Cumulative Effects of Doubling up in Childhood on Young Adult Outcomes

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Abstract

Living in a doubled up household is a common childhood experience, yet we know little about the cumulative effects of these households on children. In this paper, I present estimates of the impacts of three types of doubled up households: 1) those formed with the child's grandparent(s), 2) those formed with the child's adult sibling(s), and 3) those formed with another adult(s). I first explore what family characteristics predict residence in each type of doubled up households. I then employ marginal structural models and inverse probability of treatment weighting, methods that allow me to account for the fact that household composition is both a cause and consequence of other family characteristics, to estimate the relationship between childhood years spent in each double up type and young adult educational attainment and health. This analysis provides evidence that this increasingly common household form may play a role in shaping children's life chances.

Introduction

Children's lives are profoundly affected by the adults with whom they live. Previous research has linked family structure, particularly the presence of absence of a father or other romantic partner of the mother, to a variety of behavioral and cognitive childhood outcomes, as well as young adult outcomes such as family formation and employment (McLanahan and Percheski 2008; McLanahan, Tach, and Schneider 2013). Less research moves beyond parents' romantic partners to examine the impact of doubling up – when a family co-resides with other adults, like grandparents, extended family, or friends. However, like family structure, household composition shapes children's access to resources and caregiving time and influences parents' stress levels (Harvey 2015; Kalil, Ryan, and Chor 2013; Mutchler and Baker 2009). Doubling up is a common childhood experience: nearly half of mothers live in a doubled up household before their child reaches age ten (Pilkauskas, Garfinkel, and McLanahan 2014).

Studies of the impact of doubled up households on children have predominately estimated the effect of doubling up at a single point in time. These cross-sectional measures ignore the dynamic nature of household structure for many children (e.g., Astone and Washington 1994; DeLeire and Kalil 2002). Most double ups dissolve within a year (Glick and Van Hook 2011), and many children transition in and out of doubled up households multiple times (Mollborn, Fomby, and Dennis 2012; Pilkauskas 2012). Children's outcomes are shaped not only by their immediate environment, but also by the sum of environments they have experienced in the past. Yet the short-term measures of household structure that previous studies have employed compare children who were doubled up during the survey round, many of whom will soon transition out of such households, to all children who were not doubled up during the survey, though many of these children live doubled up at some point during childhood. Thus,

they likely underestimate the impact of doubling up on child outcomes. Moreover, studies that use static measures estimate effects for children who were doubled up for a short duration along with children who were doubled up for a long period. The mechanisms through which household composition may affect children likely accumulate over time, suggesting that measuring duration in different household types is vital to understanding the cumulative effects. Additionally, as I discuss later, many of these mechanisms through which household composition may affect child outcomes also affect selection into household types, which limits the ability of conventional regression techniques to accurately estimate the effects of household composition on child outcomes.

In this project, I estimate the effects of the total number of childhood years spent in different doubled up household types on young adult health and education outcomes. Instead of examining household composition at a single point, I operationalize childhood household composition with a duration-weighted measure of exposure to different household types from ages 1 to 17. I employ marginal structural models and inverse probability of treatment weighting, methods that acknowledge that household composition is likely both a cause and consequence of other time-varying family characteristics—like income and mother's marital status—that affect children's young adult outcomes. Recognizing that relationships between doubled up household members are important for how the household functions, I examine effects separately for three different types of doubled up households: 1) double ups formed with the child's grandparent(s); 2) double ups formed with the child's adult sibling(s); and 3) double up formed with other adult(s), such as extended family and non-kin.

