0.04 (0.14)		0.08 (0.15)
Disability (not in universe, age>69)*			-0.14 (0.08)		-0.10 (0.10)
Previous spells*		-0.26 (0.13)			-0.25 (0.13)
State unemployment rate*				0.01 (0.02)	0.01 (0.02)
Metropolitan Fair Market Rent/100*				-0.03 (0.04)	-0.04 (0.04)
Geography suppressed*				-0.03 (0.25)	-0.14 (0.27)
Month	0.22 (0.05)	0.23 (0.05)	0.23 (0.05)	0.22 (0.05)	0.24 (0.05)
Month^2	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)
Month^3	0.001 (0.0002)	0.001 (0.0002)	0.001 (0.0002)	0.001 (0.0002)	0.001 (0.0002)
Month^4	-0.00001 (0.000003)	-0.00001 (0.000003)	-0.00001 (0.000003)	-0.00001 (0.000003)	-0.00001 (0.000003)
Intercept	-4.53 (0.14)	-4.60 (0.16)	-4.69 (0.17)	-4.52 (0.31)	-4.62 (0.40)
Log-likelihood	-5100.45	-4995.43	-5076.59	-5097.85	-4972.36
N	50,379	50,379	50,379	50,379	50,379

Table 11. Discrete time logit estimates of exits from other types of subsidized housing, PSID (Spells clustered within 4,439 individuals)

	Model 1	Model 2	Model 3	Model 4	Model 5
<u>Type of household (Married couple family omitted)*</u>					
Family - male head		-0.19 (0.12)			-0.07 (0.13)
Family - female head		-0.02 (0.04)			0.11 (0.05)
Nonfamily - male head		0.11 (0.09)			0.26 (0.10)
Nonfamily - female head		0.02 (0.09)			0.18 (0.09)
<u>Race of head of household (White omitted)</u>					
Black		-0.19 (0.05)			-0.16 (0.05)
Other		-0.52 (0.06)			-0.38 (0.07)
<u>Education (8 years or less omitted)*</u>					
9-12 years, no diploma		0.16 (0.07)			0.16 (0.07)
High School Diploma		0.08 (0.07)			0.04 (0.07)
Some College		0.22 (0.07)			0.16 (0.07)
College Degree and Above		0.35 (0.10)			0.24 (0.10)
Education, missing		0.36 (0.15)			0.32 (0.14)
<u>Age first entered subsidized housing (<18 omitted)</u>					
19-25		-0.03 (0.05)			-0.05 (0.05)
26-40		-0.16 (0.05)			-0.17 (0.05)
41-65		-0.71 (0.10)			-0.66 (0.10)
65+		-1.07 (0.13)			-1.02 (0.14)
<u>Year first entered subsidized housing (1969-1980 omitted)</u>					
1981-1990		-0.13 (0.04)			-0.04 (0.04)
1990-2000		-0.03 (0.05)			0.05 (0.05)
2001-2007		-0.23 (0.11)			-0.20 (0.11)
Extended family members present*		-0.08 (0.05)			-0.07 (0.05)
Number of children under 6*		0.04 (0.02)			0.04 (0.02)
Earnings/1000*			0.005 (0.001)		0.01 (0.001)
Means-Tested Benefits/1000*			0.003 (0.003)		0.004 (0.004)
<u>Employment (employed omitted)*</u>					
Unemployed looking for work			-0.10 (0.06)		-0.09 (0.07)
Unemployed, not looking for work			-0.17 (0.06)		-0.01 (0.06)
Unemployment status missing			-0.24 (0.20)		-0.23 (0.20)
Disability preventing work*			-0.21 (0.06)		-0.12 (0.06)
Disability (not in universe)*			-0.01 (0.24)		-0.19 (0.24)
Previous spells*		-0.06 (0.05)			-0.05 (0.05)
County unemployment rate*				-0.05 (0.01)	-0.04 (0.01)
Fair Market Rent/100*				-0.07 (0.01)	-0.06 (0.01)
Geography missing*				-0.18 (0.52)	-0.21 (0.53)
Cubic Spline 1	-0.31 (0.02)	-0.33 (0.02)	-0.30 (0.02)	-0.31 (0.02)	-0.33 (0.02)
Cubic Spline 2	0.29 (0.19)	0.50 (0.19)	0.26 (0.19)	0.29 (0.19)	0.46 (0.19)
Cubic Spline 3	-0.29 (0.37)	-0.69 (0.38)	-0.22 (0.38)	-0.29 (0.38)	-0.60 (0.38)
Intercept	0.10 (0.06)	0.42 (0.10)	0.11 (0.07)	0.83 (0.10)	0.77 (0.13)
Log-likelihood	-6731.10	-6623.52	-6967.72	-6698.70	-6595.72
N	15,633	15,633	15,633	15,633	15,633

Table 12. Characteristics of individuals before and after entering public housing, PSID
(N=4,966)

	before	after	p-value of difference
Proportion in single-headed households	0.54	0.62	0.000
Family size	3.91	3.48	0.000
Number of children, age<6	1.00	0.96	0.000
Extended family members present	0.27	0.21	0.000
Household labor income	17,330	13,864	0.000
Household transfer income	3,867	3,615	0.041
Proportion receiving foodstamps	0.36	0.38	0.001
Proportion receiving AFDC/TANF	0.05	0.07	0.000
Proportion employed (household head)	0.37	0.42	0.000
Neighborhood: percent black	46	46	0.529
Neighborhood: poverty rate	23	27	0.000
Neighborhood: unemployment rate	10	11	0.000
Neighborhood: percent on welfare	12	14	0.000
Neighborhood: percent single-headed households	32	34	0.000
Neighborhood: percent children	28	30	0.000

Table 13. Characteristics of individuals before and after exiting public housing, PSID

	before	after	p-value of difference
Proportion in single-headed households	0.56	0.54	0.000
Family size	3.88	3.56	0.000
Number of children, age<6	0.84	0.79	0.000
Extended family members present	0.22	0.20	0.000
Household labor income	17,195	19,690	0.000
Household transfer income	3,686	3,497	0.210
Proportion receiving foodstamps	0.38	0.27	0.000
Proportion receiving AFDC/TANF	0.07	0.06	0.000
Proportion employed (household head)	0.35	0.31	0.000
Neighborhood: percent black	47	43	0.949
Neighborhood: poverty rate	27	22	0.000
Neighborhood: unemployment rate	11	10	0.000
Neighborhood: percent on welfare	14	10	0.000
Neighborhood: percent single-headed households	34	29	0.000
Neighborhood: percent children	30	28	0.000

Table 14. Characteristics of individuals before and after entering other types of subsidized housing, PSID (N=3,396)

	before	after	p-value of difference
Proportion in single-headed households	0.54	0.62	0.000
Family size	3.75	3.39	0.000
Number of children, age<6	0.94	0.91	0.003
Extended family members present	0.24	0.17	0.000
Household labor income	18,286	14,475	0.000
Household transfer income	3,847	3,640	0.150
Proportion receiving foodstamps	0.36	0.40	0.143
Proportion receiving AFDC/TANF	0.07	0.07	0.623
Proportion employed (household head)	0.37	0.41	0.000
Neighborhood: percent black	41	39	0.000
Neighborhood: poverty rate	21	22	0.002
Neighborhood: unemployment rate	9	10	0.000
Neighborhood: percent on welfare	12	12	0.873
Neighborhood: percent single-headed households	31	31	0.012
Neighborhood: percent children	28	28	0.161

Table 15. Characteristics of individuals before and after exiting other types of subsidized housing, PSID (N=3,582)

	before	after	p-value of difference
Proportion in single-headed households	0.53	0.53	0.737
Family size	3.79	3.59	0.000
Number of children, age<6	0.94	0.88	0.000
Extended family members present	0.17	0.18	0.346
Household labor income	18,931	19,728	0.001
Household transfer income	3,412	3,239	0.027
Proportion receiving foodstamps	0.37	0.30	0.000
Proportion receiving AFDC/TANF	0.06	0.06	1.000
Proportion employed (household head)	0.34	0.35	0.203
Neighborhood: percent black	39	36	0.000
Neighborhood: poverty rate	22	20	0.000
Neighborhood: unemployment rate	10	9	0.000
Neighborhood: percent on welfare	12	10	0.000
Neighborhood: percent single-headed households	31	28	0.000
Neighborhood: percent children	29	28	0.000

Table 16. Characteristics of individuals before and after moving from public to other housing,
PSID (N=1,151)

	before	after	p-value of difference
Proportion in single-headed households	0.78	0.79	0.550
Family size	3.68	3.44	0.000
Number of children, age<6	0.90	0.87	0.090
Extended family members present	0.24	0.21	0.002
Household labor income	8,224	8,464	0.449
Household transfer income	3,968	3,786	0.123
Proportion receiving foodstamps	0.59	0.49	0.000
Proportion receiving AFDC/TANF	0.09	0.09	1.000
Proportion employed (household head)	0.56	0.56	0.952
Neighborhood: percent black	52	50	0.002
Neighborhood: poverty rate	30	26	0.000
Neighborhood: unemployment rate	13	12	0.000
Neighborhood: percent on welfare	16	12	0.000
Neighborhood: percent single-headed households	38	34	0.000
Neighborhood: percent children	31	30	0.000

Table 17. Characteristics of individuals before and after entering public housing, SIPP (N=5,020)

	before	after	p-value of difference
Proportion in single-headed households	0.63	0.70	0.000
Family size	3.98	3.50	0.000
Number of children, age<6	0.86	0.96	0.000
Extended family members present	0.28	0.25	0.000
Proportion employed	0.23	0.23	0.143
Household labor income	1,711	1,234	0.000
Household transfer income	141	144	0.086
Household in-kind benefits	174	161	0.000

Table 18. Characteristics of individuals before and after exiting public housing, SIPP

	before	after	p-value of difference
Proportion in single-headed households	0.69	0.65	0.000
Family size	3.71	3.88	0.000
Number of children, age<6	0.87	0.62	0.000
Extended family members present	0.26	0.24	0.022
Proportion employed	0.28	0.28	0.814
Household labor income	1,525	1,739	0.000
Household transfer income	132	122	0.000
Household in-kind benefits	145	143	0.245

Table 19. Characteristics of individuals before and after entering other types of subsidized housing, SIPP (N=2,826)

	before	after	p-value of difference
Proportion in single-headed households	0.65	0.69	0.000
Family size	4.05	3.64	0.000
Number of children, age<6	0.94	1.01	0.000
Extended family members present	0.28	0.22	0.000
Proportion employed	0.18	0.17	0.170
Household labor income	1,407	1,024	0.000
Household transfer income	165	166	0.536
Household in-kind benefits	252	240	0.011

Table 20. Characteristics of individuals before and after exiting other types of subsidized housing, SIPP (N=3,182)

	before	after	p-value of difference
Proportion in single-headed households	0.65	0.63	0.001
Family size	3.91	3.98	0.000
Number of children, age<6	0.99	0.73	0.000
Extended family members present	0.24	0.24	0.478
Proportion employed	0.23	0.23	0.672
Household labor income	1,352	1,570	0.000
Household transfer income	129	117	0.000
Household in-kind benefits	226	209	0.000

Table 21. Characteristics of individuals before and after moving from public to other housing, SIPP (N=1,606)

	before	after	p-value of difference
Proportion in single-headed households	0.78	0.77	0.556
Family size	3.80	3.71	0.007
Number of children, age<6	0.89	0.86	0.015
Extended family members present	0.24	0.21	0.031
Proportion employed	0.17	0.18	0.140
Household labor income	944	935	0.779
Household transfer income	178	169	0.000
Household in-kind benefits	240	238	0.652

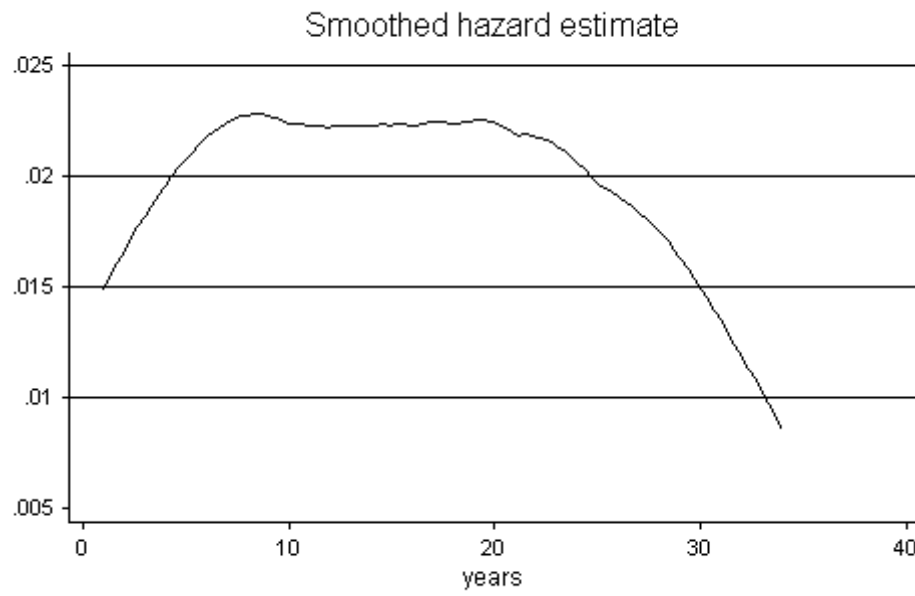


Figure 1. Hazard of entering subsidized housing (PSID)

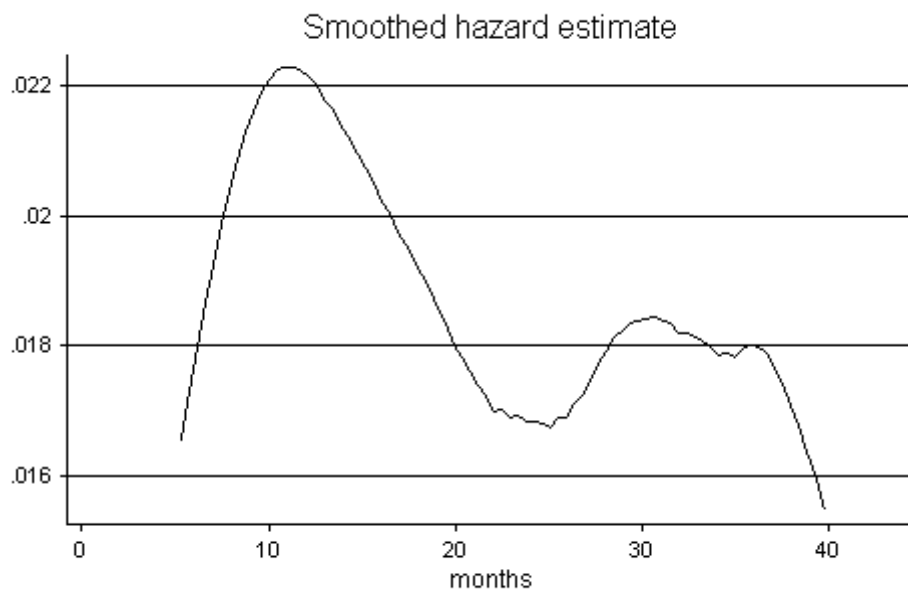


Figure 2a. Hazard of exiting public housing (SIPP)

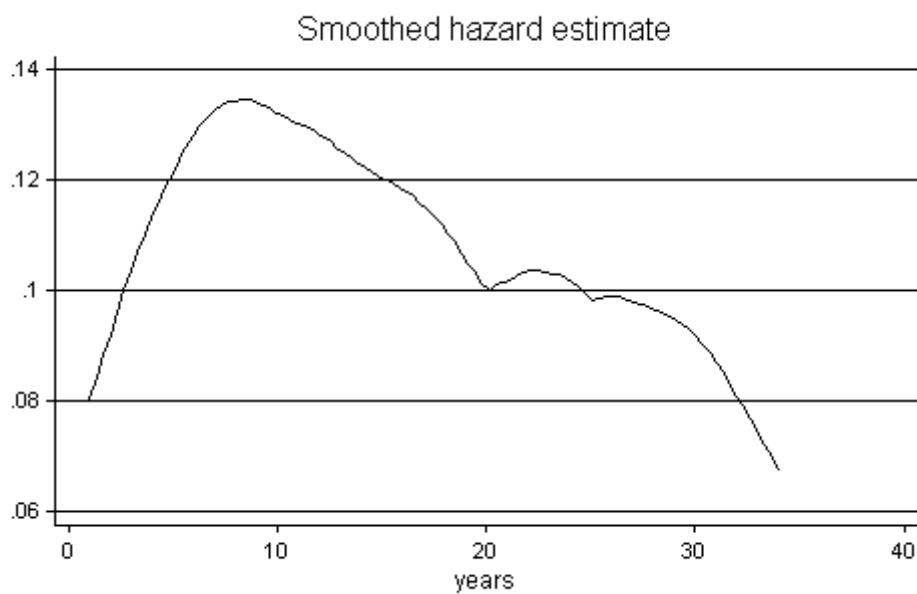


Figure 2b. Hazard of exiting public housing (PSID)

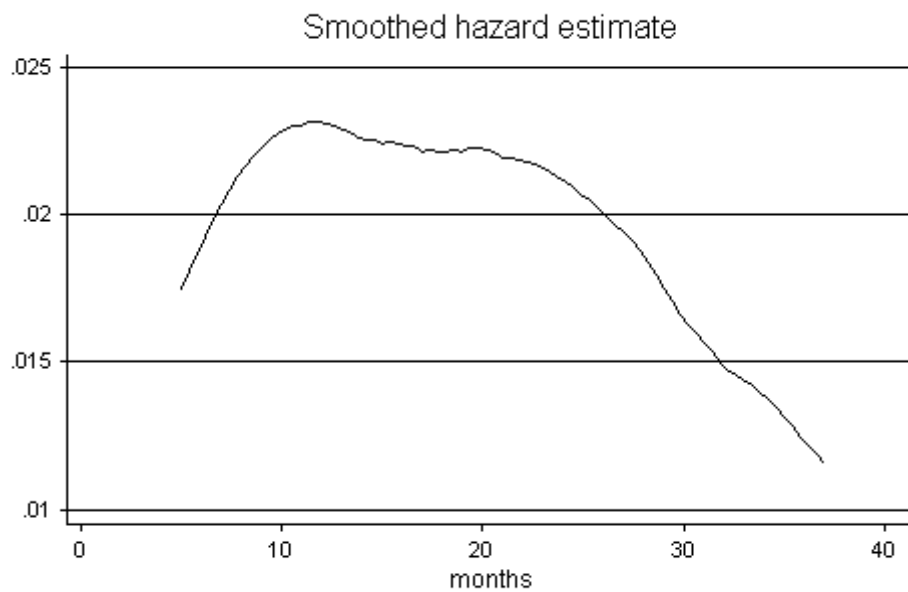


Figure 3a. Hazard of exiting other types of subsidized housing (SIPP)

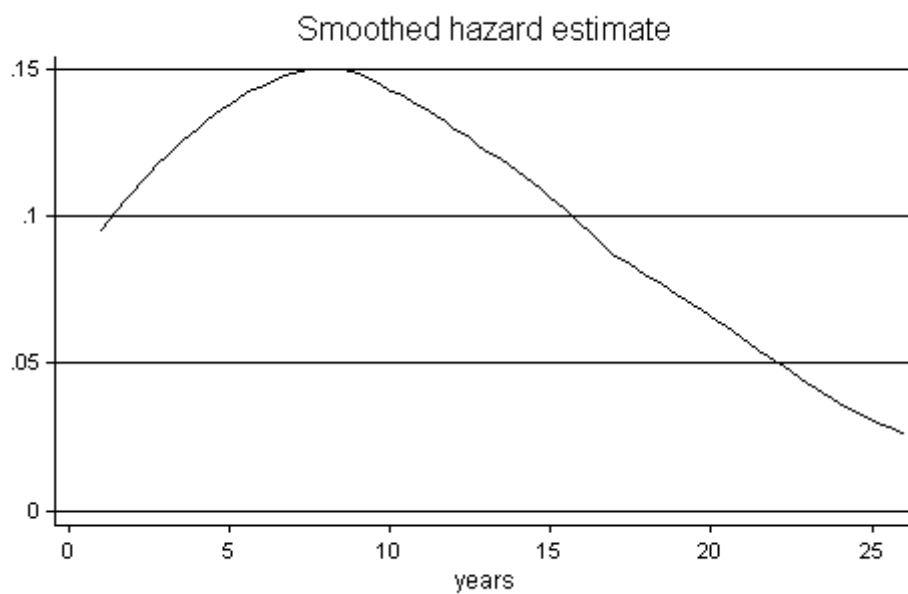


Figure 3b. Hazard of exiting other types of subsidized housing (PSID)

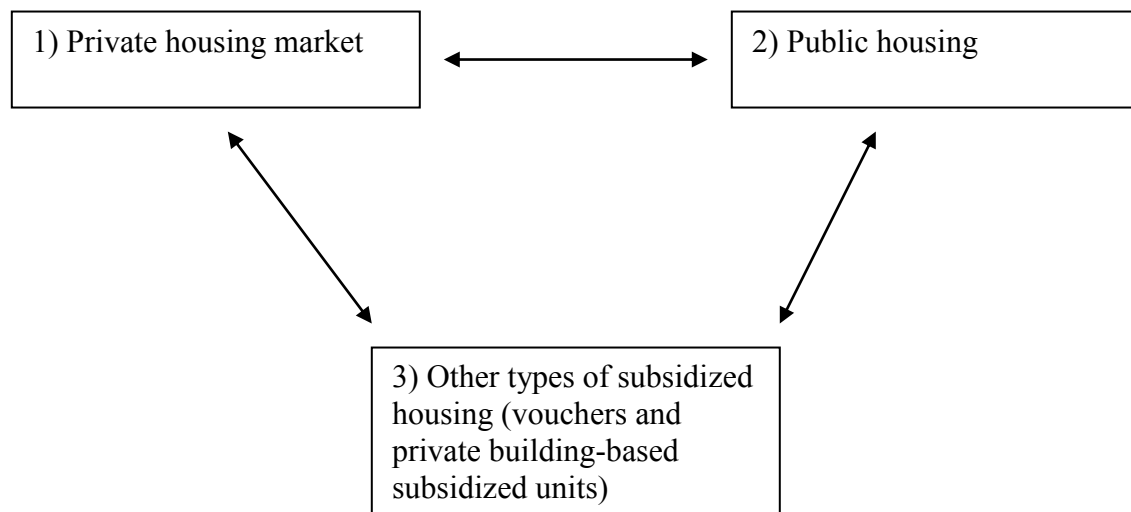


Figure 4. Multi-state representation of entering and exiting subsidized housing

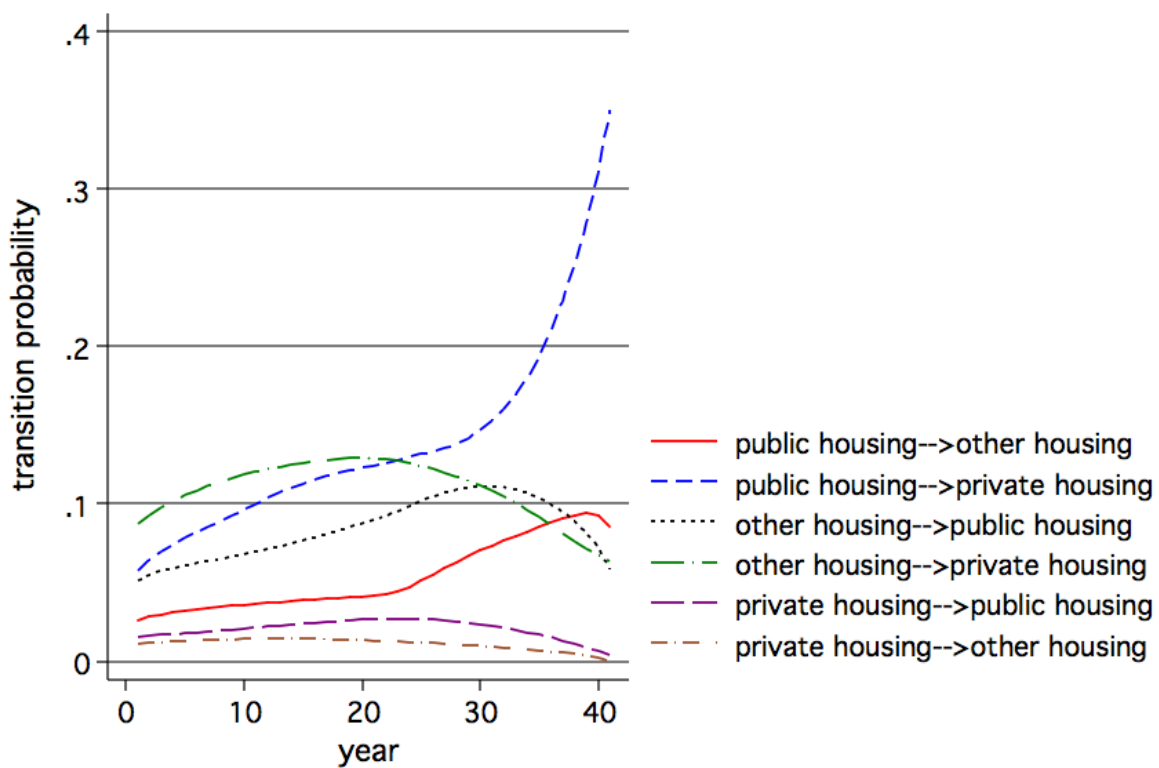


Figure 5. Smoothed transition probability between different types of housing, multi-state representation (PSID)