Prior Research on the Effects of Doubling up

The expected effect of doubling up on children is unclear. Previous qualitative work has highlighted the important safety net role of doubling up, providing housing assistance in times of financial need (Desmond 2012; Skobba and Goetz 2013). For some families, doubling up allows children to escape dangerous neighborhoods or attend better schools (Goodman and Silverstein 2002; Rhodes and DeLuca 2013). Relative to living in a non-shared household, doubling up is associated with higher household income (Mykyta and Maccartney 2012) and lower housing costs (Pilkauskas et al. 2014). If doubling up improves housing, neighborhood, and school environments and increases household income, it could be beneficial for children's long-term outcomes. On the other hand, increasing household size can strain already limited resources, and doubled up families may experience more food insecurity than they did before doubling-up (Rhodes and DeLuca 2013). Qualitative work demonstrates that mothers who live doubled up in someone else's home feel that this living arrangement threatens their sense of adulthood and their control over their children, driving dissatisfaction with doubling up (Harvey 2015). If such dissatisfaction leads to household conflict or maternal stress, these households could have negative effects on children.

Most existing research on the effects of doubling up on child outcomes focuses exclusively on multigenerational households. Though the findings on the effects of multigenerational homes on children are inconsistent (see Dunifon, Ziol-Guest, and Kopko 2014 for a review), these double ups are often considered supportive environments, especially for young mothers. Children in multigenerational household benefit from substantial time investments from their co-residential grandparents (Kalil, Ryan, and Chor 2014). Previous research has also found a positive associated between multigenerational co-residence and

mothers' productive activities, such as work and school (Gordon, Chase-Lansdale, and Brooks-Gunn 2004; Hao and Brinton 1997a; Unger and Cooley 1992).

Only 63 percent of doubled up mothers live in a household with at least one of their parents or in-laws (Pilkauskas et al. 2014), but non-multigenerational doubled up households are less discussed in the literature. Studies that examine non-multigenerational doubling up generally group all doubled up household types together (Aquilino 1996; Entwisle and Alexander 1996; Thompson et al. 1992), and others compare the effects of double ups formed with a child's grandparents to those formed with any other adults (Mollborn, Fomby, and Dennis 2011; Mollborn et al. 2012). Some evidence suggests that co-residence with non-grandparent adults in early childhood is negatively associated with cognitive scores at age two and is more harmful than co-residence with grandparents, though these effects vary by race (Mollborn et al. 2011).

To my knowledge, no work has specifically examined the impact of living doubled up in a household with an adult sibling on children's outcomes. However, qualitative work examining adult children who live in their natal home—often referred to as "boomerang kids" if they return home after a period of residential independence—reveals that these young adults often have positive feelings about living in their natal home (Newman 2012; Sassler, Ciambrone, and Benway 2008). Co-residence with an adult sibling may create a supportive childhood environment if the adult sibling does not bring additional stress to the household. Moreover, supportive older siblings are associated with positive child outcomes (Prime et al. 2014), so these double ups may be particularly beneficial if the adult sibling is attentive to the younger child's needs. Much of the increase in doubling up during the recession has been concentrated among

young adults living in their natal home (Eggers and Moumen 2013), so understanding the effects of this household type in particular is important for evaluating the potential impacts of this shift.

Extant research on the effects of doubled up households, regardless of type, have generally focused on cognitive and behavioral outcomes in childhood or adolescence (Augustine and Raley 2013; Dunifon and Kowaleski-Jones 2007; Leadbeater and Bishop 1994; Mollborn et al. 2011). However, given that household composition has both economic and social implications for children's environments, it is likely influential in shaping children's long-term outcomes as well. In this analysis, I examine young adult outcomes in two domains, education and health. I focus on high school graduation and college attendance because of their established importance in labor market outcomes and stratification processes (Breen and Jonsson 2005; Jencks 1972). I examine smoking, obesity, and depression because of their importance for adult health. Family structure substantially affects smoking and adult depression (McLanahan et al. 2013), suggesting that household composition may be particularly relevant for these outcomes. Because childhood weight tracks onto risk of obesity in adulthood (Daniels 2006), young adult obesity may be especially susceptible to cumulative effects of household type during childhood.