Table A1. Consistency of entries into and exits from subsidized housing and residential moves

Table 111. Consistency of characteristics and time from substance housing and residential moves								
	Move into public housing without switching addressed		Move out of public housing without switching addresses		Move into other type of housing without switching addressed		Move out of other type of housing without switching addresses	
	SIPP	PSID	SIPP	PSID	SIPP	PSID	SIPP	PSID
No	7,344	6,362	10,738	6,420	3,489	3,656	38,009	3,482
Yes	11,722	152	8,328	94	4,286	50	24,632	224
Total	19,066	6,514	19066	6,514	7,775	3,706	62,641	3,706

Table A2. Discrepancies between subsidized housing self-reports and administrative data, 1986-1995 (PSID)

	Person years	Percent
No discrepancy	21,346	58
In public housing in administrative data, but not in self-reports	544	1
In public housing in self-reports, but not in administrative data	7,586	21
In other types of housing in administrative data, but not in self-reports	2,042	6
In other types of housing in self-reports, but not in administrative data	5,117	14
Total	36,635	100%

Table A3. Recoded person-months or person-years given residential moves

	Public Housing		Other housing	
	SIPP	PSID	SIPP	PSID
Not recoded	81,876	26,621	44,236	15,935
Recoded to other category	5,004	1,249	--	0
Recoded to subsidized	21,457	132	6,786	319
Total	108,337	28,002	51,022	16,254

Table A4. Median time in subsidized housing by type of subsidy and source of data

	Median time in public housing		Median time in other types of housing	
	SIPP months	PSID years	SIPP months	PSID years
Administrative data	--	5	--	3
Self-reports	12	2	13	2
Self-reports edited for residential moves	36	4	34	4
Administrative data and edited self-reports combined	--	5	--	4

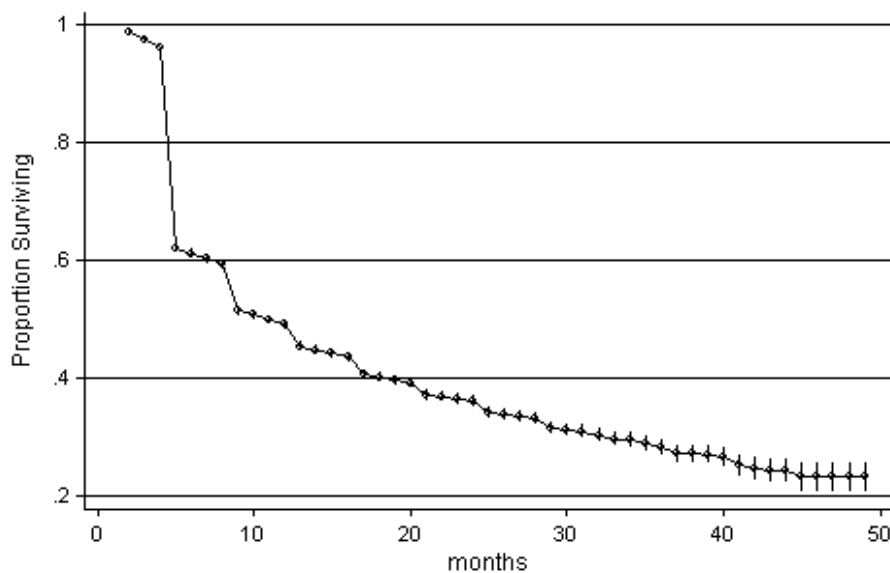


Figure A1a. Proportion in public housing by month (SIPP)

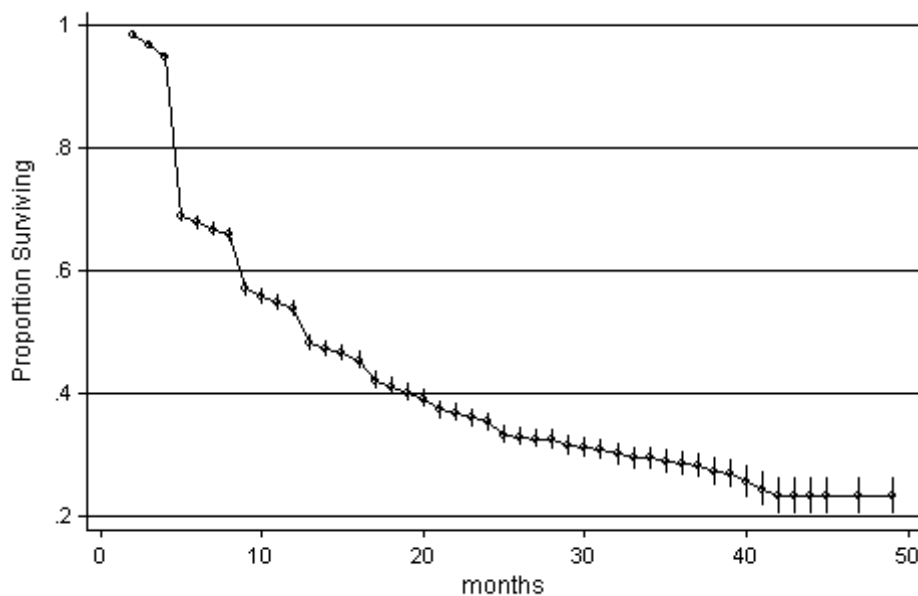


Figure A1b. Proportion in other types of subsidized housing by month (SIPP)

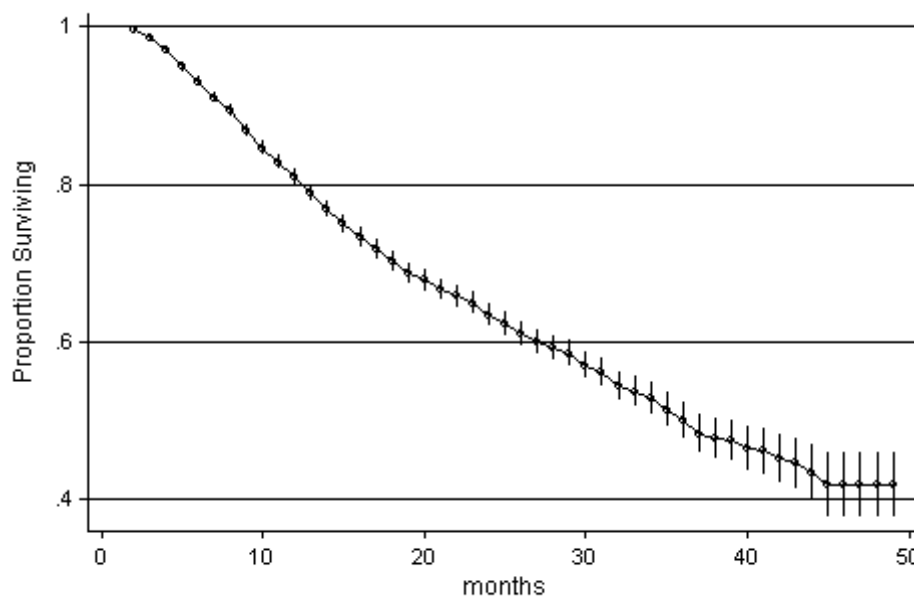


Figure A2a. Proportion in public housing by month, edited for residential moves (SIPP)

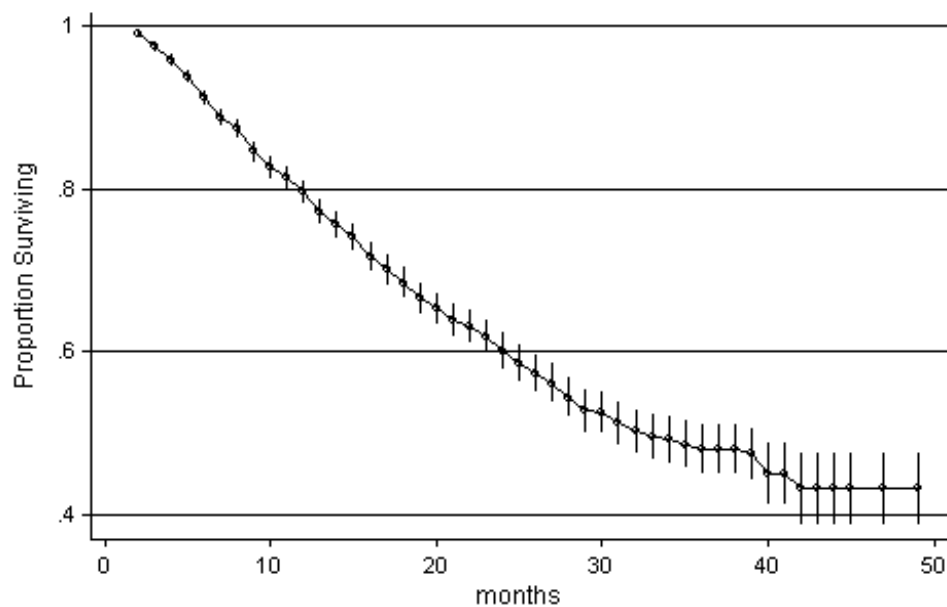


Figure A2b. Proportion in other types of subsidized housing by month, edited for residential moves (SIPP)

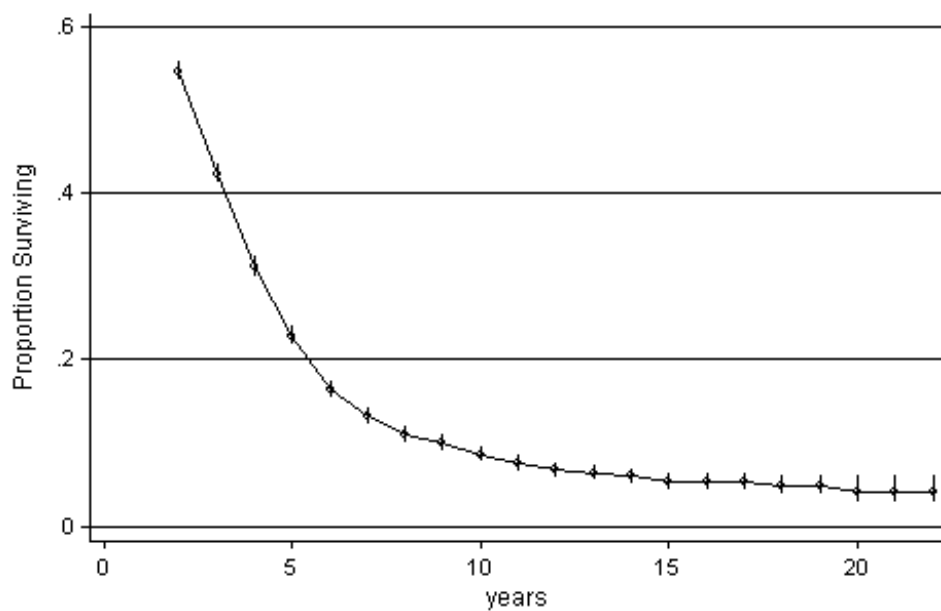


Figure A3a. Proportion in public housing by year, self-reports (PSID)

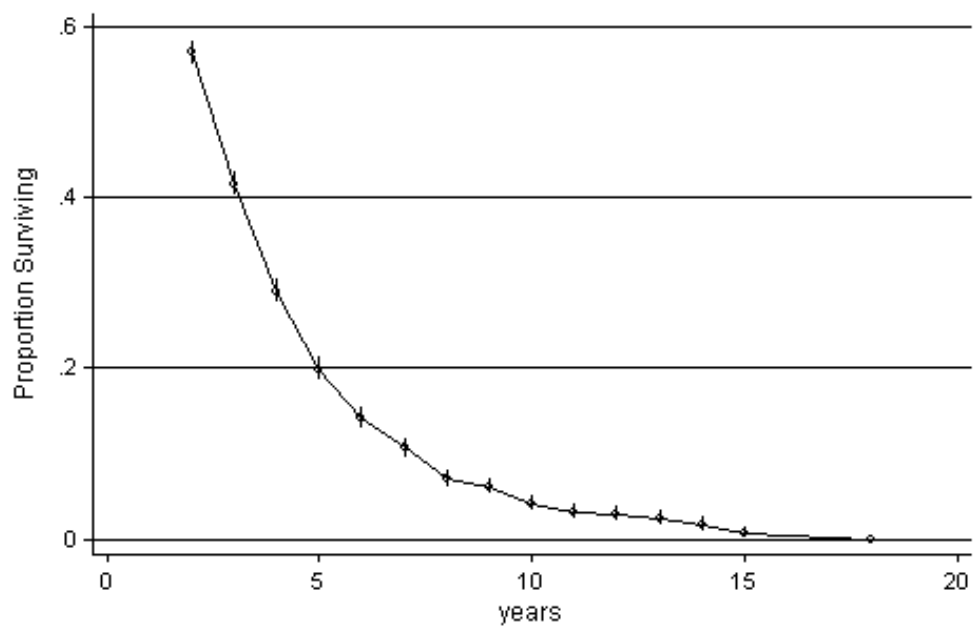


Figure A3b. Proportion in other types of subsidized housing by year, self-reports (PSID)

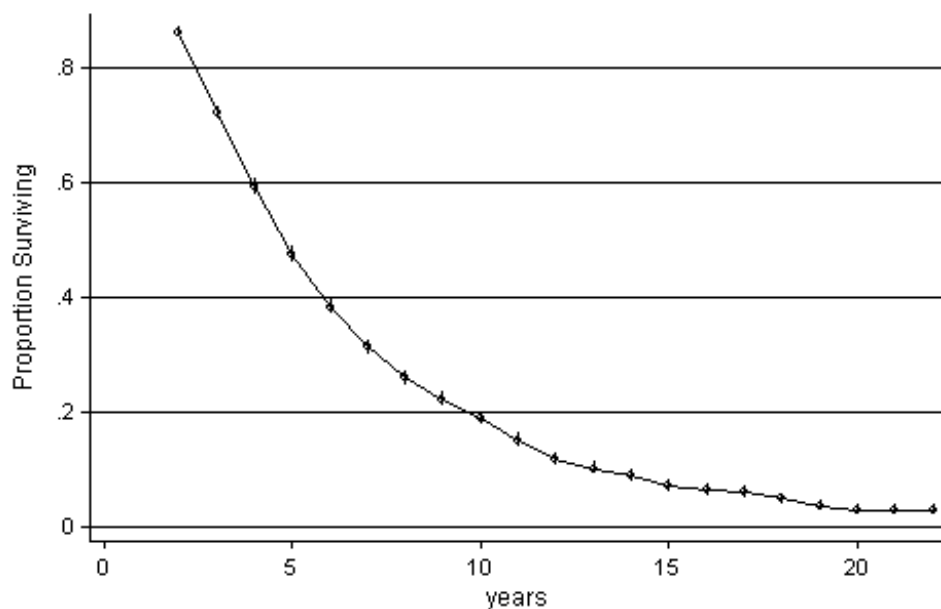


Figure A4a. Proportion in public housing by year, self-reports edited for residential moves (PSID)

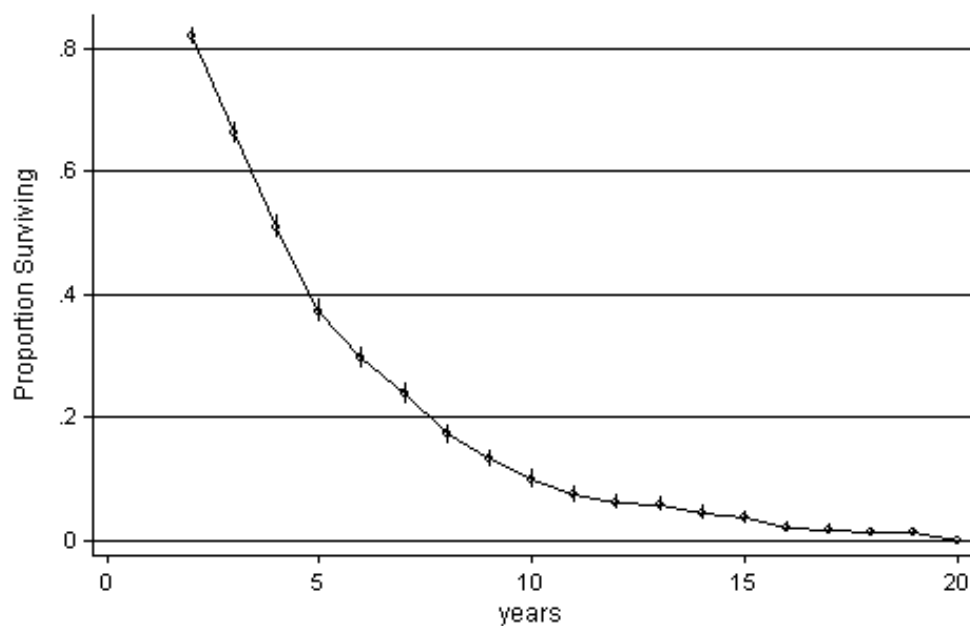


Figure A4b. Proportion in other types of housing by year, self-reports edited for residential moves (PSID)

References

- Allison, Paul D. 1982. "Discrete-Time Methods for the Analysis of Event Histories," in S. Leinhardt, ed. *Sociological Methodology*. San Francisco: Jossey-Bass.
- Allison, Paul D. 1984. *Event History Analysis: Regression for Longitudinal Event Data*. Sage University Paper Series: Quantitative Applications in the Social Sciences no. 07-046. Beverly Hills, Calif.: Sage.
- Alvarez, Lizette. 1997. "Bill to Redesign Housing Policy Clears Hurdle." *New York Times*, May 15.
- Ambrose, Brent W. 2005. "A Hazard Rate Analysis of Leavers and Stayers in Assisted Housing Programs," *Cityscape* 8 (2): 69–93.
- Bahchieva, Raisa, and Amy Hosier. 2001. "Determinants of Tenure Duration in Public Housing: The Case of New York City," *Journal of Housing Research* 12 (2): 307–348.
- Bane, Mary Jo and David T. Ellwood. 1983. The dynamics of dependence: the routes to self-sufficiency. Report prepared for U.S. Department of Health and Human Services by Urban Systems Research and Engineering, Inc., Cambridge, MA.
- Bane, Mary Jo and David T. Ellwood. 1994. *Welfare Realities*. Cambridge, MA: Harvard University Press.
- Blank, Rebecca. 1989. "Analyzing the Length of Welfare Spells." *Journal of Public Economics* 39: 245-274.
- Bureau of Labor Statistics. "Local Area Unemployment Statistics." <http://www.bls.gov/lau/>. Last accessed: December 2009.
- Buron, Larry, Susan Popkin, Diane Levy, Laura Harris, and Jill Khadduri. 2002. *The HOPE VI Resident Tracking Study: A Snapshot of the Current Living Situation of Original Residents from Eight Sites*. Washington DC: The Urban Institute. Available at <http://www.urban.org/publications/410591.html>
- Casey, Connie. 1992. *Characteristics of HUD-Assisted Renters and Their Units in 1989*. US Department of Housing and Urban Development, Office of Policy Development and Research. Washington, DC.
- Cortes, Alvaro, Ken Lan and David Fein. 2008. "Household Life Cycle and Length of Stay in Housing Assistance Programs." *Cityscape* 10 (1): 117–156.
- Department of Housing and Urban Development. "Fair Market Rents." <http://www.huduser.org/datasets/fmr.html>. Last accessed: December 2009.

- Freeman, Lance. 1998. "Interpreting the Dynamics of Public Housing: Cultural and Rational Choice Explanations." *Housing Policy Debate* 9 (2): 323-353.
- Freeman, Lance. 2005. "Does Housing Assistance Lead to Dependency? Evidence From HUD Administrative Data." *Cityscape* 8 (2): 115-133.
- Gordon, Erika, Sandra Chipungu, Lisa Marie Bagley, and Sophia I. Zanakos. 2005. *Improving Housing Subsidy Surveys: Data Collection Techniques for Identifying the Housing Subsidy Status of Survey Respondents*. Report prepared by ORC Macro for the U.S. Department of Housing and Urban Development's Office of Policy Development and Research. Washington, DC.
- Guo, Guang. 1993. "Event-History Analysis for Left-Truncated Data." *Sociological Methodology* 23: 217-243.
- Harris, Kathleen Mullan. 1993. "Work and Welfare Among Single Mothers in Poverty." *The American Journal of Sociology* 99 (2): 317-352.
- Harris, Kathleen Mullan. 1996. "Life after Welfare: Women, Work, and Repeat Dependency." *American Sociological Review* 61: 407-426.
- Hungerford, Thomas. 1996. "The Dynamics of Housing Assistance Spells." *Journal of Urban Economics* 39: 193-208.
- Lancaster, Tony. 1990. "The Econometric Analysis of Transition Data." *Econometric Society Monographs*, no. 17. Cambridge: Cambridge University Press.
- O'Neill, June, Douglass Wolf, and Lauri Bassi. 1987. "The Duration of Welfare Spells." *Review of Economics and Statistics* 69(2): 241-248.
- Olsen, Edgar O., Scott E. Davis, and Paul E. Carrillo. 2005. "Explaining Attrition in the Housing Voucher Program." *Cityscape* 8 (2): 95-113.
- Pear, Robert. 1996. "House Votes to Overhaul Housing for the Poor." *New York Times*, May 10.
- Popkin, Susan, Bruce Katz, Mary Cunningham, Karen Brown, Jeremy Gustafson and Margery Turner. 2004. *A Decade of HOPE VI: Research Findings and Policy Challenges*. The Urban Institute. Washington, D.C.
- Rohe, William M., and Rachel Garshick Kleit. 1997. "From Dependency to Self-Sufficiency: An Appraisal of the Gateway Transitional Families Program." *Housing Policy Debate* 8(1): 75-108.
- Rohe, William. 1995. "Assisting Residents of Public Housing Achieve Self-Sufficiency: An Evaluation of Charlotte's Gateway Families Program." *Journal of Architectural and Planning Research* 12:1-19.

- Rothenberg, Jerome, George C. Galster, Richard V. Butler, and John Pitkin. 1991. *The Maze of Urban Housing Markets*. Chicago: University of Chicago Press.
- Ryzin, Gregg van, Michelle Ronda and Douglass Muzzio. 2001. "Factors Related to Self-Sufficiency in a Distressed Public Housing Community." *Journal of Urban Affairs* 23(1): 57-69.
- Shroder, Mark. 2002. "Does Housing Assistance Perversely Affect Self-Sufficiency? A Review Essay." *Journal of Housing Economics* 11 (4): 381–417.
- Susin, Scott. 1999. "Durations in Subsidized Housing," Working Paper 99–5. New York: New York University Center for Real Estate and Urban Policy.
- Venkatesh, Sudhir A. 2002. *American Project: The Rise and Fall of a Modern Ghetto*. Cambridge: Harvard University Press.
- Westat. 2001. *Survey of Income and Program Participation Users' Guide, A Supplement to the Technical Documentation*. Third Ed. Washington, D.C.

Chapter 2. Subsidized Housing and Household Structure

Two of the explicit goals of US welfare policy have been to keep families together and to discourage non-marital childbearing (Berrick 2006). While participation in AFDC has had a modest effect on divorce and separation and almost no effect on unmarried fertility, the program's most pronounced influence may have been on the living arrangements of unmarried mothers by encouraging their independent residence away from kin (Ruggles 1997). This paper will examine a related but often overlooked part of the relationship between government subsidies and household composition, namely how the availability and receipt of subsidized housing affects household composition.

Housing subsidies defray the largest expense facing families and may provide residents with options away from unsatisfactory relationships and crowded conditions (Freeman 2005). On the other hand, the strict rules regarding who may reside in the subsidized apartment and stepped-up enforcement of "one strike, you're out" rules as they pertain to people with drug abuse histories and criminal records may limit the pool of potential partners available to subsidized residents and keep unions from forming in subsidized housing (Mincy 2009). Moreover, the act of entering and exiting the program as opposed to the length of stay in subsidized housing may by themselves influence household composition decisions, as a mother may choose to live apart from the father of her child if that means she is eligible for the subsidy or choose to move out if the rules in subsidized housing make certain unions or living arrangements impossible. Therefore, I analyze not only the dynamics of household composition during tenure in subsidized housing but also before families take up the subsidy and after they give it up.

Housing assistance and household structure

Housing assistance might affect household composition in several ways. First, by reducing the cost of housing, rent subsidies may also reduce the economic incentive to share a home and thus reduce household size. This prediction is supported by empirical evidence showing that households receiving rent assistance have fewer adults (Ellen and O’Flaherty 2002, Abt Associates 2006, Freeman 2005). For example, subsidized single adults are less likely to get married over time (Freeman 2005). Moreover, cohabitation before the birth of a child is less likely if the mother lives in subsidized housing rather than other types of rental housing (Turner 2003). In fact, in-depth interviews with recipients of Welfare-to-Work housing vouchers in a demonstration program for single mothers on welfare show that vouchers enabled them to stop living with partners in abusive circumstances (Abt Associates 2006). Therefore, by providing single adults and especially single women with children with a feasible alternative to staying in unsatisfactory relationships, housing subsidies may allow mothers with children to establish independent households away from partners and other family members (Turner 2003, Freeman 2005, Abt Associates 2006).

Nevertheless, the stringent rules of who may live under the same lease in a subsidized apartment may also cause unwanted family break-ups. For example, Welfare-to-Work voucher recipients reported amongst the reasons of not living with other relatives the mistaken belief that even related adult males (e.g. husbands, adult sons) could not live in the same household as the voucher holder. Therefore, even though housing assistance does not appear to affect the dissolution of partnerships once families enter the program (Freeman 2005), it may reduce the

number of adults in a household by forcing subsidized individuals to choose between taking up the subsidy or living together with other family members.