Dynamic Selection into Household Types

As discussed, the instability of doubled up households makes it important to study household structure longitudinally. However, in the presence of time-varying characteristics that both predict and are affected by household structure, conventional static models provide biased estimates of the total effect of household structure on child outcomes. Research on doubling up suggests that selection into household types is affected by many of the same factors that mediate the relationship between household structure and child outcomes. For example, economic need affects children's outcomes directly and is also associated with entry into a multigenerational

household (Pilkauskas 2012), so controlling for income is necessary to prevent omitted variable bias when estimating the effect of doubling up throughout childhood on young adult outcomes. However, doubling up increases mothers' likelihood of entering the workforce (Hao and Brinton 1997b), so controlling for mother's earnings throughout childhood would not produce an accurate portrayal of the total effect of doubling up, given that one of the mechanisms through which doubling up may affect children's young adult outcomes is through a change in maternal work status. Conversely, controlling only for maternal earnings in the year before the child was born would allow a model to capture indirect effects of doubling up, but would fail to acknowledge that employment may change in ways not caused by household structure, and household structure may then respond to those changes.

Given these issues, I use marginal structural models and inverse probability of treatment weighting (IPTW) (Robins, Hernán, and Brumback 2000) to estimate the effects of spending an additional year in a given household type. IPTW addresses the problem of time-varying confounders by weighting each individual by the inverse of the predicted probability that the individual would be in the series of household structures in which she was observed. IPTW does not solve any bias due to unmeasured covariates that should be included in the model, so accurately modeling selection into doubled up households is important.

Data

I employ data from the National Longitudinal Study of Youth 1979 (NLSY79) and Child and Young Adult supplements (NLSY79-CYA). The NLSY surveyed over 12,600 Americans, with an oversample of Hispanic and African American respondents, to create a nationally-representative sample of men and women between the ages 14 to 21 at the start of 1979. The NLSY79-CYA sample includes all children born to NLSY79 mothers, and this sample is

representative of approximately 95 percent of all the children ever born to this cohort of women (Bureau of Labor Statistics n.d., Bureau of Labor Statistics n.d.). My sample excludes members of the discontinued subsamples who were not followed into young adulthood.[1] In 2012, the most recent interview wave, the young adult response rate was over 80 percent (National Longitudinal Surveys n.d.). To study household structure throughout childhood and outcomes at age 20, I restrict my sample to children born between 1979 and 1992, about 76 percent of the original sample. When the final 2014 data are released later this year, I will expand my sample to children born between 1979 and 1994, about 80 percent of the original sample. Of the 8,711 children currently available, about 70 percent have valid measures of at least one of my outcomes of interest. For my initial analyses, I have limited my sample to children for whom I observe the housing roster for every survey wave (i.e., not missing data on household type or child residence), which brings my final sample size to 4,972. For item-missing data, I assume the characteristic stayed constant if its value in the previous and following surveys were the same. For all other item-missing data, I impute the mean of the non-missing values for continuous variables and 0 for binary variables and include indicator variables for missingness. I plan to use multiple imputation for future versions of this paper.

My treatment variable, created from maternal household roster data, is a duration-weighted measure of exposure to different household types from ages 1 to 17. Because I cannot model selection into household type at birth, it is incorporated into my prediction models as a baseline confounder and is not used to estimate the effects of household type on child outcomes (Wodtke, Harding, and Elwert 2011). I consider a household doubled up if it contains at least one adult age 21 or over other than the mother and mother's romantic partner (Eggers and

[1] This includes the disadvantaged white oversample, which was dropped in 1990 (Bureau of Labor Statistics n.d.). Additionally, in 2000, the NLSY79-CYA excluded from the survey fielding approximately 38% of young adults between the ages of 15 and 20 from minority oversample families (The Ohio State University 2006).

Moumen 2013).[2] I classify households into five types: 1) child living in any household without her mother; 2) with mother in non-doubled up household; 3) with mother in double up formed with the child's grandparent(s); 4) with mother in double up formed with the child's adult sibling(s); and 5) double up formed with another adult(s), which I call extended kin/non-kin households.[3] In all models, if a household has multiple additional adults, I assign children to the first extended household type listed above for which they are eligible. For example, if a mother co-resides with two additional adults, her mother and her adult sister, I consider the household to be a multigenerational double up.