Second, by decreasing rent burdens and freeing up family resources, housing assistance might make having an additional child more feasible, thus, increasing the number of children in the household (Freeman 2005). Nevertheless, while recipients of housing assistance do have more children on average than their private-market counterparts, they are less likely to have an additional child while in public housing (Freeman 2005). Therefore, the program itself does not appear to have a positive effect on the number of minors in the household.

Third, because of their access to stable and decent housing, subsidized families may take in extended family members in hard times. There is some limited cross-sectional evidence though that subsidized residents do not appear to be doubled up with other adults. For example, housing assisted leavers of TANF are much less likely than non-assisted leavers to live in extended family or multifamily households (Mancuso et al. 2003). Moreover, Welfare-to-Work voucher recipients reported satisfaction with being able to leave doubled-up housing arrangements (Abt Associates 2006). Voucher recipients considered forming their own household an improvement that gave them a sense of increased stability and independence (Abt Associates 2006). In fact, they could still rely on support from their kin even though they did not live in the same housing unit (Abt Associates 2006).

Nevertheless, the initial decrease of the number of family members living with the subsidized individual could still be offset over time by the stability and quality of subsidized housing arrangements. For example, family members who find themselves without housing options or with poor housing alternatives may seek help first from individuals in subsidized housing, thus, bringing up the number of persons in the subsidized unit over time. Therefore,

while initially housing subsidies may allow recipients living in extended households to move out and form their own households, over the long run they can also make recipients more attractive to pleas for help with housing from friends and extended family members.

Research Model

As the decision to enter and exit subsidized housing is related to the household composition of tenants who choose to take advantage of the subsidy, I examine the household structure of subsidized tenants not only during their stays in subsidized apartments but also before they take up the subsidy and after they leave the program. While there is some evidence that being in subsidized housing reduces the number of adults in the household compared to income-eligible households (Ellen and O’Flaherty 2002, Abt Associates 2006, Freeman 2005), it is not clear whether this reduction comes about because of lower propensity of subsidized tenants to marry, lower propensity to cohabit or lower propensity to live with other kin. Therefore, my study builds upon previous findings regarding the number of adults in subsidized households by using the complete household roster of subsidized units and tracking over time exactly who moves in or who moves out of the household.

Moreover, it is not established whether the event of entering the program or exiting the program rather than the stay in a subsidized apartment has a greater salience for the marital, cohabitation, and doubling-up decisions of subsidized individuals. We know that over time subsidized individuals have lower probabilities to get married and, once partnered, lower probabilities to get divorced (Freeman 2005). We also know that subsidized pregnant women are less likely to cohabit with the father of the child compared to similar non-subsidized women (Turner 2003). However, these findings do not speak to how household composition changes in

conjunction with the event of entering or exiting subsidized housing. Moreover, the first set of results are only based on subsidized households in New York City who did not move between 1996 and 1999 (Freeman 2005), while the second set of findings come from cross-sectional data (Turner 2003). Therefore, I build upon these previous studies of the marital and cohabitation decisions of subsidized households by using a nationally representative dataset of both subsidized and non-subsidized individuals that tracks household composition decisions and subsidized housing receipt on a monthly basis for the period 1990-2008. I not only explore if a move into subsidized housing is associated with leaving overcrowded conditions or doubled-up living arrangements. I also ascertain how households change over time by tracking the movement of specific individuals across household arrangements in conjunction with changes in subsidized housing receipt.

I answer the following questions. Is a move into subsidized housing associated with a decrease in the number of household members and, if so, is that decrease due to a move away from a spouse, cohabitor, or other kin? Is the negative effect on marriage for individuals in the program due to the income eligibility rules of subsidized housing or is it due to the unfavorable set of marital prospects that people in subsidized housing face? Are exits from subsidized housing associated with changes in household composition such as marriage or are they due to other circumstances related to increases in employment stability and earnings? How would household arrangements both for the subsidized and unsubsidized population change if the rates of entry into and rates of exit from subsidized housing change or if the number of people that the subsidized housing program can accommodate changes?

I answer these questions using a multi-state life table that allows me to incorporate within the same analysis the sequence of decisions that individuals make regarding whether or not to

receive a housing subsidy and in what type of household arrangements to live. It is methodologically challenging to establish a causal relationship between stays in subsidized housing and the timing of union formation, childbearing, and doubling-up with family members and roommates. It may be the case that households with certain living arrangements choose to apply for subsidized housing in order to establish a less stressful environment for their children. It could also be true, however, that the rules associated with living in subsidized apartments discourage certain household arrangements from happening, so that the beneficiary does not lose the subsidy. Therefore, my study builds upon the findings of previous research regarding the decrease in the number of adults in subsidized housing and the decrease in the marital prospects of subsidized adults by examining the complete sequence of household decisions that individuals make in conjunction with entries into and exits from subsidized housing. Because I do not impose a particular causal order to household formation and subsidized housing decisions, I am able to see what particular circumstances lead to the realized household arrangements in subsidized housing, how households evolve while in subsidized housing, and how they change once their members leave subsidized housing.

Methods

The multi-state life table, also known as an increment-decrement life table, characterizes population movement over time between finite and mutually exclusive states (Schoen 1975, 1988). The transitions from one state to another occur as a Markov process, meaning that the distribution of the population across all states at time t depends only on the distribution of the population across all states at time $t-1$. Multi-state life tables are useful in the analysis of life cycle processes that involve multiple and recurrent transitions between at least two transient

states. The direction of movement across states is flexible.

In this paper, I specifically analyze the transitions of individuals between different types of household arrangements crossed with subsidized housing status. I categorize household arrangements as follows: 1) single person household; 2) married couple family household; 3) single householder with at least one child under 18; 4) married couple family household with at least one child under 18; 5) single householder with a cohabitor²², or non-primary family members, or roommates²³; 6) single householder with at least one child under 18 and a cohabitor, or non-primary family members, or roommates; 7) married couple household with non-primary relatives, or roommates; 8) married couple household with at least one child under 18 and non-primary relatives, or roommates. These household arrangements can occur both within and outside subsidized housing, yielding a sixteen state space. Figure 1 is a schematic representation of all household arrangements crossed with subsidized housing status.²⁴ I examine transitions between all states in the figure. All transitions are reversible and there are no absorbing states. Transitions can occur on a monthly basis. The clock in the analysis is age measured in months.

My analysis proceeds in three steps. First, I calculate the observed transition rates between distinct states in my multi-state life table (${}_nM^{ij}_x$). Second, using these observed rates, I

²² The SIPP only started collecting data on cohabitation with the 1996 panel. Before the 1996 panel, any cohabitor would be classified as a “non-relative” member of the household. Therefore, I choose to classify cohabitators in the “non-primary relative/roommate” category, so that I use consistent household categories over time. In future research, I will explore the possibility of coding cohabitators for panels prior to the 1996 one, using the householder’s age, sex and marital status to construct implied cohabitation status.

²³ Non-primary family members are the following: parent of the householder, grandchild of the householder, brother/sister of the householder, foster child of the householder, other relative of the householder.

²⁴ Note that for neatness not all transitions have been marked with an arrow. However, I examine transitions between all states in the figure.

estimate the following multi-state life table quantities for a synthetic cohort of 10,000 people: 1) the number of people in state i at age x ($l^i(x)$); 2) the number of transitions from state i to state j between ages x and $x+1$ (${}_nd^{ij}_x$); 3) the probability of leaving state i between age x and age $x+1$ (q^i_x); and 4) the number of person-months lived in state i between ages x and $x+1$ (${}_nL^i_x$). The mathematical relationships between these measures are as follows:

$$l^i(x+n) = l^i(x) + \sum {}_nd^{ii}_x - \sum {}_nd^{ij}_x \quad (1)$$

$${}_nd^{ij}_x = {}_nM^{ij}_x * {}_nL^i_x \quad (2)$$

$${}_nL^i_x = .5 * [l^i(x) + l^i(x+n)] \quad (3)$$

$$q^i_x = 1 - (l^i(x) - l^i(x+n)) / l^i(x) \quad (4)$$

(Palloni 2001: 263)

Third, after I construct my multi-state life table using the observed transition rates between each state, I conduct a number of simulations that show what would happen to the household arrangements of the subsidized and the non-subsidized population under different policy regimes that would affect either the rates of entry into and exit from subsidized housing or the number of people in subsidized housing. Specifically, I manipulate the rate of entry into subsidized housing and the rate of exit from subsidized housing to be zero, half, twice or four times its current rate at any age. Second, I manipulate the number of people in subsidized housing at age 0 or age 18 to be zero, half, twice or four times the current number. These simulations show how changing who gets in or gets out of subsidized housing would change the household composition of the non-subsidized and the subsidized population.

Data

I implement the multi-state life table analysis using data from the 1990, 1991, 1992,

1993, 1996, 2001 and 2004 panels of Survey of Income and Program Participation (SIPP) covering the period between 1990 and 2008. The SIPP is a nationally representative, longitudinal survey of the U.S. civilian non-institutionalized population. It was designed to measure the effectiveness of federal, state, and local programs and to collect measures of economic wellbeing. Each SIPP panel lasts between 3 and 4 years. Interviews are conducted every four months with information available for each of the preceding four months. The SIPP has a detailed household roster, which allows me to create different categories of household composition. In addition, the SIPP has been asking householders whether they live in public housing or whether they receive any other help from federal, state or local sources in paying their rent in every wave of each panel. The “other” category of subsidized housing includes both privately managed building-based subsidized housing (such as properties built using Low Income Housing Tax Credits) and housing vouchers that subsidized individuals can use on the private market.

Descriptive statistics (Table 1) indicate that the distribution of person-months spent in different types of household arrangements is similar across the two types of housing subsidies. For example, 19 percent of person-months in public housing are spent in a single-person household, while the corresponding number for other types of subsidized housing is 15 percent. Twenty-five percent of person-months in public housing are spent in a household with a married couple with at least one child versus 23 percent in other types of subsidized housing. The biggest difference between the two housing subsidy types is in the category of single parent with child where 41 percent of person-months in public housing occur. The corresponding number for other types of subsidized housing is 51 percent. Despite this last difference, for simplicity, I combine both categories of subsidized housing into a single one.

Results

My analysis uses the monthly longitudinal housing and household composition histories of all individuals in all SIPP panels from 1990 through 2008. I use information on more than 17 million person-months, clustered within 604,052 individuals. About 5 percent of these individuals ($N=31,860$) have ever been in subsidized housing. I observe a total of 7,181 transitions into subsidized housing and a total of 9,018 transitions out of subsidized housing (Table 2). As Table 2 shows, States 1 through 6 experience a fair amount of both outflow and inflow, while States 7 and 8 experience very few transitions into and out of them. States 15 and 16 also send very few individuals into subsidized housing. While I keep these states in my analysis for completeness, in all subsequent discussions I focus my attention on describing the states where individuals spend the most time (i.e. States 1, 3 and 4, see Table 2) and the transitions between states that are most frequent (i.e. transitions into and out of States 1, 2, 3, 4 and 5, see Table 2).

Unconditional and Conditional Durations

Table 3 shows the expected number of years spent in each of the 16 states of my multi-state life table overall and disaggregated by age period. The total duration shows that over an entire life course, an individual is expected to spend about 4 years ($1.18+0.31+1.41+0.74+0.13+0.12+0.01+0.02 = 3.92$) in subsidized housing with the rest of the time – outside of subsidized housing²⁵. The longest expected duration overall is for State 12 – a married couple

²⁵ The SIPP dataset includes individuals as young as 1 month old and as old as 89 years old. Therefore, the expected durations in the table are computed off of the observed transitions in the dataset given the age span of respondents.

family with at least one child outside of subsidized housing (36 years). Within subsidized housing, the longest expected durations are for State 3 – single householder with at least one child (1.4 years), followed by State 1 – single person household (1.2 years).

States 3 and 1 correspond to the most frequent household arrangements within subsidized programs targeted, respectively, at families and at the elderly. There is a strong life course component to the ages at which subsidized individuals live in these particular household arrangements. For example, 73% ($0.86/1.18 \times 100$) of the expected duration in subsidized housing as a single person household occurs after age 65, while 58% ($0.82/1.41 \times 100$) of the expected duration in subsidized housing in a single parent household occurs before age 18. In contrast, outside of subsidized housing only 56% of the expected duration in a single person household occurs after age 65 and only 30% of the expected duration in a single parent household occurs before age 18.

Because of the strong age patterns of household arrangements in subsidized housing, next I ask the question of what happens to individuals once they are in a certain household arrangement at a certain age (Tables 4 and 5). The first line in Tables 4 and 5 represents the unconditional duration in each state, or the average duration spent in each state regardless of the state of origin at either age 0 or age 18. The unconditional durations in Table 4 match the ones from Table 3 as I compute them over the entire life course. The unconditional durations in Table 5 cover the period of life after age 18 and sum up only to 71.4 years. The rest of the rows in Tables 4 and 5 show conditional durations in each state. These durations depend on the state in which each individual was at either age 0 or age 18²⁶.

²⁶ Since no one can be in a single person household or a married couple household without a child at age 0, in Table 4 I do not present conditional durations for states 1, 2, 9, and 10.

Similarly to the unconditional durations, the conditional durations show that the longest lasting states in subsidized housing are a single person household (State 1) and a single-headed householder with at least one child (State 3). In particular, depending on the state in which an individual is at birth, that individual is expected to spend between 1.45 and 2.78 years in a single parent household in subsidized housing²⁷. The longest duration in that state is for children who are born to a single parent outside of subsidized housing. These children are expected to spend a total of 6 years over their entire life course ($1.19+0.31+2.78+1.20+0.15+0.34+0.01+0.06 = 6.04$) in subsidized housing with the largest share of that time (2.78 years) in a single-parent household. The total duration in subsidized housing for children who start out life in single-parent families (State 12) is about 2 years longer than any of the other durations in subsidized housing conditional on being born into a particular household arrangement.

After age 18, the unconditional expected duration in subsidized housing is about 3 years (Table 5). Compared to this unconditional duration of 3 years, individuals who started out in a single-parent household outside of subsidized housing (State 12) at age 18 are expected to spend about 4 years in subsidized housing. Taken together Tables 4 and 5 show that it is individuals who start off in single-parent households outside of subsidized housing who end up staying the longest in subsidized housing.

Transitions across States: A Graphical Approach

Next, I present in graph form the annual transition probabilities between different

²⁷ Please note that the years spent in a particular state are calculated over an entire life. Therefore, an individual could be in subsidized housing in a single parent household either as the child to a single parent or the single parent to a child. Table 4 does not show distinctions between what role in the household each individual holds as it sums across all instances of life spent across different household arrangements over an entire lifespan.

household states over time²⁸. Figures 2 through 7 graph the probabilities of transition from household states in subsidized housing, while figures 8 through 19 graph the probabilities of transition from household states outside of subsidized housing. The clock in all figures is age. I present transition probabilities that are based on at least 50 total transitions²⁹. Dashed lines graph transitions into different types of household arrangements in subsidized housing, while solid lines graph transitions into different household arrangements on the private housing market. For all transitions out of subsidized housing (out of States 1 through 9) and into subsidized housing (into States 1 through 9), I also plot on the same graph the total number of transitions between distinct states off of which I compute the transition probabilities. I plot the number of transitions with a dot. Each dot represents the total number of transitions in the ten-year period around the dot. For example, the first dot from the left on each graph shows the total number of transitions between ages 0 and 10, the second dot – the total number of transitions between ages 11 and 20, the third dot – the total number of transitions between ages 21 and 30, etc.

First, Figure 2 shows the probability of transitioning from a single-person household in subsidized housing to any other type of household.³⁰ That single person has the highest probability of transitioning to either a single-parent household with child in subsidized housing (State 1 to State 3) or to living in a single-person household outside of subsidized housing (State

²⁸ The graphed annual transition probabilities are smoothed using the –lowess– command in STATA 10, a running-mean smoothing method with a bandwidth of 1 (Cox 2005). I also experimented with smoothing the transition probabilities using a regression of the transition probabilities on a third-order polynomial of age. The graphs across the two methods are similar in terms of the resulting shape and order of the lines.

²⁹ As discussed above, there are very few transitions between certain states (see Table 2). Therefore, I choose to present only the lines that are based on more than 50 transitions between two states.

³⁰ No one lives in a single-person household or a married couple household before the age of 16. Therefore, the transition probabilities into and out of States 1, 2, 9, and 10 start at age 16.

1 to State 9). Second, Figure 3 shows the transition probabilities for a married couple living in subsidized housing. A similar pattern to Figure 2 emerges in that households have high probabilities of transitioning outside of subsidized housing in the same household arrangement (State 2 to State 10) and high probabilities of welcoming a child to the family (State 2 to State 4) especially before age 40. In addition married couple households have a growing probability over time of transitioning into a single-person household (State 2 to State 1), which could be attributable to divorce earlier in life and mortality later in life.

Third, Figure 4 shows the transition probabilities for a single householder with child in subsidized housing. The probability of transitioning outside of subsidized housing in the same household arrangement stays about the same through age 20 and drops off after that (State 3 to State 11), while the probability of staying in subsidized housing as a single person household picks up after age 20 (State 3 to State 1). The first pattern is consistent with parents leaving subsidized housing with their minor children. The second pattern is consistent with children leaving the nest as they and their parents age. In addition, Figure 4 shows small probabilities of transitioning to a married couple household with child (State 3 to State 4) or a single householder with cohabitor/roommates (State 3 to State 5). This pattern implies that single parents in subsidized housing do marry but the probability of marriage is much lower than the probability of leaving subsidized housing altogether (State 4 vs. State 11). Moreover, it suggests that as children age they may stay with their parents in subsidized housing as adult roommates (State 5).

Figure 5 reveals similar patterns to Figure 4 in that individuals transition outside of subsidized housing in the same household arrangement as they were in subsidized housing, in this case – a married couple household with at least one child (State 4 to State 12). It also shows that starting with age 35, the probability of transitioning to a married couple household without

any children picks up which is consistent with children leaving the nest. Figure 5 also shows that the probability of transitioning from a married couple family to a single parent family (State 4 to State 3) decreases up to age 50 and increases after that. This pattern reveals that there is some probability of married couples in subsidized housing splitting up over time.

Finally, in terms of the transitions from household states in subsidized housing, Figures 6 and 7 show that there is not one distinct pattern of transition probabilities for households with cohabitators and/or roommates (State 5 or State 6). While these households do have relatively high probabilities of transitioning outside of subsidized housing in the same household arrangement (State 5 to State 13 or State 6 to State 14), there are also high probabilities of transitioning to a single parent household (States 3 and 11) and somewhat lower probabilities of transitioning to a married couple household with child (State 4).

Overall, the figures showing the transitions from household arrangements in subsidized housing (transitions from States 1 through 8) suggest that when individuals living in subsidized housing transition to a different household arrangement, that transition happens to a household arrangement in subsidized housing. When they leave subsidized housing, they have the highest probabilities of transitioning in the same household arrangement. The figures also imply that the probability of marriage for single parents in subsidized housing is much lower than the probability of leaving subsidized housing altogether. The figures also show that the probability of a split for married parents with children is much lower than leaving subsidized housing altogether.

Next, Figures 8 through 13 plot the transition probabilities from household arrangements not in subsidized housing to all other types of household arrangements (transitions from States 9 through 16). Individuals living across all types of household arrangements outside of subsidized

housing have probabilities of transitioning into subsidized housing very close to 0. The only exceptions to this pattern are individuals living in single-parent households (State 11, Figure 10), cohabitor/roommate households (State 13, Figure 12), and single-parent households with a cohabitor/relatives/roommates (State 14, Figure 13), where the probability of entering subsidized housing as single-parent household is modest especially before the age of 40 (States 11, 13, or 14 to State 3).

Because of the very low probabilities of transitioning into subsidized housing compared to transitioning to different types of household arrangement outside of subsidized housing, I plot separately all transitions into subsidized housing from different types of household arrangements outside of subsidized housing (Figures 14 through 19). First, single individuals outside of subsidized housing have the highest probability of transitioning into subsidized housing as a single individual compared to any other household arrangement (State 9 to State 1, Figure 14). Before age 50, they also have a declining probability of transitioning into subsidized housing that is associated with the birth of a child (State 9 to State 3, Figure 14).

Second, individuals living in a married couple household outside of subsidized housing have a fairly low and steady probability of entering subsidized housing as a single individual (State 10 to State 1, Figure 15), while individuals living in single parent households outside of subsidized housing overwhelmingly enter the program again as a single parent household (State 11 to State 3, Figure 16).

Third, individuals who are already married with children have the highest probability of entering subsidized housing as a married couple with child (State 12 to State 4, Figure 17), while individuals who live in the same household with a cohabitor, relatives and/or roommates up until age 30 have a high probability of transitioning into subsidized housing as a single householder

with a child (State 13 to 3, Figure 18) and a modest probability thereafter of transitioning into subsidized housing either as a single householder or a single householder with cohabitor/roommates (State 13 to States 1 and 5, Figure 18). Finally, individuals who live in a household with a child and cohabitor/relatives/roommates have high probabilities of transitioning into subsidized housing as a single parent with child (State 14 to State 3, Figure 19) and modest ones of transitioning either as a cohabitating couple with child (State 14 to State 6, Figure 19) or as a married couple with child (State 14 to State 4, Figure 19).

Overall, these results suggest that the entry into subsidized housing could reduce household size by the movement of individuals away from cohabitators, relatives or roommates. Nevertheless, married couples with children who enter subsidized housing have higher probabilities of making the transition in the same household arrangement as opposed to as a single-parent household. Moreover, while households with cohabitators/roommates have a high probability of transitioning into subsidized housing as a single-parent household they also have modest probabilities of bringing the cohabitor/roommate along with them. Therefore, subsidized households have lower numbers of adults because the program ends up admitting individuals who already live in single-parent households and because individuals living with cohabitators or roommates move away from them. However, the program does not seem to break up marriages that are already in existence.

Looking back at Table 2, this is not a surprising result. For example, 86 percent of the transitions of single parent households into subsidized housing involve entering subsidized housing as a single parent household (State 11 to State 3), while 72 percent of the transitions of married couple households with children involve entering subsidized housing again as a married couple with children (State 12 to State 4). Moreover, 40 percent of the transitions into subsidized

housing of households with a cohabitor/roommate involve bringing the cohabitor/roommate along (State 13 to State 5). On the other hand, when households with children and cohabitators/relatives/roommates enter subsidized housing about half of those transitions involve leaving the cohabitor/relatives/roommates behind (State 14 to State 3). Therefore, Table 2 and the graphs of transitions into subsidized housing indicate that the entry into subsidized housing is associated with moving away from cohabitor/relatives/roommates for single parents with children; however, it is rarely associated with the break-up of an actual marriage.

Simulations

As a final step in my analysis of the relationship between subsidized housing and household composition, I conduct a series of simulations that show what would happen to the household arrangements of the subsidized and the non-subsidized population should either the rates of entry into and exit from subsidized housing change or the number of people in subsidized housing change. Specifically, I first manipulate the rates of entry into subsidized housing and the rates of exit from subsidized housing for all individuals in my multi-state life table (Table 6). This simulation multiplies the transition rates by the same amount across all ages of the individuals in my analysis. Second, I manipulate the number of individuals in subsidized housing at age 0 (Table 7) and age 18 (Table 8). This manipulation involves changing the number of individuals across different household states only for ages 0 and 18.

Table 6 shows the results of my first simulation. The columns in this table represent the proportion of person-months lived over the course of a lifetime, given the observed rates of entry into and exit from subsidized housing and given the simulated rates of entry into and rates of exit from subsidized housing. I start with a simulation that assumes rates equal to 0 and proceed with

rates that are half the current observed rate, twice the current observed rate, and four times the current observed rate.

First, using the observed rates of entry into and exits from subsidized housing, I show that individuals are expected to spend about 5 percent of their lives in subsidized housing across any of the eight household arrangements (States 1 through 8). In terms of calendar time spent in subsidized housing, individuals are expected to spend about 4 years in subsidized housing. When the rate of entry into subsidized housing drops to 0 and all rates of exit stay at their current levels, the corresponding percent of life lived in subsidized housing drops to 1 percent, or about 1 year. When the rate is halved, the corresponding percent drops to 3, or about 3 years. When the rate is doubled, the corresponding percent increases to 8, or about 7 years. Finally, when the rate of entry is quadrupled, the corresponding percent increases to 15, or about 13 years.

It is interesting to point out that increasing the rates of entry into subsidized housing does not have the same multiplicative effect across different types of household arrangements. For example, when the rate of entry into subsidized housing is quadrupled, the time spent in either a single-parent household (State 3) or a married couple household with child (State 4) only doubles, while the time spent in a single-person household quadruples (State 1). Given the age distribution across these household arrangements, this simulation implies that if the rates of entry into subsidized housing increased by the same factor across all ages, individuals would spend more of their lives in subsidized housing as single-person elderly households as opposed to younger single-parent or married couple households.

If no one exits subsidized housing (rate of exit = 0) but the corresponding rates of entry are kept at their current levels, the percent of life lived in subsidized housing across all household states would be very similar to the observed percent of life lived in subsidized

housing, or about 5 percent. Even if the rate of exit is halved, doubled, or quadrupled, individuals would still spend about 5 percent of their lives in subsidized housing. Therefore, the expected percent of life lived in subsidized housing would stay about the same even if no one exited subsidized housing or if the current rates quadruple.