I include outcomes in two domains, education and health. I measure whether the child, at age 20: 1) has graduated high school, 2) has ever attended college, 3) has smoked in the past month, 4) had symptoms of depression, measured by a score of 8 or above on the CES-D-SF (CESD-R n.d.; Levine 2013), and 5) was obese, measured by a self-reported height and weight that corresponds to a BMI greater than 30.

Inverse Probability Treatment Weighting

Predictors

To estimate the IPTWs, I predict household type from multinomial logistic regression models. Previous research has established the importance of culture, economic factors, and generational needs in mothers' likelihood of doubling up (Pilkauskas 2012; Sigle-Rushton and McLanahan 2002). To capture cultural factors that may prompt doubling up, I include child's

[2] While others have counted all adults age 18 and over as additional adults (Mollborn, Fomby, and Dennis 2011; Mykyta and Maccartney 2012; Pilkauskas, Garfinkel, and McLanahan 2014), this definition results in approximately 47 percent of children in my data living doubled up with an adult sibling at some point before age 18 because many adult children do not leave the natal household immediately after turning age 18. Wiemers (2014), in studying unemployment effects on likelihood of doubling up, defines adults as age 25 or older.

[3] Ideally, I would stratify household types based on the presence of the mother's romantic partner as well, but this would result in too many household types. Instead, to begin to think about whether the effect of these household types may vary by the mother's relationship status, I will stratify my sample by mother's partner status at baseline and see if the results hold.

race (Hispanic, non-Hispanic black, and non-black, non-Hispanic) and an indicator for whether the mother was born in the United States. To capture mothers' social origins, I include indicator variables for whether both of the mother's parents were born in the United States and the highest reported educational attainment of the mother's parents (less than high school, high school, or at least one year of college). As baseline characteristics, I also include mother's religious denomination (Catholic, no denomination, or other denomination), an indicator variable for whether the mother attends religious services at least twice per month. Because these variables were measured repeatedly but not at every survey wave, I used the mother's last observed value before the birth of the child. I also include time-varying indicator variables for whether the family lives in an urban area and the family's region of residence (south, north central, west, or northeast).

As measures of economic need, I include measures of total income from wages and salary in the previous calendar year for the mother and, if applicable, her spouse; total family income from all sources of household members related by blood or marriage to the mother; and the family's total assets and total debts. Each measure is top coded at the 95^{th} percentile and logged. Because doubling up is a common response to spells of unemployment, I also include an indicator for whether the mother was unemployed at some point during the previous calendar year. To further capture the mother's earning potential, I include her educational attainment (less than high school, high school, some college, or 4+ years of college) and her Armed Forces Qualifying Test score percentile, a measure of cognitive achievement. Because members of the armed forces may receive housing, I include measures of whether the mother or her spouse, if married, received any income from military service in the past year. Similarly, I include a measure of whether she ever lived in public housing or received a government rent subsidy in the

past year and whether the respondent (or her spouse) owns or is currently buying their home. These variables capture the availability of other housing options. Rented housing, as well as public housing and military housing, may impose stricter rules about occupancy and extended stays by guests, making it less likely that a family will double up. To account for past household instability, I include an indicator for the number of previous transitions between household types.

Mothers with greater childcare needs may be more likely to double up. To capture factors which may limit a mother's ability to care for her child, I include measures of mother's age, her age at the birth of her first child, whether health limits her ability to work, and the last observation of her Rosenberg self-esteem score before the child was born. As a rough measure of substance use, I use a time-invariant indicator for whether she ever reports having used cocaine (including crack cocaine) ten or more times in her lifetime. I also include a measure of whether the mother reported drinking six or more drinks on a single occasion in the past month. Because the data on self-esteem, cocaine use, and drinking were gathered in just a few survey years, I include their baseline values in my models. To measure other demands for her time, I include time-varying measures of the employment status (full-time, part-time, or not employed) in the past calendar year and whether she is currently enrolled in school.