Taken together the above simulations that manipulate the rates of entry into and rates of exit out of subsidized housing show that changing how fast people enter subsidized housing as opposed to changing how fast they exit subsidized housing would have a greater effect on the amount of time spent in subsidized housing. Moreover, increasing the rates of entry into subsidized housing does not have the same multiplicative effect across different types of household arrangements. If the rates of entry into subsidized housing increased by the same factor across all ages, the program would house single-person elderly households for longer periods of time compared to younger single parent or married couple households.

Tables 7 and 8 show the results of my second simulation that manipulates the number of individuals in subsidized housing at either age 0 or age 18. Since I only simulate the number of individuals in subsidized housing at these two ages, my simulations amount to asking either what would happen to individuals if a different number of them are born into subsidized housing or what would happen to individuals if a different number of them start their adult lives in subsidized housing.

I first start with a simulation that assumes that no one is born into subsidized housing. Then, I assume that half of the observed number of people are born into subsidized housing, twice the observed number of people are born into subsidized housing, and four times the observed number of people are born into subsidized housing.³¹ As the first column in Table 7

³¹ For all of these analyses, I use a synthetic cohort of 10,000 people and weigh the number of

shows, over the course of an entire lifetime given the current observed distribution of births across different household arrangements, an individual is expected to spend about 5 percent (or about 4 years) of his/her life in subsidized housing. If no one is born into subsidized housing, about 4 percent of person-months (or about 3 years) would be spent in subsidized housing. If only half of the current number of people is born into subsidized housing, about 5 percent of person-months (or about 4 years) would be spent in subsidized housing. When I double and quadruple the numbers at age 0, the corresponding percent of person-months are 6 percent (or about 5 years) and 8 percent (or about 7 years).

Simulating the number of people in different household states at age 0 has the most impact on the percent months individuals spend in either single-parent households (State 3) or married couple households with children (State 4). For example, doubling the number of children at age 0 in subsidized housing increases the percent months spent in States 3 or 4 by about 40%, while quadrupling the number of children at age 0 in subsidized housing doubles the percent months spent in States 3 or 4. It is interesting to point out that this simulation has the same multiplicative effect on the percent months spent in both State 3 and State 4. Therefore, this simulation implies that if the relative proportions of children at age 0 across household states

people in each state according to their proportion across all household states in the SIPP. This analysis amounts to assuming that there are a total of 10,000 newborns across different household arrangements both inside and outside of subsidized housing or that there are a total of 10,000 eighteen-year olds across all types of household arrangements. In order to maintain a starting cohort of 10,000 people, I either add or subtract the number of people who otherwise would have been in subsidized housing to the non-subsidized population. For example, if we assume that 500 of these 10,000 people are born in subsidized housing, it follows that 9,500 children are born to households outside of subsidized housing. In the simulation where half the number of children is born in subsidized housing, I assume that only 250 children are born in subsidized housing and that 9,750 children are born outside of subsidized housing. In the simulation where twice the number of children are born in subsidized housing, I assume that 1,000 children are born in subsidized housing and 9,000 children are born outside of subsidized housing.

stay the same, multiplying the absolute numbers by the same amount would not change the relative amounts of time spent across these household states in subsidized housing. In other words, the proportion of life spent in single parent or two-parent households in subsidized housing would not change if the relative rates of birth into these types of families also do not change.

Table 8 shows the results of similar simulations to the ones in Table 7. In Table 8, I start with a cohort of 18-year olds instead of a cohort of newborns. The first column in Table 8 shows that given the current distribution of people in subsidized housing, an 18-year old is expected to spend about 4 percent of his/her life in subsidized housing (or about 3 years). Even if no one starts out in subsidized housing at age 18, the percent of life spent in subsidized housing would again be about 4. If half of the current number of people starts out in subsidized housing at age 18, the percent would again stay at about 4. When I double or quadruple the number of individuals in subsidized housing at age 18, the corresponding percent of person-months goes up to about 5, representing an expected duration in subsidized housing after age 18 of about 4 years.

The simulations in Tables 7 and 8 suggest that the biggest changes in the expected duration in subsidized housing occur when I manipulate how many people get into subsidized housing at birth as opposed to how many people are in subsidized housing at age 18. Unlike the simulations in Table 6, the ones in Table 7 and 8 also indicate that multiplying the number of people across household states at age 0 or 18 by the same number does not change the relative proportion of time spent in subsidized housing across different household arrangements.

Discussion

This paper examines an understudied aspect of the relationship between government

subsidies and household structure, namely how entering subsidized housing, staying in subsidized housing and exiting into the private housing market interacts with the choices that subsidy recipients make regarding the kind of households they live in. Housing subsidies may provide families a way out of crowded and stressful living arrangements. At the same time, the income and behavioral rules associated with keeping the subsidy may make adding extra members to the household, especially adult members, a tough choice if that means losing the housing benefit.

My multi-state life table results show that there is a distinct life course pattern to the entry into subsidized housing with younger individuals transitioning into subsidized housing as single parents with children and older individuals transitioning as single householders. In fact, a majority of years that subsidized individuals spend in a single parent household occur before age 18, while a majority of years that subsidized individuals spend in single person households occur after age 65. Moreover, it is children who are born into single parent households outside of subsidized housing as opposed to those who are born to single parent households in subsidized housing who spend the most time in the program. Since single parent households and single person households are a majority of subsidized housing participants, the program seems to be serving the most vulnerable members of society – children in single parent household and the elderly – for the longest amounts of time.

My results also show that the entry into subsidized housing is accompanied by changes in household composition that reduce the number of adults. Specifically, single parents living with cohabitators, roommates and other kin in a majority of cases move into subsidized housing leaving the cohabitators, roommates, and relatives behind. Nevertheless, the entry of married couple families into subsidized housing happens without any corresponding changes in household

composition. Therefore, while entries into subsidized housing may break up living arrangements with cohabitators, roommates, and relatives, they do not seem to break up marriages.

I also find no strong evidence that marriages break up once individuals are in subsidized housing, but I do find that single mothers with children have low probabilities of marriage while in subsidized housing. Households in subsidized housing do not seem to take in cohabitators or extended family members while receiving the subsidy. Moreover, individuals tend to exit subsidized housing in the same household arrangement as they were in subsidized housing, indicating that these moves may be associated with other changing circumstances such as greater economic stability rather than changes in household composition.

Finally, the simulations in my paper suggest that the biggest changes in the expected number of years that individuals spend in subsidized housing occur with changes in the rates of entry into subsidized housing or changes in how many people are born into subsidized housing. In fact, the expected percent of life lived in subsidized housing would stay about the same even if the current rates of exit quadrupled. These results indicate that a policy aimed at speeding the transitions of individuals out of subsidized housing would not change the amount of time that individuals spend in subsidized housing without any corresponding changes in the rates of entry into subsidized housing. Moreover, increasing the rates of entry into subsidized housing does not have the same multiplicative effect across different types of household arrangements. In fact, a policy that allows individuals across all ages to transition more frequently into subsidized housing would shift the program towards housing single-person elderly households for longer periods of time compared to younger single parent or married couple households.

While my multi-state life table results extend our knowledge of the sequence of household transitions that happen along with entries into, stays in, and exits from subsidized

housing, as mentioned above, they do not imply a particular causal order to the decision with whom to live and the decision whether to use the subsidy. Therefore, my results cannot speak to what would have happened to households had they not received the subsidy, nor can they indicate if households engage in particular types of behaviors because they expect to receive the subsidy or because they are trying to keep the subsidy. Therefore, while I find descriptively that single parents in subsidized housing do not get married and that subsidized households do not take in additional adult members, it could be the case that the rules associated with who could be on the lease or what the maximum amount of household income should be might prevent some marriages from happening or might change with whom subsidized individuals choose to live. Nevertheless, I do not know if these single parents would have had better marriage prospects had they not been in subsidized housing nor do I know if households would have taken in additional members had they not been in subsidized housing. Therefore, a next step in this line of research would establish whether the associations I find in my paper are a function of the rules of the program or would have occurred even without the presence of the program.

Table 1. Percent Months Lived in Different Types of Household Structure by Subsidized Housing Status, SIPP 1990-2008

Household Structure	Public Housing		Other Types of Subsidized Housing		Not in Subsidized Housing	
	Percent	N	Percent	N	Percent	N
Single	18.6	131,834	14.8	37,922	11.2	1,818,846
Married	6.3	44,694	3.4	8,807	17.2	2,800,370
Single with child	40.9	289,945	50.5	129,641	13.1	2,137,077
Married with child	24.5	173,604	23.1	59,409	48.2	7,859,592
Single with cohabitor/relatives/roommates	3.9	27,662	3.8	9,777	5.1	823,071
Single with child and cohabitor/relatives/roommates	4.5	31,939	3.8	9,809	2.7	439,571
Married with relatives/roommates	0.3	1,836	0.1	247	0.7	106,754
Married with child and relatives/roommates	1.0	7,138	0.4	1,081	1.9	310,285
Total	100%	708,652	100%	256,693	100%	16,295,566

Table 2. Total number of transitions between states (17,260,911 person-months clustered within 604,052 individuals; 31,860 individuals ever in subsidized housing)

Inflow state	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
	In subsidized housing								Not in subsidized housing								
Outflow state	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non-primary relatives, or roommates	Single householder with child and a cohabitor, or non-primary relatives, or roommates	Married couple with non-primary relatives, or roommates	Married couple with at least one child under 18 and non-primary relatives, or roommates	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non-primary relatives, or roommates	Single householder with child and a cohabitor, or non-primary relatives, or roommates	Married couple with non-primary relatives, or roommates	Married couple with at least one child under 18 and non-primary relatives, or roommates	
1		120	294	38	125	12	3	4	570	33	55	41	107	12	36	26	1,476
2	145		5	329	25	1	1	1	12	222	3	18	3	3	1	9	778
3	325	6		743	153	187	1	3	117	20	3,176	339	105	399	9	131	5,714
4	36	179	868		70	32	2	26	86	24	114	2,086	47	62	4	68	3,704
5	227	59	151	131		66	16	2	91	7	64	46	233	13	7	6	1,119
6	10	4	248	68	92		0	35	19	1	140	36	20	254	2	13	942
7	4	2	2	3	15	0		13	7	2	1	2	2	2	9	0	64
8	2	2	18	17	1	39	9		4	0	13	16	6	10	1	53	191
9	639	19	53	34	79	14	4	4		5,487	4,979	2,804	4,745	252	410	280	19,803
10	19	247	10	20	4	4	0	0	4,997		403	14,401	785	143	87	218	21,338
11	93	11	2,295	102	41	123	3	15	6,167	712		10,159	2,408	2,693	190	861	25,873
12	101	29	269	1,339	58	29	5	20	5,736	12,227	14,062		2,318	1,647	296	1,692	39,828
13	113	14	75	25	176	14	5	7	7,280	3,050	2,180	2,823		1,363	599	232	17,956
14	23	10	324	79	21	197	0	15	409	245	3,527	2,857	1,700		49	765	10,221
15	13	1	8	2	9	0	6	0	537	143	140	281	542	53		472	2,207
16	34	13	216	47	4	24	0	23	427	363	1,171	1,960	221	1,030	497		6,030
Total	1,784	716	4,836	2,977	873	742	55	168	26,459	22,536	30,028	37,869	13,242	7,936	2,197	4,826	157,244

Table 3. Expected duration in years by state and age

Age	Expected number of years to be lived in state j =																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
In subsidized housing									Not in subsidized housing								
	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non-primary relatives, or roommates	Single householder with child and a cohabitor, or non-primary relatives, or roommates	Married couple with non-primary relatives, or roommates	Married couple with at least one child under 18 and non-primary relatives, or roommates	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non-primary relatives, or roommates	Single householder with child and a cohabitor, or non-primary relatives, or roommates	Married couple with non-primary relatives, or roommates	Married couple with at least one child under 18 and non-primary relatives, or roommates	
Ages 0-18	0.00	0.00	0.82	0.37	0.01	0.12	0.00	0.02	0.00	0.00	3.36	12.60	0.06	0.90	0.05	0.68	19.0
Ages 19-35	0.05	0.01	0.48	0.23	0.04	0.02	0.00	0.01	1.84	1.20	2.97	8.54	0.92	0.34	0.12	0.22	17.0
Ages 36-64	0.25	0.08	0.34	0.25	0.04	0.02	0.00	0.00	3.94	6.00	3.29	13.24	1.08	0.25	0.07	0.15	29.0
Ages 65+	0.86	0.21	0.08	0.04	0.05	0.01	0.00	0.00	7.70	10.14	1.55	1.75	1.15	0.18	0.30	0.36	24.4
Total	1.18	0.31	1.41	0.74	0.13	0.12	0.01	0.02	13.68	17.80	11.15	35.99	3.26	1.66	0.55	1.41	89.4

Table 4. Expected duration in years by state and state of origin

origin (at birth)	Expected number of years to be lived in state j =																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
	In subsidized housing								Not in subsidized housing								
	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non-primary relatives, or roommates	Single householder with child and a cohabitor, or non-primary relatives, or roommates	Married couple with non-primary relatives, or roommates	Married couple with at least one child under 18 and non-primary relatives, or roommates	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non-primary relatives, or roommates	Single householder with child and a cohabitor, or non-primary relatives, or roommates	Married couple with non-primary relatives, or roommates	Married couple with at least one child under 18 and non-primary relatives, or roommates	
All	1.18	0.31	1.41	0.74	0.13	0.12	0.01	0.02	13.68	17.80	11.15	35.99	3.26	1.66	0.55	1.41	89.4
1																	
2																	
3	1.18	0.31	1.45	0.86	0.14	0.16	0.01	0.03	13.68	17.80	10.99	35.98	3.26	1.63	0.55	1.40	89.4
4	1.18	0.31	1.64	0.77	0.14	0.16	0.01	0.03	13.68	17.80	11.08	35.77	3.26	1.64	0.55	1.40	89.4
5	1.18	0.31	1.68	0.88	0.14	0.17	0.01	0.03	13.68	17.80	11.06	35.66	3.26	1.63	0.55	1.40	89.4
6	1.18	0.31	1.65	0.88	0.14	0.12	0.01	0.03	13.68	17.80	11.04	35.75	3.26	1.62	0.55	1.40	89.4
7	1.18	0.31	1.68	0.88	0.14	0.17	0.01	0.03	13.68	17.80	11.06	35.66	3.26	1.63	0.55	1.40	89.4
8	1.18	0.31	1.67	0.88	0.14	0.16	0.01	0.03	13.68	17.80	11.06	35.67	3.26	1.63	0.55	1.39	89.4
9																	
10																	
11	1.18	0.31	1.62	0.89	0.14	0.16	0.01	0.03	13.68	17.80	10.55	36.23	3.25	1.61	0.55	1.40	89.4
12	1.19	0.31	2.78	1.20	0.15	0.34	0.01	0.06	13.72	17.78	13.15	30.11	3.33	2.59	0.60	2.09	89.4
13	1.18	0.31	1.68	0.88	0.14	0.17	0.01	0.03	13.68	17.80	11.06	35.67	3.25	1.63	0.55	1.40	89.4
14	1.18	0.31	1.65	0.88	0.14	0.16	0.01	0.03	13.68	17.80	10.94	36.10	3.25	1.36	0.55	1.39	89.4
15	1.18	0.31	1.68	0.88	0.14	0.17	0.01	0.03	13.68	17.80	11.06	35.67	3.26	1.63	0.53	1.40	89.4
16	1.18	0.31	1.66	0.89	0.14	0.16	0.01	0.03	13.68	17.80	11.01	36.01	3.26	1.60	0.54	1.14	89.4

Table 5. Expected duration in years by state and state of origin

origin (at age=18)	Expected number of years to be lived in state j =																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total	
	In subsidized housing								Not in subsidized housing									
	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non- primary relatives, or roommates	Single householder with child and a cohabitor, or non- primary relatives, or roommates	Married couple with non- primary relatives, or roommates	Married couple with at least one child under 18 and non- primary relatives, or roommates	Single person	Married couple	Single householder with at least one child under 18	Married couple with at least one child under 18	Single householder with a cohabitor, or non- primary relatives, or roommates	Single householder with child and a cohabitor, or non- primary relatives, or roommates	Married couple with non- primary relatives, or roommates	Married couple with at least one child under 18 and non- primary relatives, or roommates		
All	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.68	17.79	7.86	23.60	3.23	0.80	0.51	0.76	71.4	
1	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.68	17.79	7.86	23.60	3.23	0.80	0.51	0.76	71.4	
2	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.68	17.79	7.86	23.60	3.23	0.80	0.51	0.76	71.4	
3	1.17	0.31	0.73	0.54	0.13	0.05	0.01	0.01	13.68	17.81	7.84	23.83	3.24	0.80	0.51	0.76	71.4	
4	1.18	0.31	0.91	0.48	0.13	0.05	0.01	0.01	13.69	17.80	7.88	23.65	3.24	0.81	0.51	0.76	71.4	
5	1.18	0.31	0.93	0.55	0.13	0.05	0.01	0.01	13.68	17.79	7.86	23.61	3.23	0.80	0.51	0.76	71.4	
6	1.18	0.31	0.92	0.55	0.13	0.05	0.01	0.01	13.68	17.79	7.86	23.63	3.23	0.80	0.51	0.76	71.4	
7	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.68	17.79	7.86	23.60	3.23	0.80	0.51	0.76	71.4	
8	1.18	0.31	0.93	0.55	0.13	0.05	0.01	0.01	13.68	17.79	7.86	23.60	3.23	0.80	0.51	0.76	71.4	
9	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.67	17.79	7.86	23.61	3.23	0.80	0.51	0.76	71.4	
10	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.68	17.78	7.87	23.60	3.24	0.80	0.51	0.76	71.4	
11	1.17	0.31	0.92	0.58	0.13	0.06	0.01	0.01	13.60	17.81	6.81	24.70	3.20	0.80	0.52	0.77	71.4	
12	1.23	0.32	1.44	0.73	0.16	0.08	0.01	0.02	13.92	17.74	9.81	19.91	3.55	1.03	0.59	0.86	71.4	
13	1.18	0.31	0.93	0.56	0.13	0.06	0.01	0.01	13.67	17.78	7.87	23.65	3.20	0.80	0.51	0.76	71.4	
14	1.18	0.31	0.93	0.56	0.13	0.05	0.01	0.01	13.66	17.78	7.88	23.77	3.17	0.72	0.51	0.76	71.4	
15	1.18	0.31	0.93	0.55	0.13	0.06	0.01	0.01	13.67	17.78	7.87	23.63	3.23	0.80	0.49	0.75	71.4	
16	1.18	0.31	0.93	0.56	0.13	0.06	0.01	0.01	13.67	17.78	7.88	23.67	3.23	0.80	0.49	0.71	71.4	

Table 6. Proportion of person-months lived between ages 0 and 89, observed and simulated rates

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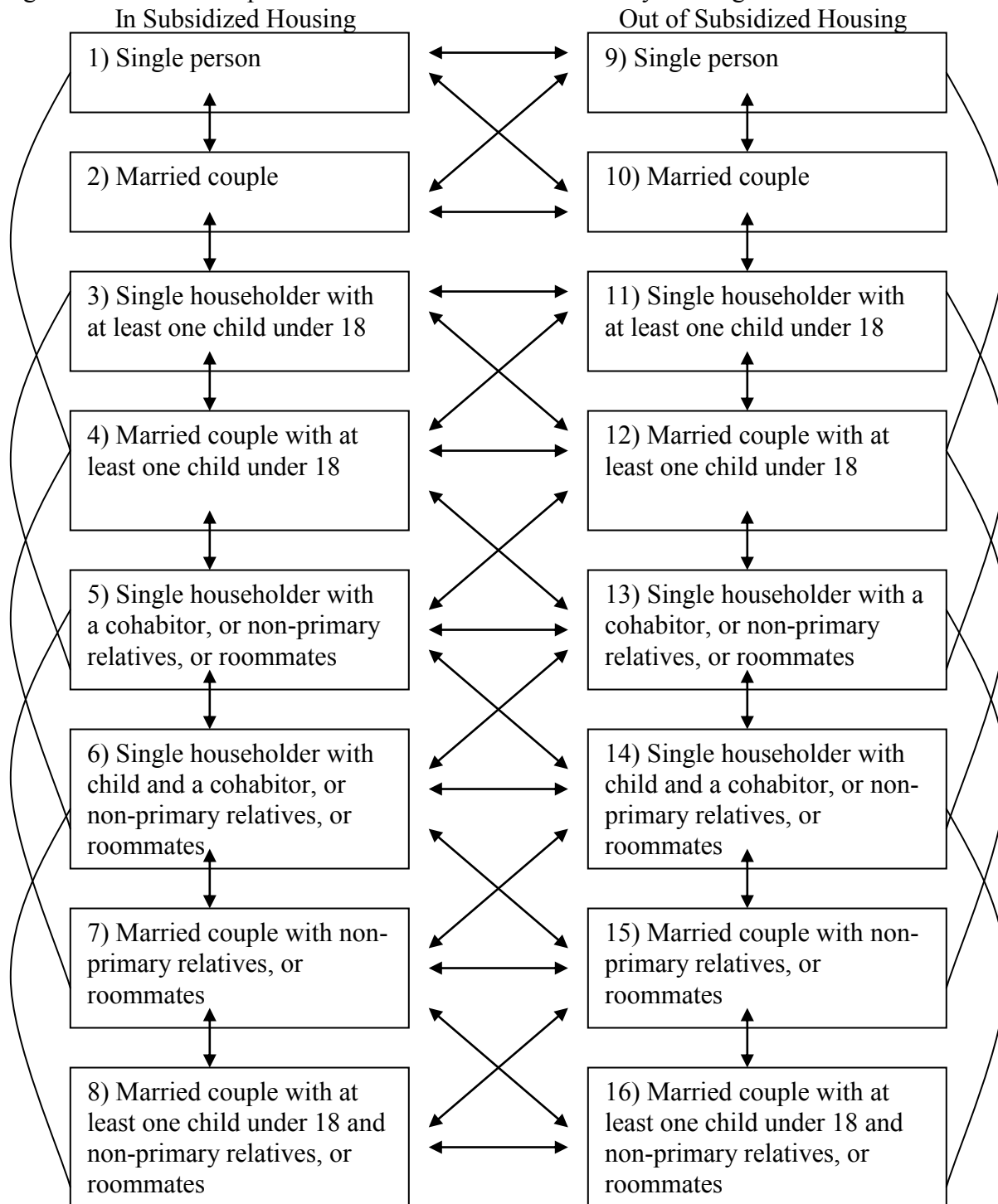
Table 7. Proportion of person-months lived between ages 0 and 89, observed and simulated number of people

State	Observed				
	number of people at age 0	Number of people at age 0 = 0	Number of people at age 0 = 1/2	Number of people at age 0 = x2	Number of people at age 0 = x4
1	0.013	0.013	0.013	0.013	0.013
2	0.003	0.003	0.003	0.003	0.003
3	0.019	0.016	0.019	0.027	0.038
4	0.010	0.008	0.010	0.014	0.020
5	0.002	0.001	0.002	0.002	0.002
6	0.002	0.001	0.002	0.003	0.005
7	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.001	0.001
9	0.153	0.153	0.153	0.153	0.153
10	0.199	0.199	0.199	0.199	0.199
11	0.124	0.125	0.124	0.121	0.117
12	0.399	0.403	0.399	0.388	0.374
13	0.036	0.036	0.036	0.036	0.037
14	0.018	0.019	0.018	0.017	0.016
15	0.006	0.006	0.006	0.006	0.006
16	0.016	0.016	0.016	0.015	0.015
Total	1.000	1.000	1.000	1.000	1.000

Table 8. Proportion of person-months lived between ages 18 and 89, observed and simulated number of people

State	Observed				
	number of people at age 18	Number of people at age 18 = 0	Number of people at age 18 = 1/2	Number of people at age 18 = x2	Number of people at age 18 = x4
1	0.017	0.016	0.016	0.017	0.017
2	0.004	0.004	0.004	0.004	0.004
3	0.013	0.010	0.011	0.013	0.016
4	0.008	0.006	0.007	0.008	0.009
5	0.002	0.002	0.002	0.002	0.002
6	0.001	0.001	0.001	0.001	0.001
7	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000
9	0.192	0.192	0.192	0.192	0.191
10	0.249	0.250	0.249	0.249	0.249
11	0.110	0.112	0.111	0.110	0.108
12	0.330	0.333	0.332	0.330	0.328
13	0.045	0.046	0.045	0.045	0.045
14	0.011	0.011	0.011	0.011	0.011
15	0.007	0.007	0.007	0.007	0.007
16	0.011	0.011	0.011	0.011	0.011
Total	1.000	1.000	1.000	1.000	1.000

Figure 1. Multi-state representation of household structure by housing status



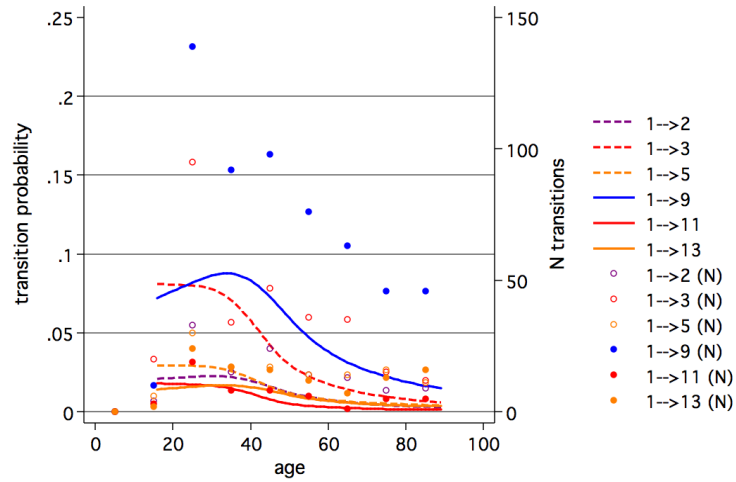


Figure 2. Transition probabilities from State 1
(Single individual, in subsidized housing)

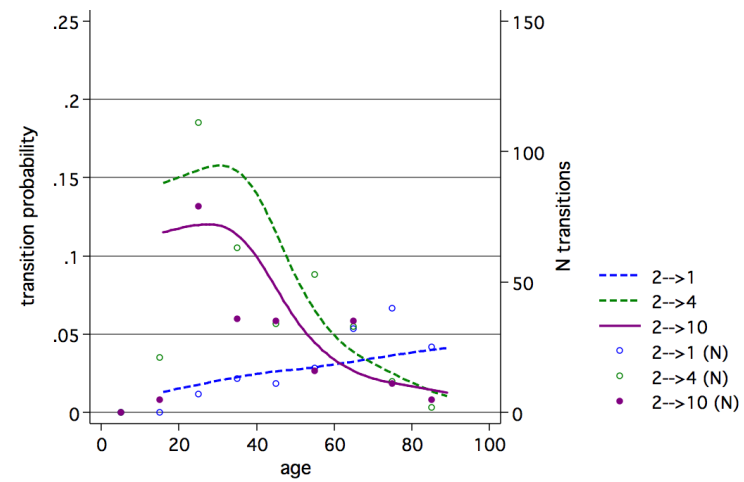


Figure 3. Transition probabilities from State 2
(Married couple, in subsidized housing)

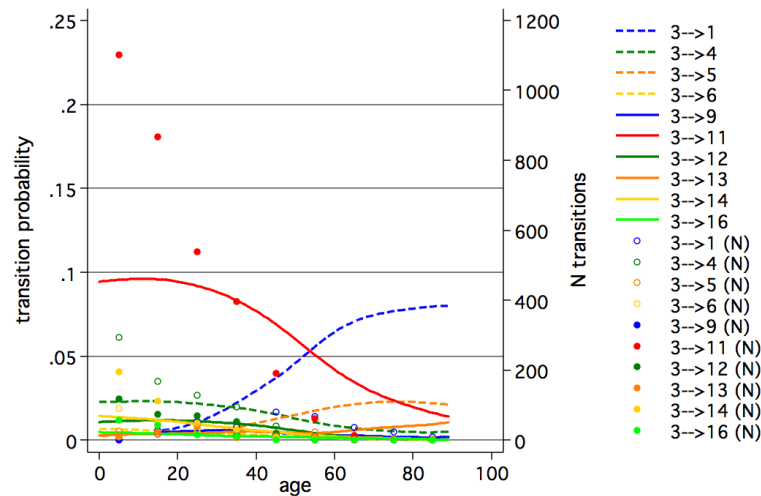


Figure 4. Transition probabilities from State 3
(Single householder with child, in subsidized housing)

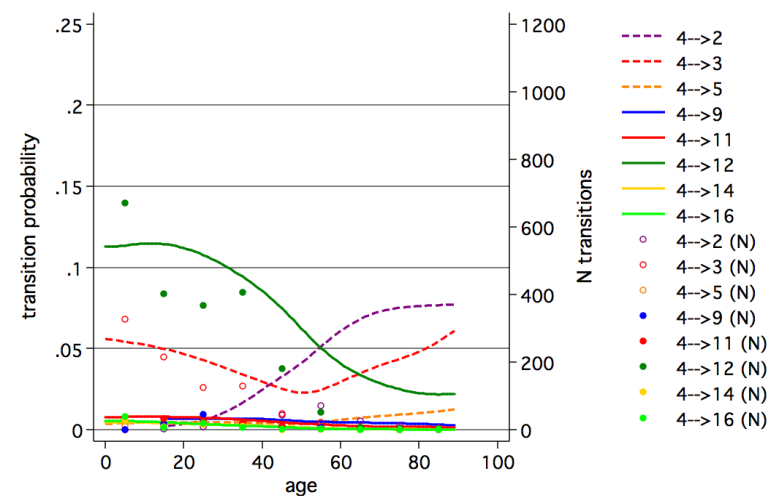


Figure 5. Transition probabilities from State 4
(Married couple with child, in subsidized housing)

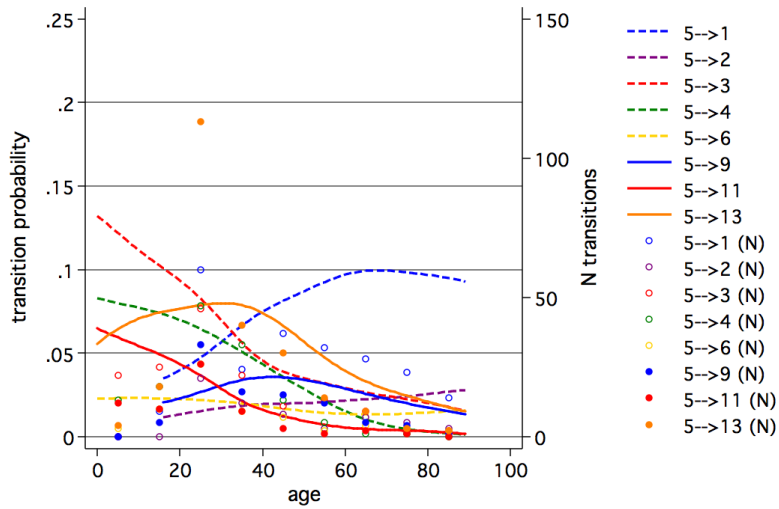


Figure 6. Transition probabilities from State 5
(Single with cohabitor/roommates, in subsidized housing)

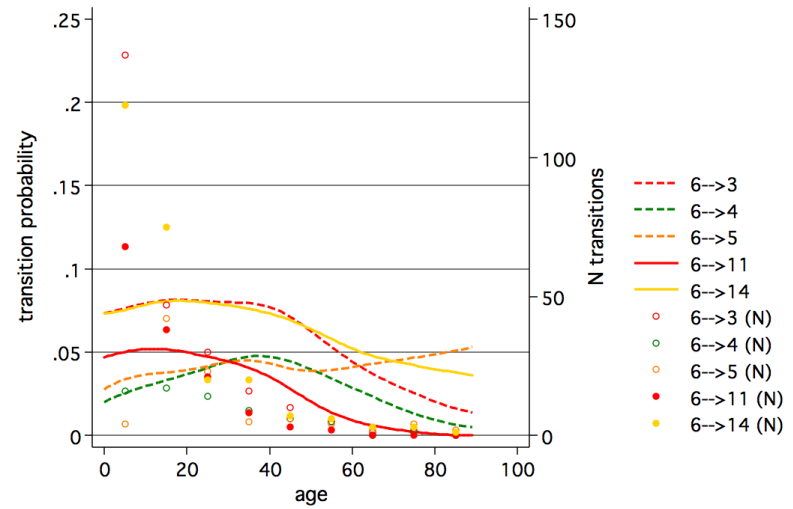


Figure 7. Transition probabilities from State 6
(Single with child, cohabitor/roommates, in subsidized housing)

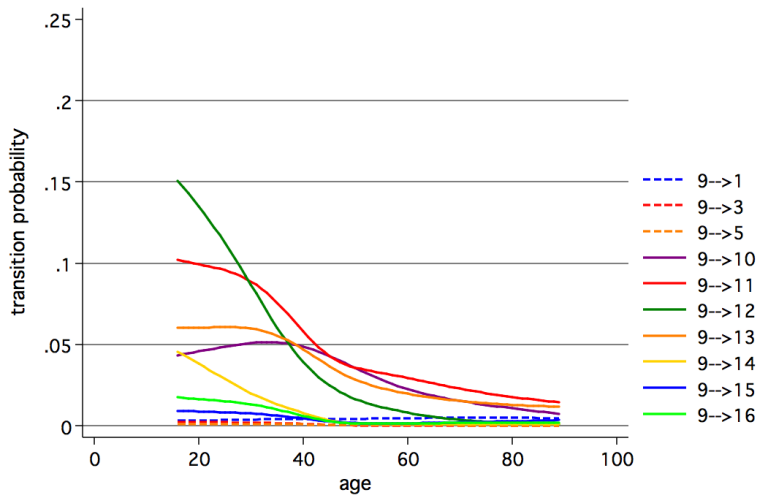


Figure 8. Transition probabilities from State 9
(Single person, not in subsidized housing)

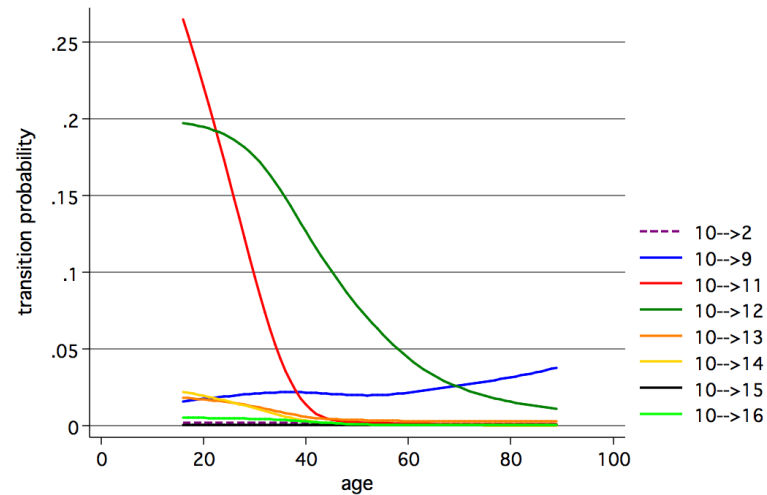


Figure 9. Transition probabilities from State 10
(Married couple, not in subsidized housing)

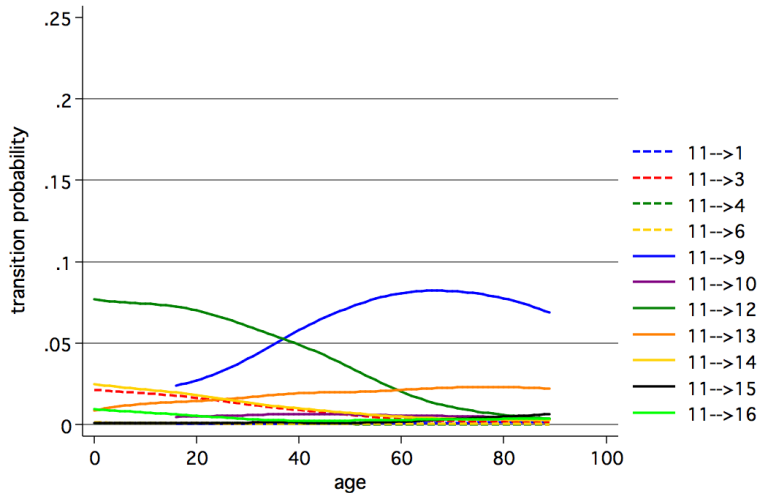


Figure 10. Transition probabilities from State 11
(Single householder with child, not in subsidized housing)

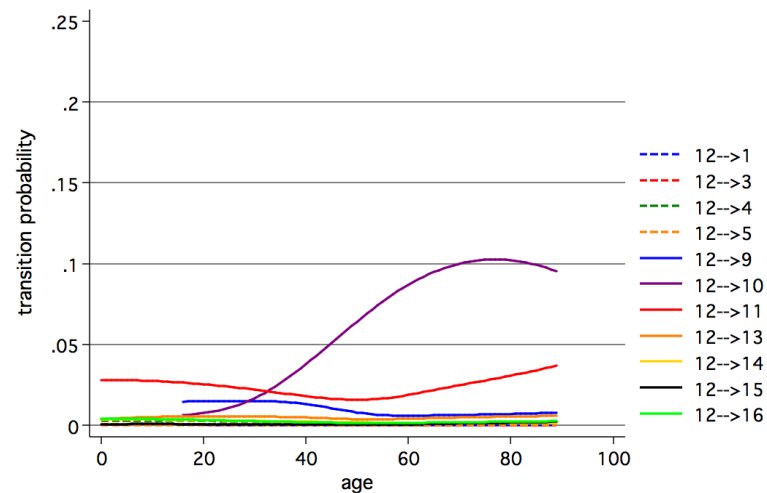


Figure 11. Transition probabilities from State 12
(Married couple with child, not in subsidized housing)

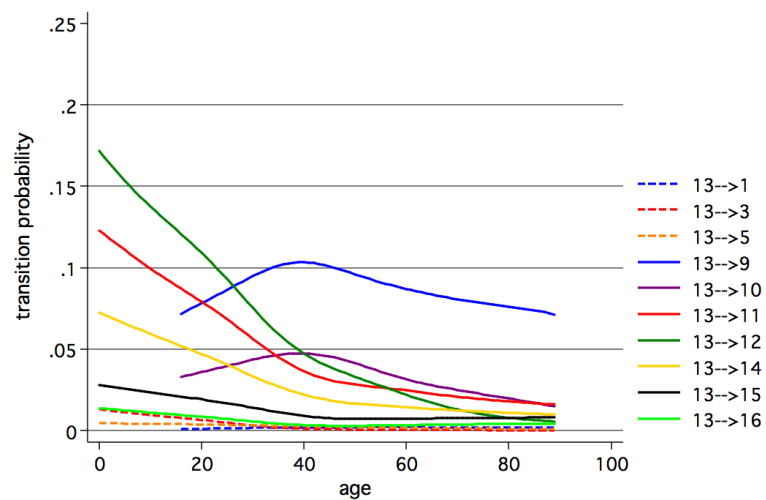


Figure 12. Transition probabilities from State 13
(Single with cohabitor/roommates, not in subsidized housing)

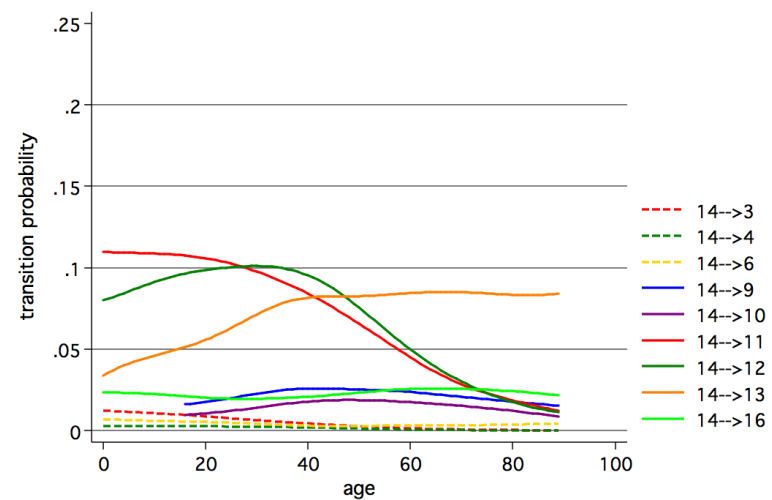


Figure 13. Transition probabilities from State 14
(Single w/ child, cohabitor/roommates, not in subsidized housing)

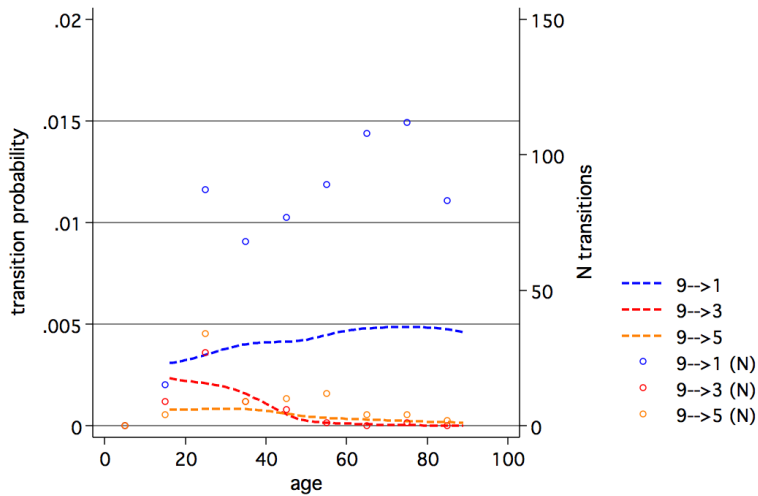


Figure 14. Transition probabilities from State 9
(Single person, not in subsidized housing)

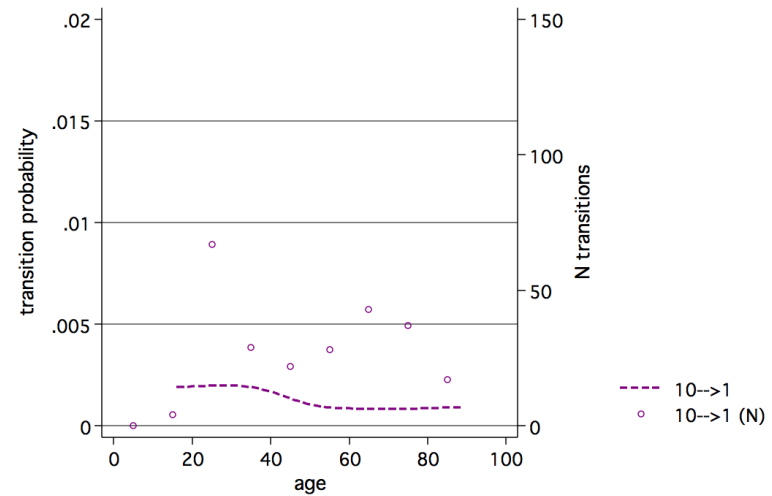


Figure 15. Transition probabilities from State 10
(Married couple, not in subsidized housing)

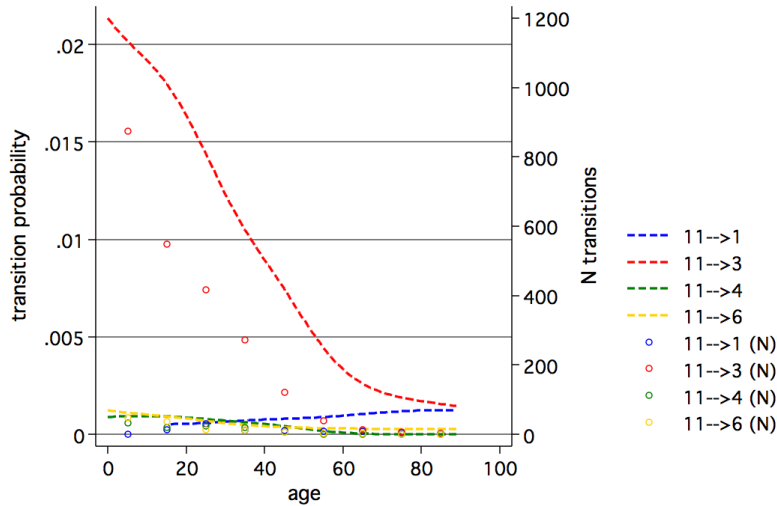


Figure 16. Transition probabilities from State 11
(Single householder with child, not in subsidized housing)

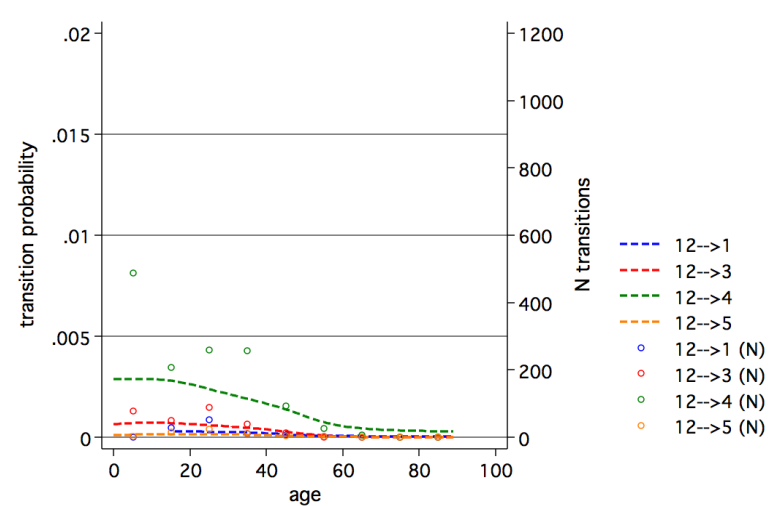
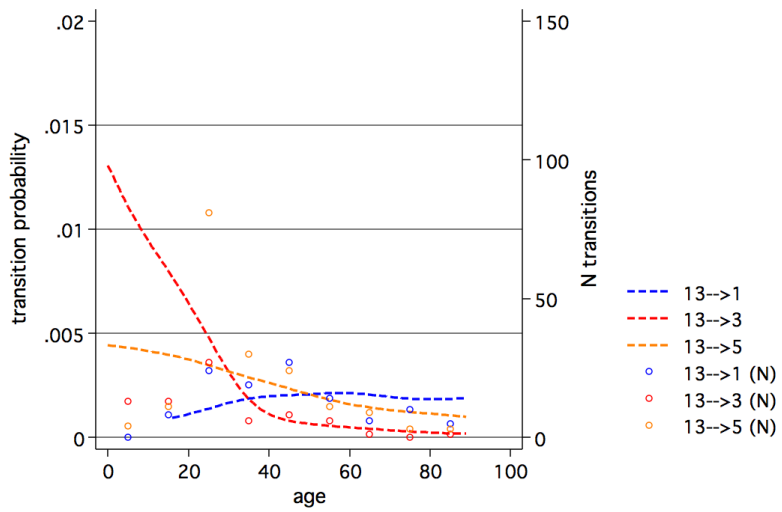


Figure 17. Transition probabilities from State 12
(Married couple with child, not in subsidized housing)



115 Figure 18. Transition probabilities from State 13
(Single with cohabitor/roommates, not in subsidized housing)

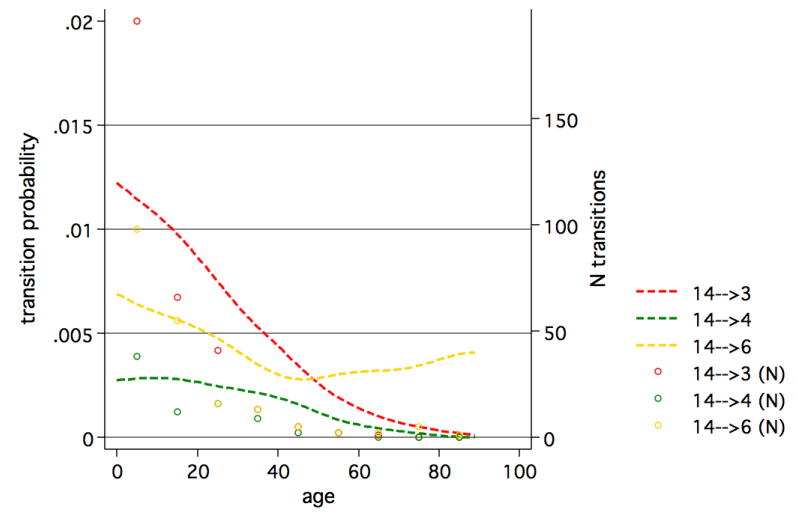


Figure 19. Transition probabilities from State 14
(Single w/ child, cohabitor/roommates, not in subsidized housing)

References

- Abt Associates Inc. 2006. *Effects of Housing Vouchers on Welfare Families*. www.huduser.org
- Berrick, Jill. 2006. "Marriage, Motherhood and Welfare Reform." *Social Policy and Society* 4(2): 133-145.
- Cox, Nicholas. 2005. "Speaking Stata: Smoothing in Various Directions". *Stata Journal* 5: 574 – 593.
- Ellen, Ingrid Gould and Brendan O’Flaherty. 2002. "Do Housing and Social Policies Make Households Too Small? Evidence from New York." Discussion Paper #0203–07. New York: Columbia University, Department of Economics.
- Freeman, Lance. 2005. "Household Composition and Housing Assistance: Examining the Link." *Cityscape: A Journal of Policy Development and Research* 8(2): 49-68.
- Mancuso, David, Charles Liebman, Vanessa Lindler and Anne Moses. 2003. "TANF Leavers: Examining the Relationship between the Receipt of Housing Assistance and Post-TANF Well-Being." *Cityscape: A Journal of Policy Development and Research* 6(2): 123-138.
- Mincy, Fiona. 2009. *The Effects of Housing Subsidies on Union Status and Visitation*. Ph.D. Dissertation. Milano the New School for Management and Urban Policy.
- Palloni, Albert. 2001. "Increment-Decrement Life Tables." *Demography: Measuring and Modeling Population Process*, Samuel Preston, Patrick Heuveline, and Michel Guillot, eds. Oxford: Blackwell Publishers: 256 - 272.
- Ruggles, Steven. 1997. "The effects of AFDC on American Family Structure, 1940-1990." *Journal of Family History* 22: 307-325.
- Schoen, Robert. 1975. "Constructing Increment-Decrement Life Tables." *Demography* (12): 313–24.
- Schoen, Robert. 1988. *Modeling Multigroup Populations*. New York: Plenum.
- Turner, Mark. 2003. *Cohabitation of Unwed Parents in Federally Subsidized Housing: Effects of Income and Housing Prices*. Draft report. Washington, DC: Urban Institute.