A mother's childcare needs are also influenced by the age and number of children for whom she is responsible; I include time-varying measures of the number of biological, adopted, or step-children in five age categories (0 to 2, 3 to 5, 6 to 11, and 12 to 17) as well as the age of the focal child and age of the youngest child. I also include an indicator for the gender of the child. An indicator for whether the child was low birthweight serves as a rough measure of child and maternal health. Because marital status and marital status changes can influence a mother's need for childrearing assistance, I include time-varying indicator variables for whether the

mother is currently married, previously married (divorced, separated, or widowed), or never married. For currently unmarried mothers, I also include an indicator for whether the mother's romantic partner is cohabiting. I also include indicator variables for changes in the mother's relationship status, one for whether she gained a spouse or cohabiting partner and one for whether she lost a spouse or cohabiting partner since the previous survey wave.

Inverse Probability Treatment Weights

Following previous research (Sharkey and Elwert 2011; Wodtke et al. 2011), I use stabilized IPTWs, which have many desirable properties over non-stabilized weights, including smaller variance (Robins et al. 2000). The use of stabilized weights also reduces the magnitude of any potential non-positivity bias, which can occur if certain subgroups of the sample rarely receive the treatment (Cole and Hernán 2008). To construct the weights, I predict household type using multinomial logit models. For each child (*i*), the probability of treatment is the product of the year-specific probabilities from ages 1 to 17. The wave-specific (k) predicted probabilities of an individual being in the household structure in which he was observed (A_{ik}) are based on previous household structure ($A_{i(k-1)}$) and time-varying covariates ($\bar{L}_{(k-1)}$), as well as baseline and time-invariant covariates ($\bar{L}_0$). This product is the denominator of the stabilized weight. The numerator follows the same form, but only includes baseline predictors.

$$SW_i = \frac{\prod_{k=1}^{17} P[A_k = a_{ki}] | \, A_{(k-1)} = a_{(k-1)i}, \bar{L}_0 = l_0}{\prod_{k=1}^{17} P[A_k = a_{ki}] | \, A_{(k-1)} = a_{(k-1)i}, \bar{L}_{(k-1)} = l_{(k-1)i}, \bar{L}_0 = l_0}$$

To reduce the variance of the weights and lessen the influence of the more highly weighted observations, I truncate at the 1st and 99th percentile. In future analyses, I will incorporate weights that adjust for attrition and sampling.

Marginal Structural Model using IPTW

I estimate a logit model in which each outcome—high school graduation, college attendance, smoking, depression, and obesity—is a function of duration-weighted exposure to each household type from ages 1 through 17. In the equation below, the log odds ratio δ_1 is the estimated impact of spending one additional childhood year in a given household type on the log odds of experiencing the outcome.

$$logit_{weighted}\big(P(Y_i = 1)\big) = \theta_0 + \delta_1 \sum_{k=1}^{17} a_{ik} + \gamma_2 \overline{L}_{i0}$$

Using the stabilized IPTWs requires that the model condition on baseline covariates, $\overline{L}_{i0}$, in order for doubling up patterns to be unconfounded with these background traits (Wodtke et al. 2011). For both the prediction models and marginal structural models, I cluster standard errors at the mother level to account for non-independence of observations from siblings.

Future Plans

I propose to extend this analysis in several ways. As I refine my prediction models, one contribution of this research will be to show the characteristics that predict doubling up for children. My current results predict household type for all children in one model. However, in subsequent versions of this manuscript, I will predict the likelihood that the child is in each household type in the next year separately for each of the five household types in order to allow the predictor variables to have different associations with household structure depending on the household type in which the child was living in the previous wave. That is, I will estimate multinomial logit hazard models of entrances into and out of household types.

Because I suspect that selection into and the effects of doubled up households may differ by age of the child, I will separate the years spent doubled up by child age – maybe early (1-9) vs later (10-17) childhood – and then look at the effects of early childhood years spent in each

household type and the effects of later childhood years spent in each household type. Additionally, because previous work suggests that selection into doubled up households and their effects on children may differ by race (Foster and Kalil 2007; Mollborn et al. 2011), I would like to explore separate models by race if possible given data limitations. These additional analyses will provide further insight into the effects of doubling up on children and whether they might vary by age and race of child.

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