Chapter 3. Transitions to Adulthood of Children in Subsidized Housing

Early adulthood is a demographically dense period characterized by multiple short-spaced transitions to higher education, marriage, parenthood, employment, and independent living. It is a period when young adults “[try] out various life possibilities and gradually [move] toward making enduring decisions” (Arnett 2000, 473). However, the life circumstances of many young people may compel them to adopt adult roles at earlier ages or limit the types of transitions they can make (Keller et al. 2007). The timing and order of assuming adult responsibilities can set in place trajectories that are difficult to reverse, and thus, can have long-term consequences for individual wellbeing. This chapter examines how children who grew up in subsidized housing make the transition to adulthood and the extent to which they return to the subsidized housing program as adults.

A persistent controversy in academic and policy circles has been whether government programs aimed at helping the poor undermine the upward mobility of those who receive assistance. The importance of the issue can hardly be overstated, especially when it concerns the federal subsidized housing program. There are roughly 2 million families with children in subsidized housing; median length of stay for these families is about 3 years, but lengths of stay up to 25 years occur (Lubell et al. 2003). Therefore, it is important to know if the subsidized housing program is not only helping to meet shelter needs, but also does not hinder the educational, economic, and marriage prospects of children who grow up in subsidized housing.

My project is a detailed examination of how children who grew up in subsidized housing make the transition to adulthood. Specifically, I estimate the effect of subsidized housing on the timing of first marriage, first birth, and the establishment of an independent household. I also

assess whether living in subsidized housing makes children less likely to complete high school, continue their education after high school, and complete college, and more likely to live in subsidized housing after age 18. I use propensity score matching to statistically match children who grew up in subsidized housing to ones who are similar on observable characteristics but did not live in subsidized housing. I use these “treatment” and “control” groups to derive race- and gender-specific estimates of the effect of subsidized housing on the transition to adulthood. I also assess whether these effects vary by the stage in childhood when the stay in subsidized housing occurred, i.e. early childhood, middle childhood, or adolescence.

I find that subsidized housing accelerates the first birth and the establishment of an independent household only for black girls who were in subsidized housing between the ages of 6 and 11. Moreover, white children who grew up in subsidized housing have consistently worse educational outcomes compared to similar white children who did not grow up in subsidized housing. The most consistent finding in my paper, however, is that children who grew up in subsidized housing during any age in childhood are also much more likely to remain in subsidized housing as adults. If the subsidized housing program is indeed reproducing itself to a high degree and if subsidized units continue to be located in some of the poorest and socially marginalized inner-city neighborhoods, the program may be creating a persistent marginalized population that is not able to transmit the needed human and social capital to the next generation, so that it would not need further government assistance.

Determinants of the Timing and Pathways out of the Parental Home

Non-traditional family arrangements as well as low socioeconomic status accelerate the transitions out of the parental home. First, children in stepfamilies (White and Booth 1985) and

single-parent families (Bianchi 1987, Mitchell, Wister, and Burch 1989, Aquilino 1991, Goldscheider and Goldscheider 1993) leave the nest sooner than children who live with both biological parents. The differences between children in two-parent families versus those who grew up with other living arrangements is particularly large when it comes to leaving home to attend college. (Goldscheider and Goldscheider 1998). Growing up in a variety of alternative family arrangements decreases the likelihood of leaving home via college attendance and increases the likelihood of leaving early, especially to independence and marriage (Goldscheider and Goldscheider 1998). Nevertheless, among children who do not leave home to attend college, delayed home leaving and a period of premarital residential independence are associated with higher educational attainment (White and Lacy 1997).

Second, children from more affluent homes leave the nest later (Bianchi 1987) and marry later (Goldscheider and DaVanzo 1989, Michael and Tuma 1985) than less affluent children. This shows that parents could use their income to retard very early departures of their children and to deter the youngest adults from leaving via marriage (Avery, Goldscheider and Speare 1992). Leaving home early while not being well prepared to enter the labor force or at the expense of additional educational attainment may restrict the future options of young adults especially with respect to career and family formation (Goldscheider and Goldscheider 1998).

Gender and race also have discernible effects on the timing and pathways out of the family home independent of family circumstances. Women leave the nest earlier than men, with most differentials stemming from women's earlier age at marriage (Goldscheider and DaVanzo 1985, DaVanzo and Goldscheider 1990). Girls with a stepparent and stepsiblings are more likely to establish early residential independence than girls from intact families (Aquilino 1991). Unmarried mothers, however, are much more likely to live with their parents than unmarried

fathers (Goldscheider and DaVanzo 1985, Aquilino 1991). Blacks are less likely and Asians are much less likely than whites to be home leavers, with the differentials for blacks largely attributable to lower likelihoods of leaving for marriage (Goldscheider and DaVanzo 1989).

Nevertheless, parental resources, gender and race are only part of the determinants of leaving home. Housing costs (Christian 1989, Haurin, Hendershott and Kim 1993, Whittington and Peters 1996), job opportunities (Whittington and Peters 1996) and for women the extent of government-provided cash assistance (Ellwood and Bane 1995) affect when and how children transition to adulthood. First, children are more likely to live outside their parents' homes if rents are lower and wage opportunities higher (Haurin et al. 1992). Second, higher welfare benefits reduce the likelihood of a single mother living with her parents (Ellwood and Bane 1985, Hutchens et al. 1989). In fact, the growth of Aid to Families with Dependent Children (AFDC) may have had as much an impact on the increase in the proportion of those ages 15 to 24 who head their own households between 1961 and 1979 as the growth in real wages (Kent 1992).

The Transitions to Adulthood and Government Assistance

Given the relationship between poverty and leaving home early especially for reasons other than education, one might expect that children whose parents received some form of government assistance would follow the paths out of the home that poor children usually take. Indeed, parental welfare receipt has a negative effect on children's educational attainment, regardless of race and gender, especially for children whose mothers received welfare payments when the child was an adolescent (Ku 2001). Teens whose mothers received welfare are more likely to give birth out of wedlock and to become female heads of households (An et al. 1993, Rank and Cheng 1995). Moreover, there is a strong association between parental use of welfare

and offsprings' use of welfare (An et al. 1993, Gottschalk 1996). Although there is mixed evidence whether this association is causal in nature, what is more important is that receiving welfare does not seem to break the cycle of the intergenerational transmission of poverty (Gottschalk 1996, Rank and Cheng 1995). Growing up poor has a negative impact upon the development of human capital, which in turn places individuals at a greater risk of needing aid from public assistance programs at some point later in life (Rank and Cheng 1995).

When it comes to the subsidized housing program specifically, results from Britain show that children of public housing tenants compared to children of renters and home-owners experience most transitions to adulthood faster (Kneale and Sigle-Rushton 2010). They not only become parents sooner but also are more likely to stop their education at an earlier phase (Kneale and Sigle-Rushton 2010). The beneficial aspects of public housing do not work through investments in education but through the parents' ability to provide housing in kind, especially for their sons (Kneale and Sigle-Rushton 2010). The negative effects of subsidized housing appear to be concentrated in more recent cohorts as the subsidized housing program in Britain has become smaller and more focused on the most disadvantaged (Lupton et al. 2009). Therefore, the transition of the housing program to serving poorer households over time counteracted the beneficial effects of housing quality and stability and sped up children's transition to adulthood (Kneale and Sigle-Rushton 2010).

Nevertheless, there is some limited evidence that increasing the levels of government support to poor families leads to an increase in children's educational attainment, boosting the likelihood that a child would complete some college (Butler 1990). This finding indicates that parents may choose to use the extra income from government benefits to invest in their children's human capital. It is also consistent with the contention that rather than undermining

the children's self-esteem and control over their lives, adequate welfare levels provide a floor of income security and allow the family to focus on the future rather than worry about daily expenses (Perlman 1960, Butler 1990).

Research Model and Hypotheses

Given the mostly negative effects of growing up poor and receiving government benefits on children's life chances as well as the accelerated departures out of the home for children from disadvantaged backgrounds, how does subsidized housing influence the decision of children to leave the parental nest?

First, compared to all income-eligible renters, subsidized households are more likely to be female-headed and to rely on income from Social Security, TANF, SSI, and Food Stamps (HUD 2008). Therefore, given their more disadvantaged socioeconomic backgrounds, I expect children in subsidized housing to transition to adulthood at younger ages, especially via birth or via residential independence as opposed to enrollment in higher levels of schooling. Nevertheless, I also expect these differences to be due to selection into the program rather than any other features of the program itself.

Second, subsidized housing residents are less likely to experience overcrowding, more likely to stay in their apartments longer, and more likely to have access to higher quality housing than they would otherwise enjoy in the private market (HUD 2008, Newman and Schnare 1997). Therefore, as subsidized tenants have access to housing that is appropriate for their family size and in better condition than what is available for the same price on the private market, children may not be compelled to move out at the first available opportunity. Indeed, as a study of the British subsidized housing program indicates, parents in subsidized housing provide their adult sons with housing delaying the process of leaving the parental home (Kneale and Sigle-Rushton

2010). Therefore, I expect that boys in subsidized housing leave the parental home at later ages compared to boys from similar socioeconomic backgrounds.

Third, as rents in subsidized housing are lower than rents in the private sector, parents may have relatively more disposable income to invest in their children possibly cushioning the transition out of the family home (Newman 2008). In fact, children in subsidized housing are less likely to have been held back in school (Currie and Yelowitz 2000) and less likely to be undernourished (Meyers et al. 1995, 2005) compared to children of similar socioeconomic backgrounds who did not grow up in subsidized housing. These findings suggest that even though children in subsidized housing grow up in families that are more socio-economically disadvantaged, some of the negative effects of growing up in a poor family may be mitigated by access to affordable housing that leaves parents with more disposable income.

Nevertheless, since the program helps to offset the largest expense in the budget of low-income families, having rent covered might actually reduce the labor force participation of subsidized households (for an extensive review of this topic see Rosenthal 2007)³². Moreover, taking up the subsidy may lead to suboptimal residential location choices if the only available subsidized housing is in neighborhoods with poor schools and low levels of safety, meaning that in some cases families would have to make a choice between living in affordable housing versus living in a better neighborhood but in more expensive housing. In fact, compared to other rental housing and to housing occupied by welfare recipients, public housing is far more likely to be

³² There are two reasons why households receiving housing subsidies may work less. First, since the rent of households in subsidized housing is tied to the amount of income earned, the penalty that households receive for increasing work effort reduces the value of work for subsidized households compared to other households. Therefore, subsidized households may choose to devote more time to leisure as opposed to work, an effect that labor economists call a “substitution effect.” Second, since subsidies represent a form of income, that amount must no longer be earned to maintain current utility levels, an effect that labor economists call an “income effect.”

located in racially segregated areas with high concentrations of households in poverty (Newman and Schnare 1997). Segregated poor neighborhoods could prevent children in subsidized housing from coming into contact with middle-class role models leading to the development of cultural norms that may be at odds with mainstream social conventions (Wilson 1987). The assumption of norms that are different from mainstream values may in turn lead to early sexual initiation, non-marital childbirth and engagement in illicit activities (Wilson 1987). Moreover, the poor schools in segregated neighborhoods may not prepare children for future college attendance.

Therefore, in terms of the household and neighborhood resources available to children, the subsidized housing program has an ambiguous effect on the transition to adulthood. If parents choose to live in affordable housing that is in disadvantaged neighborhoods, the gains to children due to good housing quality and stability might be counteracted by the bad quality of the local environments especially in terms of schools and safety. Moreover, if parents reduce work effort because of the housing subsidy, the lower income levels of parents might offset the positive effects of living in a stable home.

Lastly, ethnographic evidence suggests that many families have been in subsidized housing for generations (Venkatesh 2002). While the intergenerational transmission of subsidized housing status may be only a feature of the most distressed public housing projects, it could be the case that the subsidized housing program is reproducing itself by elevating the risk of children reentering the program as adults. Therefore, the program may be creating a persistent marginalized population that is not able to transmit the needed human and social capital to the next generation, so that it would not need further government assistance. Therefore, I expect subsidized children to find themselves in subsidized housing as adults. I also expect this difference not to disappear once I adjust for socioeconomic and neighborhood characteristics.

In sum, the subsidized housing program may exert countervailing effects on the transition to adulthood. First, because the program admits households that are relatively disadvantaged, I expect that children who grow up in subsidized housing would experience most transitions to adulthood at an early age. Nevertheless, I also expect those differences to be small once I adjust for family and neighborhood characteristics. Second, I expect that subsidized housing may postpone some of the transitions to adulthood, especially when it comes to establishing an independent residence for the adult sons of subsidized housing recipients. Third, I expect that being in subsidized housing as a child elevates the risk of utilizing the program as an adult.

The primary contributions of my paper are, first, to describe the effect of a large government support program on the launching process of young adults and, second, to provide estimates of the degree to which the housing program has a tendency to reproduce itself by having those who were subsidized as children remain in the program as adults. My study is only the second one to my knowledge to link housing subsidies and the transition to adulthood (Kneale and Sigle-Rushton 2010) and the first one to do so within the U.S. context. Moreover, it is the first one to describe and quantify the intergenerational continuity in the receipt of housing assistance. Although there is a long standing interest in the transmission of AFDC receipt from parents to children and the transition to adulthood of children who grew up in single-parent families receiving welfare (Gottschalk 1996, Rank and Cheng 1995), we know little about what happens to children who grew up in the subsidized housing program, except for their employment outcomes and earnings in adulthood (Newman and Harkness 2002). Moreover, while there is ethnographic evidence that some families remain in subsidized housing for generations (Venkatesh 2002), we do not know the degree to which the subsidized housing

program is reproducing itself and whether the strong intergenerational component is only a feature of the most distressed public housing projects rather than the program as a whole.

Methods

I explore the following transitions to adulthood: (a) first marriage, (b) first birth, (c) establishing an independent household, (d) high school completion, (e) continuing education after high school, (f) college completion, and (g) living in subsidized housing after age 18. I compare these transitions to adulthood between children who were in subsidized housing between ages 2 through 5, ages 6 through 11, and ages 12 through 17 to the transitions to adulthood of children who did not live in subsidized housing across these age periods.

In order to estimate the comparisons in my analysis, I use the potential outcome approach in which the effect of subsidized housing is defined as the difference between the two potential outcomes in the “treatment” (in subsidized housing) and “control” (not in subsidized housing) groups (Morgan and Winship 2007, Heckman 2005, Imbens 2004, Rubin 1974). This amounts to asking whether children who lived in subsidized housing across the different age periods in childhood would have had different transitions to adulthood had they not lived in subsidized housing.

The potential outcome approach to estimating the effect of living in subsidized housing is meant to address the fundamental problem of causal inference. The problem stems from the impossibility to observe the same child experience both the “treatment” and “control” conditions (Holland 1986). The main limitation of the potential outcome approach is the assumption of “ignorability” or “selection on observables.” This assumption states that conditional on the set of pretreatment observable covariates, there are no additional confounders between children who

grew up in subsidized housing and ones who did not. While this is an assumption, which is impossible to verify in practice, my dataset provides me with a set of pre-treatment covariates that allow me to create “treatment” and “control” groups that are statistically similar on observed characteristics.

My analysis proceeds in three steps. First, I estimate the probability of being in subsidized housing between ages 2 and 5, ages 6 and 11 and ages 12 and 17 based upon a set of pre-treatment observed socioeconomic covariates. I obtain these probabilities using a probit regression of the following form:

$$P = p(d_i = 1 | \mathbf{X}) = \Phi \left(\sum_{k=0}^K \beta_k \mathbf{X}_{ik} \right), \quad (1)$$

where P is the propensity score; d_i indicates whether or not individual i is in subsidized housing; and $\mathbf{X}$ represents a vector of observed socioeconomic covariates lagged with respect to the treatment period in childhood. I estimate separate probit models by race and compute the probability of being in subsidized housing respectively between ages 2 and 5, ages 6 and 11 and ages 12 and 17. The covariates for the first model are evaluated at birth, for the second model at age 3, and for the third model at age 9³³.

The procedure described above creates three separate treatment effects that depend on the different ages over childhood that individuals can be in subsidized housing, i.e. early childhood (ages 2-5), middle childhood (ages 6-11) and adolescence (ages 12-17). Treatment in childhood can occur in none, any, or all of the three periods. The controls include all those children who do not experience the treatment during a childhood period regardless of whether they experience the treatment in prior or subsequent periods.

³³ Therefore, children who are in the analysis for ages 2 through 5 are those who entered the PSID at birth. Children who are in the analysis for age 6 through 11 are those who entered the PSID before age 3. Finally, children who are in the analysis for ages 12 through 17 are those who entered the PSID before age 9.

Second, I estimate the effects of subsidized housing on first birth, first marriage, and establishing an independent household using discrete-time event history analysis. The conditional probability of each of these outcomes at time t is the discrete-time hazard rate:

$$\ln(f_{it} / 1 - f_{it}) = \alpha_t + \delta d_i + \beta P_i + \lambda_1 A_{it} + \lambda_2 A_{it}^2, \quad (2)$$

where f_{it} is a binary variable equal to 1 if the outcome occurs to the i^{th} observation at time t and 0 otherwise; d_i indicates whether or not individual i was in subsidized housing during the relevant childhood period; P_i represents the propensity for being in subsidized housing as estimated by equation (1); and A indicates age. The parameter δ is the average effect of subsidized housing. For simplicity, I only condition on the propensity score P as a function of X rather than X itself³⁴. The clock in all event history analyses starts at age 15. Individuals leave the analysis if they experience the event (i.e. first marriage, first birth, establishment of an independent household) or if they are right-censored (i.e. they leave the survey before experiencing the event).

Third, I estimate unadjusted differences in the probability of high school completion, continuing education after high school, college completion, and living in subsidized housing after age 18 and compare these to kernel matching estimates where children are matched according to their propensity to be in subsidized housing during childhood using a weighted distance between each treated child and each untreated child based on the propensity of each child to be in subsidized housing for each period during childhood (Rosenbaum and Rubin 1983, 1984, Rubin 1997). I estimate the propensity to be in subsidized housing during childhood using equation (1). Then, I derive the average treatment effect on the treated (TT) as:

$$E[\delta \mid d=1, P] = E[y^{d=1} - y^{d=0} \mid d=1, P] \quad (3)$$

³⁴ Work by Rosenbaum and Rubin (1983, 1984) demonstrates that it is sufficient to only use the propensity score as opposed to the whole vector of observables that go into the estimation of the propensity score whenever X has a linear regression on some scalar function of the propensity score P .

Unlike the discrete time hazard analyses above, for all binary outcomes I estimate the average treatment effect only for children who were at least 25 years old in 2007 and did not attrit from the survey before they reached 25. This gives respondents sufficient time to complete most educational transitions as well as sufficient time to experience a return to subsidized housing.

While there is no consensus as to which matching estimator performs best (Morgan and Harding 2006; Morgan and Winship 2007), kernel matching (Leuven and Sianesi 2003) has the least bias with a well-specified propensity equation. On the other hand, nearest neighbor matching with five neighbors (Abadie et al. 2004; Herr et al. 2004) performs best with a poorly specified propensity score equation. Therefore, as a sensitivity test for misspecification of my propensity score equation, I compare the estimates I obtain with kernel matching to estimates I obtain with nearest neighbor matching with five controls. In addition to using different ways of estimating the propensity score, I also experiment with different combinations of the independent variables in my propensity score equation.

Data

I use the Panel Study of Income Dynamics (PSID) for my analysis. The PSID is a nationally representative, longitudinal survey of US households, which started in 1968. It was conducted annually through 1997 and biennially thereafter. The PSID contains a rich set of household structure and socioeconomic variables with an oversample of low-income and minority families. Attrition from the PSID has been modest and has not compromised the representativeness of the data (Fitzgerald et al. 1998, Lillard and Panis 1994). The PSID has been asking household heads whether they live in public housing or whether they receive any other

help from federal, state or local sources in paying their rent in every wave of the survey since 1986. Moreover, out of concern for the quality of information obtained by asking respondents about their receipt of housing subsidies (Shroder and Martin 1996), each PSID family in every year through 1995 has been identified as living in a subsidized unit by matching its address to HUD and local Public Housing Agencies' administrative records (Newman et al. 2009). The subsidized status of voucher recipients has not been matched to administrative records, as HUD does not maintain a database with the addresses of those subsidized through the voucher program. In order to identify children who have lived in a home that has received a low-income housing subsidy, I use both the self-reports of household heads regarding their receipt of housing assistance as well as the information matched to administrative records. This allows me to use the full span of PSID data from 1968 through 2007. I do not disaggregate across different types of housing subsidies, as there are too few cases to support such analyses especially for white children.

In addition to using the PSID demographic and socioeconomic data on respondents, I also incorporate into the analysis the PSID-geocode files, which match the addresses of PSID respondents to the corresponding metropolitan area, county, and census tract in which they live. I use these codes to attach census tract and metropolitan-level information to every respondent at each interview year. Although census tracts are only an approximation of the concept of a neighborhood, their use in this capacity is widespread in sociological research. I use the Geolytics Neighborhood Change Database (NCDB) to access U.S. Census data for 1970, 1980, 1990 and 2000 in constant 2000 census tract boundaries. The consistency of census tracts across decades allows me to employ linear interpolation to compute the census tract characteristics of PSID respondents during intercensal years.

Results: *Descriptive Statistics*

Tables 1 and 2 describe the covariates used to predict stays in subsidized housing by childhood stage and by race.³⁵ These measures include socioeconomic characteristics associated with the household of each child in addition to characteristics that may make some households more likely to participate in the subsidized housing program given the administrative rules of the program. Covariates for the 2 to 5 age period are measured at birth, for the 6 to 11 age period are measured at age 3, and for the 12 to 17 age period are measured at age 9.

The descriptive statistics show that children who are in subsidized housing during each respective period are much more likely to have been in subsidized housing before the treatment period. They are also more likely to come from a single-headed household and slightly less likely to have extended family members present in the household. Subsidized children also come from slightly smaller families and are slightly more likely to have a sibling of the opposite gender. I am including the covariate that describes the gender composition of the sibship because of a subsidized housing regulation that states that children of opposite genders above the age of 5 need to have their own bedrooms. This rule could make households with children of opposite genders less likely to live in a subsidized housing apartment if there are no units available that are big enough to accommodate the family given the gender composition of the sibship.

On average, non-subsidized children live with more educated parents and have family income about twice that of subsidized children. The families of subsidized children, on the other hand, receive at least 50 percent more transfer income, are more likely to be on food stamps and

³⁵ The group of non-black children is overwhelmingly non-Hispanic white. Even though the PSID has made an effort to fold in a sample of Latinos after 1990, their numbers are not large enough to warrant a separate group for analysis.

receive AFDC/TANF payments. Children in subsidized housing are less likely to live in smaller MSAs and more likely to live in MSAs of a size between 500,000 to 5,000,000 people. Finally, children in subsidized housing are more likely to come from neighborhoods with higher proportion of non-Hispanic blacks, and higher rates of poverty, unemployment, welfare receipt, female-headed households and density of children. The neighborhood characteristics that I am using in this paper correspond to the scale of neighborhood “concentrated disadvantage” developed by Sampson et al. (1997) to study the effect of neighborhoods on children’s outcomes. In the context of my study, it is important to fold into the propensity score the types of metropolitan areas that children come from as well as the types of neighborhoods they live in prior to experiencing the treatment of subsidized housing. That makes the propensity score reflect the disadvantage that children are facing not only with respect to their family environments but also with respect to their neighborhood environments.

Results: *Propensity score estimation*

Tables 3 and 4 show the probit results of the estimation of the propensity score of being in subsidized housing by childhood stage. I estimate the propensity score separately by race. This separation in the analyses for blacks and non-blacks provides a better statistical balancing of the estimated propensity score between children who were in subsidized housing during childhood and those who were not. Nevertheless, please note that non-black children have a significantly lower propensity to enter subsidized housing. Therefore, any analyses of the non-black population should be interpreted with caution as they are based on few “treatment” cases. For example, only 4 percent of non-black children in the PSID are in subsidized housing between the ages of 2 and 5 (N=267). The corresponding number for black children is 24 percent (N=1,562).

These numbers reflect the reality of the U.S. subsidized housing program, where black households with children represent an overwhelming majority of the tenants of units targeted to families with children while white households represent a majority of the tenants of units targeted to the elderly (Bickford and Massey 1991). Therefore, while I present results for non-black children below, those analyses are based on few actual cases and should be interpreted with caution.

The betas in the probit propensity score models in Tables 3 and 4 are z-scores that can be interpreted as the expected changes in the standard deviation units in the latent dependent variable for each covariate in the model. Previous stays in subsidized housing, household composition, and family labor income are consistently statistically significant predictors of being in subsidized housing across all childhood periods. Children who have previous history of being in subsidized housing are significantly more likely to find themselves in subsidized housing during any of the childhood periods. Increasing labor income reduces the probability of being in subsidized housing both for black and non-black children, while black children who live in single-headed households are more likely than those from two-parent families to find themselves in subsidized housing.

Other variables in the two probit regressions have the expected sign but are generally not statistically significant. For example, black children who have siblings of different gender and those who are living with extended family members are less likely to be in subsidized housing. Children from families in the middle of the educational distribution are more likely to be in subsidized housing. Similarly to family labor income, family transfer income and the receipt of AFDC/TANF generally reduce the probability of being in subsidized housing. For black children, the percent non-Hispanic black and the percent unemployed in the neighborhood

reduces the probability of being in subsidized housing while the percent female-headed households increases that probability.

Results: *First marriage, first birth, and the establishment of an independent household*

Tables 5, 6 and 7 show discrete-time hazard analyses of the probability of first marriage, first birth, and establishment of an independent household disaggregated by childhood stage in subsidized housing, gender and race. As mentioned above, the coefficient on the variables that indicates whether a child is in subsidized housing represents the average effect of being in subsidized housing during the respective period in childhood. For example, black boys who were in subsidized housing between the ages 2 and 5 have a .13 lower hazard of getting married (or 12% reduction in the odds of getting married) than similar black boys who were not in subsidized housing between the ages of 2 and 5. This effect of subsidized housing is not statistically significant. On the other hand, black girls who were in subsidized housing between the ages of 2 and 5 have .29 higher hazard of getting married (or a 34% increase in the odds of getting married) than similar black girls who were not in subsidized housing between the ages of 2 and 5. This effect of subsidized housing is also not statistically significant.

In fact, subsidized housing does not seem to have a statistically significant effect on most of the outcomes across gender, race, and childhood stage. There are no statistically significant results for black boys. For black girls, a stay in subsidized housing during the ages of 6 and 11 is associated with 40% higher odds of first birth. Again for black girls, a stay in subsidized housing between the ages of 6 and 11 is associated with 48% higher odds of establishing an independent household.

On the other hand, for non-blacks the effect of subsidized housing is statistically significant only for males in the regressions of fathering a child for the first time. Non-black boys have 103% higher odds of becoming a father for the first time if they were in subsidized housing between the ages of 12 and 17. While this is indeed a large estimate, it is based on very few cases. Therefore, I present it here for completeness rather than to draw substantive conclusions about the effect of subsidized housing.

While for most children in most childhood periods there are no statistically significant effects of subsidized housing on the outcomes that I examine, it is possible that the coefficients in the regression might be biased due to matching on endogenous variables. Even though all covariates in the matching regressions in Tables 3 and 4 are measured prior to the treatment in terms of temporal ordering, it is possible that parents who anticipate to enter subsidized housing in the future might modify their labor force participation, so that their incomes remain low enough during the process of being approved for a subsidized apartment. It is also possible that a single mother might hold off on marrying her partner if that would disqualify her from entering subsidized housing. It is also possible that households might postpone moving to a different neighborhood in anticipation of getting a housing subsidy. Any of these scenarios would imply that the treatment of subsidized housing is jointly determined with income, household structure, and neighborhood choice even prior to entering subsidized housing. Therefore, I implement a series of robustness checks using different combinations of the covariates in the propensity score equations. I estimate the propensity score without including a control for prior stays in subsidized housing, without including controls for neighborhood characteristics, without including controls for income, without including controls for household structure, and without including controls both for income and household structure. The results across all regressions

stay robust across all different specifications of the propensity score equation. Tables A1 and A2 in Appendix A present the coefficient on the subsidized housing covariate across all discrete time models using different specifications of the propensity score equation³⁶. The stability of the results across all models gives me confidence that any possible matching on confounding variables does not lead me to different substantive conclusions regarding the effect of subsidized housing.

Results: *Education in young adulthood and return to the subsidized housing program*

In Tables 8 and 9, I report unmatched and matched differences between children who were in subsidized housing by childhood stage and children who were not in subsidized housing in that particular childhood stage for the last two sets of outcomes: being in subsidized housing after age 18 and the probability of reaching different educational milestones. The unmatched differences establish baseline estimates of the effect of subsidized housing against which I can compare my matched results. The unmatched differences show that children who were in subsidized housing during childhood are more likely to be in subsidized housing after age 18, either as a head of household or not, less likely to complete high school, less likely to continue their education after high school and less likely to get a college degree. The only unmatched differences that are not statistically significant at least at the .05-level are the ones that show the differences in educational outcomes between black children who were in subsidized housing between the ages of 2 and 5 and black children who were not in subsidized housing at those ages.

Kernel matching reduces both the point estimates of the effect of subsidized housing and the statistical significance of the estimates especially for black children. When I match children

³⁶ Full model estimates are available from the author upon request.

using the propensity of being in subsidized housing, black children who were in subsidized housing during any stage in childhood do not have statistically different educational outcomes from black children who were in subsidized housing during the respective childhood stage. The only outcome for black children that remains consistently statistically significant at the .05-level after the matching procedure involves being in subsidized housing as a head of household after age 18. For example, black children who were in subsidized housing between the ages of 2 and 5 have a 19 percent higher level of being in subsidized housing as a head of household after age 18. The corresponding numbers for the 6-11 and 12-17 age groups are 21 percent and 59 percent. The results of this outcome are similar for white children in the 6-11 and 12-17 age groups, who also have higher probabilities of being in subsidized housing as a head of household after age 18. For example, white children who were in subsidized housing between the ages of 12 and 17 have a 32 percent higher level of being in subsidized housing after age 18 as a head of household.

Unlike black children, white children who grew up in subsidized housing do seem to have worse educational outcomes than similar white children who did not grow up in subsidized housing. These effects are especially big for white children who were in subsidized housing between the ages of 12 and 17. Nevertheless, as mentioned above these results should be interpreted with caution given the small number of white children who actually received the “treatment” of subsidized housing.

The nearest neighbor estimates are in line with the kernel estimates and do not change the substantive conclusion I reach while using the kernel estimates. As mentioned above, kernel matching (Leuven and Sianesi 2003) has the least bias with a well-specified propensity score equation (Morgan and Winship 2007). Matching with five nearest neighbors (Abadie et al. 2004, Herr et al. 2004) has the least bias with a poorly specified propensity score equation (Morgan

and Winship 2007). Moreover, as Tables A3 and A4 show, my kernel matching estimates do not change substantially in size and statistical significance once I remove certain covariates from the matching equation. The results of my sensitivity analyses give me confidence that my conclusions hold under different assumptions regarding the propensity score equation.

Discussion

The timing and circumstances of leaving home are an important part of the status attainment process (White and Lacy 1997). To the extent that early transitions interfere with investments in education or hasten the assumption of family roles, these patterns can contribute to the intergenerational transmission of poverty and disadvantage. Early transitions to adulthood may have negative consequences for the life chances of children who may not be prepared to take on adult responsibilities or be able to sustain adult roles successfully (Chassin et al. 1992). As subsidized housing provides stable and better-quality housing than what most families would be able to afford on their own (Newman et al. 2009), children growing up with rental subsidies may be shielded from some of the adverse consequences of growing up in poor families. On the other hand, if growing up in subsidized housing makes children more likely to remain in subsidized housing as adults, the program may be confining generations of individuals to poor disadvantaged neighborhoods. By analyzing how government support in childhood interacts with the transitions of children into adulthood as well as the probability of re-entering subsidized housing as an adult, this project sheds light on whether federal policies aimed at supporting poor families hinder the upward mobility of children.

I use nationally representative longitudinal data on children that follows them across different stages in childhood and into adulthood. I focus on the subsidized housing program as a

possible intervening mechanism in the transition to adulthood. I adopt the potential outcome approach using propensity score matching to explore the following transitions to adulthood: (a) first marriage, (b) first birth, (c) establishing an independent household, (d) high school completion, (e) continuing education after high school, (f) college completion, and (g) living in subsidized housing after age 18. I compare these transitions to adulthood between children who were in subsidized housing between ages 2 through 5, ages 6 through 11 and ages 12 through 17 to the transitions to adulthood of children who did not live in subsidized housing across these age periods. I find that subsidized housing accelerates the establishment of an independent household and the timing of first birth only for black girls who were in subsidized housing between the ages of 6 and 11. Moreover, all children who grew up in subsidized housing during any age in childhood are much more likely to remain in subsidized housing as adults by establishing their own independent households. While these findings show the launching process of subsidized children is not that different from the launching process of non-subsidized children, they also show that the subsidized housing program does reproduce itself by having those who grew up in subsidized housing establish their own households in the program after age 18.

The main limitation to my findings is the assumption of “ignorability” based on observed covariates, which implies that I have adequately controlled for all covariates that influence the propensity to be in subsidized housing. While this is not an assumption that is verifiable using observational data, it is crucial to interpreting the effects I find as causal as opposed to just associational. Even though I have access to extensive measures on family and neighborhood characteristics for every child in the PSID, it could still be the case that children who never were in subsidized housing are different in unmeasured ways from those who did have experience with the program. For example, even though I control for the neighborhood environment of

children before they enter subsidized housing, my measures capture the average levels of concentrated disadvantage within census tracts only at a single point in a child's life. These measures are only crude approximations of the type of disadvantage that children face in their daily lives; therefore, any unmeasured neighborhood characteristics might be responsible for some of the statistically significant effects of subsidized housing. Moreover, even though I separate out the exposure to subsidized housing across different childhood stages, I do not explicitly control for the actual length of time that children live in subsidized housing. Therefore, I am averaging over the effects of subsidized housing across children who may have stayed briefly in the program and those who may have stayed for longer periods of time. Finally, due to sample size limitations, I am averaging over the effects of building-based and voucher subsidized housing. These two programs could potentially have very different implications for the development of children as voucher users can use their subsidy on the private housing market and do tend to live in slightly more advantaged neighborhoods than families in traditional building-based subsidized housing.

Despite these limitations, my study is an important first step in understanding the implications of subsidized housing for the intergenerational transmission of disadvantage. While it is the case that subsidized housing seems to speed up the first births and residential independence of black girls who received the subsidy in middle childhood, the most consistent finding in my paper is that children who grew up in subsidized housing are much more likely to remain in subsidized housing as adults not because parents are providing housing for their adult children but rather because subsidized children grow up to form their own households in the subsidized housing program. The policy implications of this conclusion depend on the underlying mechanisms that link the subsidized housing program to the behavior of children who

grew up in it. It could be the case that parents pass information to children regarding the process of entering subsidized housing. Therefore, children who grew up in subsidized housing are better informed about the program compared to children who never lived in subsidized housing. In this case, as Gottschalk (1996) has observed with respect to welfare, the intergenerational transmission of subsidized housing status resembles the process of the intergenerational transmission of occupations. In other words, as the costs of obtaining information about the subsidized program are lower for children living in subsidized households, these children will have higher probabilities of participating in the program as adults. Any policy that changes the participation rates of the parents' generation would not change the participation rates in the children's generation, as children who grew up in subsidized housing would still have the informational advantage.

On the other hand, if subsidized parents are not able to transmit the needed human and social capital to the next generation because of their participation in the subsidized program, then the consequences of growing up in subsidized housing might be amenable to policy changes. My study suggests some possible mechanisms that might make children who grew up in subsidized housing more likely to return to the program as adults, namely the earlier ages of first birth for some black females and the lower levels of educational attainment for white children. A possible explanation for these findings may be the fact that the subsidized program could reduce work effort for parents (Rosenthal 2007) and thus also reduce the amount of available resources to children. Another explanation for these findings might be the geographic location of subsidized units in some of the most segregated neighborhoods with high percentage of unemployed males (Newman and Schnare 1997). Thus, it could be case that the lower levels of family resources might be responsible for some of the negative outcomes, but it could also be the case that the

physical presence of the program in some of the worst neighborhoods might be harmful for children. If the first mechanism is at work, that would imply changing the incentives to work for subsidized parents. If the second mechanism is at work, that would imply changing the geographic placement of subsidized units. Therefore, a valuable next step in this research is to test further the causality link between subsidized housing and the transition to adulthood and to investigate the specific features of subsidized housing that have an impact on children's life chances.

Table 1. Descriptive statistics (Blacks)

	Ages 2-5		Ages 6-11		Ages 12-17	
	Non-subsidized	Subsidized	Non-subsidized	Subsidized	Non-subsidized	Subsidized
In subsidized housing at birth/age3/age9	0.075	0.459	0.091	0.406	0.075	0.496
Sibling of different gender	0.497	0.546	0.538	0.562	0.651	0.677
Family size	4.832	4.778	4.799	4.714	5.340	5.258
<u>Household structure</u>						
Married/cohabitating couple	0.618	0.366	0.615	0.398	0.597	0.337
Single-headed household	0.382	0.634	0.385	0.602	0.403	0.663
Number of children under age 6	1.880	1.981	1.922	2.031	0.803	0.915
Extended family members present	0.327	0.373	0.267	0.238	0.242	0.208
<u>Education of household head</u>						
Less than 8th grade	0.127	0.115	0.129	0.105	0.175	0.138
Some high school	0.276	0.389	0.283	0.373	0.274	0.361
High School Diploma	0.296	0.302	0.288	0.316	0.268	0.297
Some college	0.231	0.174	0.237	0.185	0.213	0.171
College Diploma/Grad School	0.070	0.019	0.062	0.020	0.070	0.034
<u>Income (in 2000 \$)</u>						
Family labor income (in '000s)	24.371	12.988	24.964	13.003	26.981	12.540
Family transfer income (in '000s)	3.288	4.158	3.375	4.816	4.056	5.944
Whether receiving food stamps	0.269	0.538	0.294	0.574	0.278	0.592
Whether receiving AFDC/TANF	0.108	0.149	0.117	0.172	0.124	0.211
<u>MSA population</u>						
Less than 250,000	0.054	0.038	0.055	0.031	0.050	0.028
250,000-500,000	0.136	0.145	0.141	0.144	0.134	0.130
500,000-1,000,000	0.085	0.101	0.092	0.089	0.094	0.093
1,000,000-5,000,000	0.485	0.530	0.488	0.555	0.497	0.571
5,000,000+	0.241	0.186	0.224	0.181	0.225	0.178
<u>Neighborhood Characteristics</u>						
Percent non-Hispanic black	55.049	63.824	56.109	64.541	56.531	65.652
Percent in poverty	22.061	29.145	22.247	29.388	21.795	30.422
Percent unemployed	9.358	11.993	9.139	11.729	8.846	11.703
Percent receiving welfare	11.911	16.906	12.481	18.324	12.183	18.981
Percent female-headed households	31.198	41.482	31.710	43.113	31.000	43.650
Density of children	28.552	30.714	29.118	31.319	29.466	32.727
N	5,021	1,562	4,711	1,403	4,908	1,277

Table 2. Descriptive statistics (Non-blacks)

	Ages 2-5		Ages 6-11		Ages 12-17	
	Non-subsidized	Subsidized	Non-subsidized	Subsidized	Non-subsidized	Subsidized
In subsidized housing at birth/age3/age9	0.017	0.262	0.015	0.276	0.010	0.342
Sibling of different gender	0.356	0.375	0.485	0.487	0.614	0.617
Family size	3.987	3.835	4.279	4.026	4.749	4.752
<u>Household structure</u>						
Married/cohabitating couple	0.927	0.760	0.905	0.719	0.870	0.624
Single-headed household	0.073	0.240	0.095	0.281	0.130	0.376
Number of children under age 6	1.664	1.667	1.773	1.886	0.584	0.624
Extended family members present	0.078	0.135	0.066	0.070	0.076	0.054
<u>Education of household head</u>						
Less than 8th grade	0.054	0.090	0.055	0.066	0.076	0.154
Some high school	0.143	0.266	0.147	0.351	0.155	0.362
High School Diploma	0.266	0.337	0.270	0.316	0.256	0.242
Some college	0.299	0.243	0.298	0.202	0.287	0.161
College Diploma/Grad School	0.238	0.064	0.231	0.066	0.227	0.081
<u>Income (in 2000 \$)</u>						
Family labor income (in '000s)	47.331	21.063	48.033	20.915	51.704	22.902
Family transfer income (in '000s)	1.798	2.900	2.005	3.104	2.909	4.434
Whether receiving food stamps	0.077	0.363	0.084	0.430	0.076	0.423
Whether receiving AFDC/TANF	0.019	0.082	0.022	0.118	0.023	0.148
<u>MSA population</u>						
Less than 250,000	0.099	0.075	0.095	0.088	0.098	0.060
250,000-500,000	0.100	0.139	0.103	0.114	0.105	0.081
500,000-1,000,000	0.119	0.157	0.123	0.101	0.120	0.040
1,000,000-5,000,000	0.298	0.206	0.299	0.272	0.297	0.228
5,000,000+	0.383	0.423	0.380	0.425	0.380	0.591
<u>Neighborhood Characteristics</u>						
Percent non-Hispanic black	6.295	6.839	6.077	9.029	5.986	10.872
Percent in poverty	8.841	12.041	8.485	12.044	8.468	12.456
Percent unemployed	4.838	6.496	4.691	6.413	4.649	6.481
Percent receiving welfare	4.125	5.848	4.256	6.298	4.233	7.180
Percent female-headed households	12.301	15.723	12.220	17.175	11.973	18.037
Density of children	24.237	24.060	24.360	24.196	24.793	23.286
N	7,349	267	6,280	228	6,142	149

Table 3. Probit regression of propensity of being in subsidized housing by childhood stage (Blacks only)

	Ages 2-5		Ages 6-11		Ages 12-17	
	b	s.e.	b	s.e.	b	s.e.
In subsidized housing at birth/age3/ag	1.213	0.048	0.903	0.050	1.193	0.051
Sibling of different gender	0.046	0.043	-0.057	0.044	-0.037	0.050
Family size	0.001	0.015	0.030	0.013	0.022	0.013
<u>Household composition (Married/cohabitating couple omitted)</u>						
Single-headed household	0.224	0.049	0.109	0.051	0.139	0.054
Number of children under age 6	-0.018	0.024	-0.012	0.024	0.043	0.023
Extended family members present	0.071	0.051	-0.184	0.051	-0.132	0.052
<u>Education of Head (Less than 8th grade omitted)</u>						
Some high school	0.097	0.066	0.143	0.070	0.156	0.067
High School Diploma	0.088	0.069	0.207	0.072	0.215	0.071
Some college	-0.025	0.074	0.072	0.077	0.081	0.077
College Diploma/Grad School	-0.369	0.121	-0.201	0.126	0.092	0.110
<u>Income</u>						
Family labor income (in '000s)	-0.006	0.001	-0.008	0.001	-0.010	0.002
Family transfer income (in '000s)	-0.009	0.004	0.003	0.004	-0.003	0.004
Whether receiving food stamps	0.274	0.045	0.279	0.047	0.290	0.050
Whether receiving AFDC/TANF	-0.128	0.063	-0.101	0.061	-0.047	0.063
<u>MSA population (5,000,000+ omitted)</u>						
Less than 250,000	0.021	0.098	-0.105	0.106	-0.076	0.116
250,000-500,000	0.127	0.069	0.167	0.072	0.084	0.079
500,000-1,000,000	0.156	0.075	0.037	0.080	0.085	0.084
1,000,000-5,000,000	0.009	0.054	0.084	0.058	0.067	0.061
<u>Neighborhood Characteristics</u>						
Percent non-Hispanic black	-0.003	0.001	-0.003	0.001	-0.003	0.001
Percent in poverty	-0.004	0.002	-0.003	0.003	-0.002	0.003
Percent unemployed	-0.007	0.004	-0.019	0.004	-0.024	0.005
Percent receiving welfare	-0.001	0.004	0.004	0.004	0.004	0.004
Percent female-headed households	0.018	0.002	0.018	0.002	0.017	0.002
Density of children	-0.003	0.002	-0.002	0.002	0.000	0.003
Intercept	-1.306	0.107	-1.360	0.112	-1.594	0.118
N	6,583		6,114		6,185	
Log-likelihood	-2857.32		-2727.85		-2389.79	

Note: Coefficients statistically significant at the $p < .05$ level (two-tailed) are in bold.

Table 4. Probit regression of propensity of being in subsidized housing by childhood stage (Non-blacks only)

	Ages 2-5		Ages 6-11		Ages 12-17	
	b	s.e.	b	s.e.	b	s.e.
In subsidized housing at birth/age3/ag	1.249	0.104	1.298	0.114	1.601	0.139
Sibling of different gender	0.103	0.081	0.012	0.079	-0.113	0.095
Family size	-0.103	0.046	-0.065	0.037	0.070	0.032
<u>Household composition (Married/cohabitating couple omitted)</u>						
Single-headed household	-0.060	0.101	-0.112	0.107	0.157	0.127
Number of children under age 6	0.011	0.060	0.091	0.054	-0.029	0.059
Extended family members present	0.233	0.115	-0.076	0.138	-0.423	0.182
<u>Education of Head (Less than 8th grade omitted)</u>						
Some high school	-0.115	0.134	0.237	0.156	0.063	0.144
High School Diploma	0.013	0.129	0.160	0.155	-0.154	0.149
Some college	-0.058	0.134	0.054	0.161	-0.211	0.155
College Diploma/Grad School	-0.219	0.159	0.016	0.185	-0.202	0.188
<u>Income</u>						
Family labor income (in '000s)	-0.012	0.002	-0.013	0.002	-0.006	0.002
Family transfer income (in '000s)	-0.002	0.007	-0.016	0.009	-0.011	0.008
Whether receiving food stamps	0.426	0.087	0.420	0.096	0.385	0.117
Whether receiving AFDC/TANF	0.074	0.150	0.289	0.146	0.292	0.168
<u>MSA population (5,000,000+ omitted)</u>						
Less than 250,000	-0.159	0.120	-0.153	0.131	-0.359	0.167
250,000-500,000	0.087	0.104	-0.125	0.123	-0.346	0.151
500,000-1,000,000	0.093	0.100	-0.251	0.123	-0.759	0.192
1,000,000-5,000,000	-0.205	0.092	-0.150	0.097	-0.454	0.119
<u>Neighborhood Characteristics</u>						
Percent non-Hispanic black	-0.004	0.003	0.001	0.002	0.003	0.002
Percent in poverty	-0.014	0.006	-0.013	0.007	-0.026	0.010
Percent unemployed	0.047	0.013	0.036	0.014	0.045	0.018
Percent receiving welfare	-0.007	0.011	-0.021	0.013	0.008	0.016
Percent female-headed households	0.012	0.005	0.023	0.006	0.025	0.007
Density of children	-0.003	0.004	-0.001	0.004	-0.007	0.005
Intercept	-1.315	0.205	-1.688	0.228	-2.063	0.225
N	7,616		6,508		6,291	
Log-likelihood	-919.71		-758.84		-497.56	

Note: Coefficients statistically significant at the $p < .05$ level (two-tailed) are in bold.

Table 5. Discrete time hazard model of first marriage by childhood stage

	Blacks				Non-blacks			
	Ages 2-5							
	First marriage, Males		First marriage, Females		First marriage, Males		First marriage, Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	-0.13	0.22	0.29	0.19	0.53	0.29	-0.19	0.29
Propensity Score	-1.61	0.63	-1.28	0.49	-1.98	1.09	0.89	0.85
Age	1.30	0.16	1.04	0.12	1.42	0.10	1.21	0.09
Age Squared	-0.02	0.00	-0.02	0.00	-0.03	0.00	-0.02	0.00
Intercept	-20.71	1.95	-16.81	1.40	-21.28	1.21	-17.63	1.00
N	13,511		13,908		16,178		14,576	
Log-likelihood	-879.71		-1161.65		-2158.41		-2494.91	
	Ages 6-11							
	First marriage, Males		First marriage, Females		First marriage, Males		First marriage, Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
	Subsidized in age period	-0.24	0.18	-0.07	0.15	0.15	0.22	0.02
Propensity Score	-1.08	0.50	-1.12	0.42	-0.58	0.79	-0.47	0.69
Age	1.00	0.11	0.92	0.09	1.30	0.09	1.16	0.08
Age Squared	-0.02	0.00	-0.02	0.00	-0.02	0.00	-0.02	0.00
Intercept	-17.14	1.35	-15.28	1.11	-19.75	1.05	-16.91	0.90
N	16,609		17,084		17,412		15,516	
Log-likelihood	-1221.11		-1542.23		-2440.69		-2815.98	
	Ages 12-17							
	First marriage, Males		First marriage, Females		First marriage, Males		First marriage, Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
	Subsidized in age period	-0.18	0.14	-0.26	0.13	0.46	0.24	-0.03
Propensity Score	-0.34	0.29	-0.76	0.28	-1.62	0.76	0.10	0.50
Age	0.93	0.07	0.71	0.06	1.18	0.07	1.02	0.07
Age Squared	-0.02	0.00	-0.01	0.00	-0.02	0.00	-0.02	0.00
Intercept	-15.93	0.92	-12.43	0.70	-17.98	0.88	-15.08	0.74
N	23,300		24,495		18,371		16,217	
Log-likelihood	-2210.43		-2637.77		-2894.52		-3306.27	

Note: Coefficients statistically significant at the $p < .05$ level (two-tailed) are in bold.

Table 6. Discrete time hazard model of first birth by childhood stage

	Blacks				Non-blacks			
	Ages 2-5							
	First time father, Males		First birth, Females		First time father, Males		First birth, Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	-0.07	0.14	0.12	0.12	0.28	0.31	-0.25	0.31
Propensity Score	0.17	0.31	0.31	0.25	2.80	0.86	3.30	0.74
Age	1.35	0.13	1.08	0.11	1.05	0.09	0.68	0.07
Age Squared	-0.03	0.00	-0.02	0.00	-0.02	0.00	-0.01	0.00
Intercept	-18.05	1.39	-14.03	1.08	-17.59	1.11	-11.91	0.78
N	11,199		9,794		17,237		15,354	
Log-likelihood	-1796.35		-2275.66		-1920.01		-2463.11	
	Ages 6-11							
	First time father, Males		First birth, Females		First time father, Males		First birth, Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	-0.01	0.11	0.34	0.10	0.27	0.24	0.03	0.25
Propensity Score	0.51	0.27	0.23	0.23	2.02	0.65	2.15	0.60
Age	1.18	0.11	0.96	0.09	1.06	0.08	0.64	0.06
Age Squared	-0.03	0.00	-0.02	0.00	-0.02	0.00	-0.01	0.00
Intercept	-16.44	1.13	-12.99	0.91	-17.50	1.03	-11.36	0.68
N	13,671		11,846		18,724		16,610	
Log-likelihood	-2231.46		-2755.39		-2134.92		-2794.87	
	Ages 12-17							
	First time father, Males		First birth, Females		First time father, Males		First birth, Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	0.09	0.10	0.03	0.09	0.71	0.25	0.23	0.22
Propensity Score	0.32	0.20	0.73	0.18	0.14	0.67	0.82	0.47
Age	0.89	0.07	0.84	0.06	1.04	0.07	0.67	0.05
Age Squared	-0.02	0.00	-0.02	0.00	-0.02	0.00	-0.01	0.00
Intercept	-13.40	0.73	-11.74	0.67	-17.01	0.88	-11.45	0.59
N	18,938		16,234		20,482		17,969	
Log-likelihood	-3318.86		-3966.87		-2587.74		-3347.31	

Note: Coefficients statistically significant at the $p < .05$ level (two-tailed) are in bold.

Table 7. Discrete time hazard model of establishing an independent household by childhood stage

	Blacks				Non-Blacks			
	Ages 2-5							
	Males		Females		Males		Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	0.10	0.14	0.19	0.12	0.44	0.25	-0.36	0.24
Propensity Score	0.64	0.32	0.28	0.28	0.19	0.79	4.14	0.72
Age	1.71	0.13	1.98	0.12	2.28	0.12	2.31	0.12
Age Squared	-0.03	0.00	-0.04	0.00	-0.04	0.00	-0.05	0.00
Intercept	-24.81	1.52	-26.50	1.38	-30.35	1.37	-29.86	1.37
N	12,825		11,763		14,605		13,396	
Log-likelihood	-1698.46		-2082.63		-2698.32		-2792.77	
	Ages 6-11							
	Males		Females		Males		Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	0.24	0.28	0.39	0.10	0.89	0.57	-0.10	0.21
Propensity Score	0.14	0.11	0.05	0.24	0.07	0.19	1.47	0.55
Age	1.71	0.11	1.99	0.11	2.10	0.11	2.21	0.11
Age Squared	-0.03	0.00	-0.04	0.00	-0.04	0.00	-0.04	0.00
Intercept	-24.61	1.33	-26.57	1.23	-28.39	1.22	-28.50	1.24
N	15,652		14,474		15,911		14,476	
Log-likelihood	-2145.49		-2565.84		-2943.58		-3069.58	
	Ages 12-17							
	Males		Females		Males		Females	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Subsidized in age period	0.05	0.10	0.11	0.09	0.00	0.22	0.39	0.19
Propensity Score	0.25	0.20	0.26	0.18	0.52	0.57	0.30	0.44
Age	1.22	0.07	1.57	0.07	1.79	0.08	2.15	0.10
Age Squared	-0.02	0.00	-0.03	0.00	-0.03	0.00	-0.04	0.00
Intercept	-18.81	0.79	-21.56	0.83	-24.48	0.98	-27.13	1.08
N	23,058		21,306		17,884		15,961	
Log-likelihood	-3366.94		-3911.79		-3391.14		-3503.47	

Note: Coefficients statistically significant at the $p < .05$ level (two-tailed) are in bold.

Table 8. Matched outcomes (Blacks)

	Unmatched differences	PS kernel matching, TT (psmatch2)	PS nearest neighbor matching (5 controls), TT (nnmatch)
<u>In subsidized housing ages 2-5</u>			
In subsidized housing after age 18 (head of household)	0.290 *** (.041)	0.186 *** (.069)	0.273 *** (.052)
In subsidized housing after age 18 (not head of household)	0.126 *** (.047)	0.114 † (.067)	0.123 * (.055)
High School Completion	-0.043 (.028)	0.007 (.048)	-0.032 (.034)
Continuing education after high school	-0.069 † (.040)	-0.051 (.066)	-0.069 (.045)
College degree	-0.039 (0.029)	-0.081 † (0.046)	-0.020 (0.031)
<u>In subsidized housing ages 6-11</u>			
In subsidized housing after age 18 (head of household)	0.366 *** (.033)	0.212 *** (.045)	0.346 *** (.039)
In subsidized housing after age 18 (not head of household)	0.103 *** (.041)	0.043 (.051)	0.075 (.047)
High School Completion	-0.060 ** (.023)	-0.006 (.030)	-0.053 † (.028)
Continuing education after high school	-0.064 * (.032)	0.027 (.040)	0.006 (.037)
College degree	-0.075 *** (0.023)	-0.022 (0.026)	-0.021 (0.023)
<u>In subsidized housing ages 12-17</u>			
In subsidized housing after age 18 (head of household)	0.619 *** (.021)	0.591 *** (.041)	0.585 *** (.028)
In subsidized housing after age 18 (not head of household)	0.146 *** (.037)	0.083 (.053)	0.148 ** (.045)
High School Completion	-0.089 *** (.018)	-0.056 † (.031)	-0.064 ** (.024)
Continuing education after high school	-0.084 *** (.025)	-0.044 (.042)	-0.050 (.030)
College degree	-0.034 * (0.016)	0.015 (0.028)	-0.017 (0.018)

† p < .10 * p < .05 ** p < .01 *** p < .001 (two-tailed tests)

Table 9. Matched outcomes (Non-Blacks)

	Unmatched differences	PS kernel matching, TT (psmatch2)	PS nearest neighbor matching (5 controls), TT (nnmatch)
<u>In subsidized housing ages 2-5</u>			
In subsidized housing after age 18 (head of household)	0.103 *** (.031)	0.025 (.051)	0.108 † (.062)
In subsidized housing after age 18 (not head of household)	0.249 *** (.057)	0.244 *** (.090)	0.224 *** (.085)
High School Completion	-0.079 † (.048)	-0.020 (.071)	-0.028 (.071)
Continuing education after high school	-0.299 *** (.081)	-0.186 *** (.089)	-0.222 ** (.091)
College degree	-0.243 *** (0.078)	-0.145 *** (0.060)	-0.178 ** (0.067)
<u>In subsidized housing ages 6-11</u>			
In subsidized housing after age 18 (head of household)	0.173 *** (.022)	0.152 *** (.063)	0.162 *** (.061)
In subsidized housing after age 18 (not head of household)	0.158 *** (.047)	0.042 (.073)	0.052 (.078)
High School Completion	-0.136 *** (.037)	-0.020 (.062)	-0.035 (.068)
Continuing education after high school	-0.331 *** (.062)	-0.165 *** (.077)	-0.144 † (.078)
College degree	-0.191 *** (0.060)	-0.076 (0.064)	-0.032 (0.058)
<u>In subsidized housing ages 12-17</u>			
In subsidized housing after age 18 (head of household)	0.365 *** (.017)	0.317 *** (.072)	0.308 *** (.074)
In subsidized housing after age 18 (not head of household)	0.125 *** (.048)	0.105 (.077)	0.051 (.079)
High School Completion	-0.169 *** (.034)	-0.141 *** (.061)	-0.176 ** (.068)
Continuing education after high school	-0.305 *** (.058)	-0.165 *** (.075)	-0.205 * (.087)
College degree	-0.225 *** (0.054)	-0.129 *** (0.057)	-0.197 *** (0.064)

† p < .10 * p < .05 ** p < .01 *** p < .001 (two-tailed tests)

Appendix A.

Table A1. Coefficients of models using different specifications of the propensity score (Blacks)

A. Discrete time hazard model of establishing an independent household						
	Males				Females	
	Ages 2-5	Ages 6-11	Ages 12-17		Ages 6-11	Ages 12-17
All variables	0.10	0.24	0.05	0.19	0.39	0.11
Without adjustment for previous stay in subsidized housing	0.19	0.32	0.08	0.21	0.37	0.13
Without adjustment for neighborhood characteristics	0.11	0.30	0.02	0.19	0.39	0.08
Without adjustment for income	0.07	0.23	0.04	0.18	0.40	0.12
Without adjustment for household structure	0.11	0.23	0.07	0.20	0.39	0.12
Without adjustment for income and household structure	0.08	0.24	0.10	0.21	0.40	0.16
B. Discrete time hazard model of first marriage						
	Males				Females	
	Ages 2-5	Ages 6-11	Ages 12-17		Ages 6-11	Ages 12-17
All variables	-0.13	-0.24	-0.18	0.29	-0.07	-0.26
Without adjustment for previous stay in subsidized housing	-0.31	-0.30	-0.17	0.19	-0.06	-0.24
Without adjustment for neighborhood characteristics	-0.16	-0.31	-0.22	0.26	-0.12	-0.36
Without adjustment for income	-0.13	-0.25	-0.19	0.31	-0.10	-0.24
Without adjustment for household structure	-0.13	-0.24	-0.17	0.26	-0.07	-0.26
Without adjustment for income and household structure	-0.17	-0.25	-0.19	0.23	-0.13	-0.26
C. Discrete time hazard model of first birth						
	Males				Females	
	Ages 2-5	Ages 6-11	Ages 12-17		Ages 6-11	Ages 12-17
All variables	-0.07	-0.01	0.09	0.12	0.34	0.03
Without adjustment for previous stay in subsidized housing	-0.10	-0.04	0.05	0.10	0.30	0.04
Without adjustment for neighborhood characteristics	-0.07	0.01	0.11	0.10	0.32	0.04
Without adjustment for income	-0.08	0.00	0.10	0.13	0.37	0.09
Without adjustment for household structure	-0.06	-0.01	0.10	0.10	0.35	0.05
Without adjustment for income and household structure	-0.04	0.05	0.15	0.15	0.41	0.16

Table A2. Coefficients of models using different specifications of the propensity score (Non-Blacks)

A. Discrete time hazard model of establishing an independent household						
	Males			Females		
	Ages 2-5	Ages 6-11	Ages 12-17	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.44	0.89	0.00	-0.36	-0.10	0.39
Without adjustment for previous stay in subsidized housing	0.34	1.36	0.07	-0.11	-0.02	0.39
Without adjustment for neighborhood characteristics	0.44	0.97	0.05	-0.36	-0.08	0.33
Without adjustment for income	0.47	1.05	0.05	-0.27	-0.05	0.40
Without adjustment for household structure	0.45	0.68	-0.06	-0.31	-0.12	0.37
Without adjustment for income and household structure	0.50	1.25	-0.04	-0.12	-0.05	0.39
B. Discrete time hazard model of first marriage						
	Males			Females		
	Ages 2-5	Ages 6-11	Ages 12-17	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.53	0.15	0.46	-0.19	0.02	-0.03
Without adjustment for previous stay in subsidized housing	0.39	0.11	0.37	-0.16	-0.09	-0.04
Without adjustment for neighborhood characteristics	0.41	0.07	0.40	-0.41	-0.17	-0.15
Without adjustment for income	0.52	0.22	0.49	-0.14	0.08	-0.01
Without adjustment for household structure	0.54	0.17	0.46	-0.22	0.01	-0.04
Without adjustment for income and household structure	0.49	0.20	0.42	-0.21	0.03	-0.03
C. Discrete time hazard model of first birth						
	Males			Females		
	Ages 2-5	Ages 6-11	Ages 12-17	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.28	0.27	0.71	-0.25	0.03	0.23
Without adjustment for previous stay in subsidized housing	0.30	0.34	0.68	-0.09	0.06	0.09
Without adjustment for neighborhood characteristics	0.31	0.25	0.69	-0.29	-0.03	0.17
Without adjustment for income	0.38	0.35	0.73	-0.07	0.30	0.31
Without adjustment for household structure	0.28	0.28	0.70	-0.25	0.01	0.19
Without adjustment for income and household structure	0.38	0.30	0.75	-0.01	0.26	0.36

Table A3. Kernel matching treatment estimates using different specifications of the propensity equation (Blacks)

A. In subsidized housing after age 18 (Head of household)			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.186	0.212	0.591
Without adjustment for previous stay in subsidized housing	0.214	0.279	0.505
Without adjustment for neighborhood characteristics	0.234	0.228	0.583
Without adjustment for income	0.203	0.241	0.593
Without adjustment for household structure	0.240	0.215	0.584
Without adjustment for income and household structure	0.238	0.250	0.587
B. In subsidized housing after age 18 (Not head of household)			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.114	0.043	0.083
Without adjustment for previous stay in subsidized housing	0.110	0.104	0.148
Without adjustment for neighborhood characteristics	0.050	0.027	0.098
Without adjustment for income	0.137	0.071	0.121
Without adjustment for household structure	0.078	0.056	0.074
Without adjustment for income and household structure	0.064	0.083	0.125
C. High School Completion			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.007	-0.006	-0.056
Without adjustment for previous stay in subsidized housing	-0.021	-0.002	-0.036
Without adjustment for neighborhood characteristics	0.003	-0.013	-0.061
Without adjustment for income	-0.006	-0.006	-0.067
Without adjustment for household structure	0.000	-0.013	-0.058
Without adjustment for income and household structure	-0.011	-0.020	-0.070
D. Continuing education after high school			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	-0.051	0.027	-0.044
Without adjustment for previous stay in subsidized housing	-0.045	-0.004	-0.038
Without adjustment for neighborhood characteristics	-0.038	0.042	-0.049
Without adjustment for income	-0.060	0.022	-0.055
Without adjustment for household structure	-0.028	0.026	-0.046
Without adjustment for income and household structure	-0.047	0.001	-0.056
E. College degree			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	-0.081	-0.022	0.015
Without adjustment for previous stay in subsidized housing	-0.012	-0.028	0.007
Without adjustment for neighborhood characteristics	-0.036	-0.026	0.006
Without adjustment for income	-0.077	-0.036	0.012
Without adjustment for household structure	-0.012	-0.023	0.015
Without adjustment for income and household structure	-0.037	-0.046	0.004

Table A4. Kernel matching treatment estimates using different specifications of the propensity equation (Non-Blacks)

A. In subsidized housing after age 18 (Head of household)			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.025	0.152	0.317
Without adjustment for previous stay in subsidized housing	0.109	0.144	0.291
Without adjustment for neighborhood characteristics	0.050	0.140	0.324
Without adjustment for income	0.067	0.169	0.346
Without adjustment for household structure	0.059	0.131	0.326
Without adjustment for income and household structure	0.061	0.150	0.342
B. In subsidized housing after age 18 (Not head of household)			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	0.244	0.042	0.105
Without adjustment for previous stay in subsidized housing	0.234	0.110	0.100
Without adjustment for neighborhood characteristics	0.247	0.050	0.052
Without adjustment for income	0.257	0.162	0.103
Without adjustment for household structure	0.236	0.063	0.074
Without adjustment for income and household structure	0.259	0.163	0.107
C. High School Completion			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	-0.020	-0.020	-0.141
Without adjustment for previous stay in subsidized housing	-0.041	-0.067	-0.084
Without adjustment for neighborhood characteristics	-0.042	-0.052	-0.154
Without adjustment for income	-0.019	-0.153	-0.167
Without adjustment for household structure	-0.055	0.013	-0.118
Without adjustment for income and household structure	-0.026	-0.067	-0.165
D. Continuing education after high school			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	-0.186	-0.165	-0.165
Without adjustment for previous stay in subsidized housing	-0.195	-0.203	-0.154
Without adjustment for neighborhood characteristics	-0.243	-0.191	-0.171
Without adjustment for income	-0.197	-0.268	-0.199
Without adjustment for household structure	-0.196	-0.174	-0.185
Without adjustment for income and household structure	-0.230	-0.252	-0.160
E. College degree			
	Ages 2-5	Ages 6-11	Ages 12-17
All variables	-0.145	-0.076	-0.129
Without adjustment for previous stay in subsidized housing	-0.154	-0.104	-0.115
Without adjustment for neighborhood characteristics	-0.179	-0.095	-0.160
Without adjustment for income	-0.161	-0.146	-0.180
Without adjustment for household structure	-0.154	-0.063	-0.137
Without adjustment for income and household structure	-0.191	-0.154	-0.174

References

- Abadie, Alberto, David Drukker, Jane Herr, and Guido Imbens. 2004. "Implementing Matching Estimators for Average Treatment Effects in Stata." *Stata Journal* 4(3): 290-311.
- An, Chong-Bum, Robert Haveman and Barabara Wolfe. 1993. "Teen Out-of-wedlock Births and Welfare Receipt: The Role of Childhood Events and Economic Circumstances." *The Review of Economics and Statistics* 75(2): 195-208.
- Aquilino, William S. 1991. "Family Structure and Home-Leaving: A Further Specification of the Relationship." *Journal of Marriage and the Family* 53: 999-1010.
- Arnett, Jeffrey. 2000. "Emerging Adulthood. A Theory of Development from the Late Teens through the Twenties." *American Psychologist* 55: 469-480.
- Avery, Roger, Frances Goldscheider, and Alden Speare, Jr. 1992. "Feathered Nest/Gilded Cage: The Effects of Parental Resources on Young Adults' Leaving Home." *Demography* 29: 375-388.
- Bickford, Adam and Douglas Massey. 1991. "Segregation in the Second Ghetto: Racial and Ethnic Segregation in American Public Housing, 1977." *Social Forces* 69: 1011-1036.
- Bianchi, Suzanne M. 1987. "Living at Home: Young Adults' Living Arrangements in the 1980s." Unpublished paper, Center for Demographic Studies.
- Butler, Amy. 1990. "The Effect of Welfare Guarantees on Children's Educational Attainment." *Social Science Research* 19: 175-203
- Chassin, Laurie, Clark Proessen, Steven Sherman, and Debra Edwards. 1992. "The Natural History of Cigarette Smoking and Young Adult Social Roles." *Journal of Health and Social Behavior* 33: 328-347.
- Christian, P. 1989. "Non-family Households and Housing among Adults." *Ethnicity and the New Family Economy*, Frances Goldscheider and Calvin Goldscheider, Eds. Boulder, CO: Westview.
- Currie, Janet and Aaron Yelowitz. 2000. "Are Public Housing Projects Good for Kids?" *Journal of Public Economics* 75: 99-124.
- DaVanzo, Julie and Frances Goldscheider. 1990. "Coming Home Again: Returns to the Nest in Young Adulthood." *Population Studies* 44, 241-255.
- Ellwood, David and Mary Jo Bain. 1985. "The impact of AFDC on family structure and living arrangements." In Roland G. Ehrenberg, ed., *Research in Labor Economics* Vol. 7. Greenwich, CT: JAI Press.

- Fitzgerald, John, Peter Gottschalk, and Robert Moffitt. 1998. "An Analysis of the Impact of Sample Attrition on the Second Generation of Respondents in the Michigan Panel of Income Dynamics." *Journal of Human Resources* 33:300–343.
- Goldscheider, Frances and Julie DaVanzo. 1985. "Living Arrangements and the Transition to Adulthood." *Demography* 22(4): 545-563.
- Goldscheider, Frances and Julie DaVanzo. 1989. "Pathways to Independent Living in Early Adulthood: Marriage, Semiautonomy, and Premarital Residential Independence." *Demography* 26: 597-614.
- Goldscheider, Frances and Calvin Goldscheider. 1998. "The Effects of Childhood Family Structure on Leaving and Returning Home." *Journal of Marriage and the Family* 60: 745–56.
- Goldscheider, Frances and Calvin Goldscheider. 1993. *Leaving Home before Marriage: Ethnicity, Familism, and Generational Relationships*. Madison: University of Wisconsin Press.
- Gottschalk, Peter. 1996. "Is the Correlation in Welfare Participation across Generations Spurious?" *Journal of Public Economics* 63: 1–25.
- Haurin, Donald, Patric Hendershott, and Dongwook Kim. 1993. "The impact of real rents and wages on household formation." *Review of Economics and Statistics* 75: 284-293.
- Heckman, James J. 2005. "The Scientific Model of Causality." Pp. 1–98 in *Sociological Methodology*, Vol. 35, edited by Ross M. Stolzenberg. Boston, MA: Blackwell Publishing.
- Herr, Jane, David Drukker, Guido Imbens, and Alberto Abadie. 2004. "NNMATCH: Matching Estimator for Average Treatment Effects in Stata."
- Hutchens, Robert, George Jakubson, and Saul Schwartz. 1989. "AFDC and the Formation of Subfamilies." *Journal of Human Resources* 24(4): 599-628.
- Imbens, Guido W. 2004. "Nonparametric Estimation of Average Treatment Effects under Exogeneity: A Review." *The Review of Economics and Statistics* 86:4–29.
- Keller, Thomas, Gretchen Cusick and Mark Courtney. 2007. "Approaching the Transition to Adulthood: Distinctive Profiles of Adolescents Aging out of the Child Welfare System." *Social Science Review*: 455-484.
- Kent, Richard. 1992. "Household Formation by the Young in the United States." *Applied Economics* 24: 1129-1137

- Kneale, Dylan and Wendy Sigle-Rushton. 2010. "Transition to Adulthood by Housing Status: A Cross Cohort Comparison." Paper presented at the Annual Meeting of Population Association of America, Dallas, TX.
- Ku, Inhoe. 2001. "The Effect of Welfare on Children's Education." *Social Science Review*: 245-270.
- Leuven, Edwin and Barbara Sianesi. 2003. "PSMATCH2: Stata Module to Perform Full Mahalanobis and Propensity Score Matching, Common Support Graphing, and Covariate Imbalance Testing." <http://ideas.repec.org/c/boc/bocode/s432001.html>. Version 3.1.5.
- Lillard, Lee, and Constantijn Panis. 1994. "Panel Attrition from the PSID: Household Income, Marital Status, and Mortality." Working Paper series 94-16. Rand Labor and Population Program, Santa Monica, Calif.
- Lupton, Ruth, Rebecca Tunstall, Wendy Sigle-Rushton, P. Obolenskaya, R. Sabates, E. Meschi, Dylan Kneale and E. Salter. 2009. *Growing Up in Social Housing: A Profile of Four Generations from 1946 to the Present Day*. York: Joseph Rowndtree Foundation.
- Meyers, Alan, Deborah Frank, Nicole Roos, Karen Peterson, Virginia Casey, Adrienne Cupples, and Suzette Levenson. 1995. "Housing Subsidies and Pediatric Undernutrition." *Archives of Pediatric and Adolescent Medicine* 149: 1079-1084.
- Meyers, Alan, Diana Cutts, Deborah Frank, Suzette Levenson, Anne Skalicky, Timothy Heeren, John Cook, Carol Berkowitz, Maureen Black, Patrick Casey, and Nieves Zaldivar. (2005). "Subsidized Housing and Children's Nutritional Status: Data from a Multi-site Surveillance Study." *Archives of Pediatric Adolescent Medicine* 159, 551-556.
- Michael, Robert and Nancy Tuma. 1985. "Entry into Marriage and Parenthood by Young Men and Women." *Demography* 22: 515-544
- Mitchell, Barbara, Andrew Wister, and Thomas Burch. 1989. "The Family Environment and Leaving the Parental Home." *Journal of Marriage and the Family* 51: 605-613.
- Morgan, Stephen and David Harding. 2006. "Matching Estimators of Causal Effects: Prospects and Pitfalls in Theory and Practice." *Sociological Methods and Research* 35(1): 3-60.
- Morgan, Stephen and Christopher Winship. 2007. *Counterfactuals and Causal Inference*. Cambridge: Cambridge University Press.
- Newman, Sandra. 2008. "Does Housing Matter for Poor Families? A Critical Summary of Research and Issues Still to Be Resolved." *Journal of Policy Analysis and Management* 27(4): 895-925.

- Newman, Sandra and Joseph Harkness. 2002. "The Long-Term Effects of Public Housing on Self-Sufficiency." *Journal of Policy Analysis and Management* 21: 21–43.
- Newman, Sandra, C. Scott Holupka and Joseph Harkness. 2009. "The Long-Term Effects of Housing Assistance on Work and Welfare." *Journal of Policy Analysis and Management* 28(1): 81-101.
- Newman, Sandra J., and Ann B. Schnare. 1997. "... And a Suitable Living Environment': The Failure of Housing Programs to Deliver on Neighborhood Quality." *Housing Policy Debate* 8 (4): 703–41.
- Perlman, Helen. 1960. "Are We Creating Dependency?" *Social Science Review* 34: 323-333.
- Rank, Mark and Li-Chen Cheng. "Welfare Use across Generations: How Important Are the Ties That Bind?" *Journal of Marriage and Family* 57: 673-684.
- Rosenbaum, Paul and Rubin, Donald 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika* 70: 41–55.
- Rosenbaum, Paul and Rubin, Donald. 1985. "Constructing a Control Group Using Multivariate Matched Sample Methods that Incorporate the Propensity Score." *The American Statistician* 39: 33–38.
- Rosenthal, Larry A. 2007. "A Review of Recent Literature on Housing Assistance and Self-Sufficiency." Working Paper W07-008. Program on Housing and Urban Policy. Fisher Center for Real Estate and Urban Economics. University of California, Berkley.
- Rubin, Donald. 1974. "Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies." *Journal of Educational Psychology* 66:685-701.
- Rubin, Donald. 1997. "Estimating Causal Effects from Large Data Sets Using Propensity Scores." *Annals of Internal Medicine* 127:757–63.
- Sampson, Robert, Stephen Raudenbush, and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277:918–24.
- Shroder, Mark and Marge Martin. 1996. *New Results from Administrative Data: Housing the Poor, or What They Don't Know Might Hurt Somebody*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- US Department of Housing and Urban Development. 2008. *Characteristics of HUD-assisted renters and their units in 2003*. www.huduser.org
- Venkatesh, Sudhir. 2002. *American Project: The Rise and Fall of a Modern Ghetto*. Harvard University Press.

- White, Lynn and Alan Booth. 1985. "The Quality and Stability of Remarriages: The Role of Stepchildren." *American Sociological Review* 50:689-698.
- White, Lynn, and Naomi Lacy. 1997. "Pathways from Home and Educational Attainment." *Journal of Marriage and the Family* 59: 982-995.
- Whittington, Leslie and H. Elizabeth Peters. 1996. "Economic Incentives for Financial and Residential Independence." *Demography* 33: 82-97.
- Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago, IL: University of Chicago Press.