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Household Incarceration in Early Adolescence and Risk of Premarital First Birth

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Abstract

In the second half of the 20th century, the United States experienced a massive increase in incarceration. In response to this growth, a burgeoning scholarship has sought to explore the collateral consequences of incarceration for young children. However, this scholarship has less frequently explored the impact of incarceration on long-term outcomes, how incarceration experienced in periods other than early childhood impacts children, and whether the incarceration of family members other than parents has negative implications for children. Using data from the children of the mothers in the National Longitudinal Survey of Youth, I explore whether household incarceration experienced in early adolescence is associated with a child's risk of growing up to have a premarital first birth. The results suggest that, even after including a rich set of covariates, children who experience household incarceration in early adolescence are at greater risk of having a premarital first birth, particularly when the father or an external household member is incarcerated.

Keywords

Incarceration; Premarital birth; Intergenerational; Extended Household

In the second half of the 20th century, the United States experienced a massive increase in incarceration unparalleled in its own history and among advanced democracies. In the last 35 years, the U.S. incarceration rate has roughly quintupled (Wildeman & Western 2010). Since 2002, the United States has incarcerated people at a greater rate than any other country and at a much greater rate than any other industrialized democracy (Wakefield & Uggen 2010; Wildeman & Western 2010). Individuals who are already the most disadvantaged in society are the most likely to experience incarceration; black men who dropped out of high school have a cumulative risk of incarceration of 2 in 3 (Western & Wildeman 2009). As incarceration rates have increased, so has the likelihood that a child will endure the incarceration of a parent, especially among populations that are most disadvantaged. Scholarship suggests that more than 50 percent of black children born to high school

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dropouts in 1990 had an incarcerated father by the time they reached age 14 (Wildeman 2009).

In response to the growth in incarceration, a burgeoning scholarship has sought to explore the collateral consequences of incarceration for children. This scholarship has consistently found that incarceration has negatively impacted young children (Geller, Garfinkel, & Western 2011; Turney & Haskins 2014; Wakefield & Wildeman 2013; Wildeman 2010). However, scholars know much less about the impact of incarceration on long term outcomes, how incarceration experienced in periods other than early childhood impacts children, and whether the incarceration of family members other than parents has negative implications for children (Nichols & Loper 2012; Wildeman & Muller 2012).

In this paper, I begin to fill some of these gaps: using data from the National Longitudinal Survey of Youth 1979 (NLSY79) and the children of the mothers from the NLSY79, I examine the influence of household incarceration experienced between the ages of 10 and 14 (during early adolescence) on the risk of having a premarital first birth. In the first set of analyses, I explore whether a variable capturing the incarceration of any household member is associated with the risk of having a premarital first birth. In the second set of analyses, I dig deeper into this association by exploring whether the association differs depending on who in the household is incarcerated (father, mother, sibling, or extended household member). Given the growth in non-marital childbearing over time and its negative implications for the parent and the child (Bennett, Bloom, & Miller 1995; McLanahan, Tach, & Schneider 2013; Osborne & McLanahan 2007), exploring these associations has the potential to shed light on one way mass incarceration has transmitted disadvantage across generations.

1. Background

1.1 The Importance of Nonmarital Childbearing

Premarital childbearing is an important outcome to study for a number of reasons. First, the growth in nonmarital childbearing has been one of the most pronounced changes in family formation since the 1960s (McLanahan 2004). More than 40% of all U.S. births now occur outside marriage, an all-time high, compared to 5% in 1960 (Martin et al., 2009). Importantly, the increase in nonmarital births has not occurred equally across groups and tends to be concentrated among disadvantaged portions of the population. Specifically, nonmarital fertility rates are particularly high among African Americans and Hispanics and among individuals with low levels of education (Lichter 2012; Wildsmith et al., 2012). These trends may be especially relevant in the context of incarceration since incarceration grew dramatically around the same time as nonmarital childbearing and is similarly concentrated among disadvantaged segments of society (Western & Wildeman 2009; Wildeman 2009; Wildeman & Western 2010).

Second, nonmarital childbearing has negative implications for parents and their children above and beyond preexisting disadvantage. For parents, nonmarital childbearing is associated with worse health outcomes, an increased risk of welfare receipt and poverty, and a reduction in labor force participation and likelihood of getting married (Bennett, Bloom, &

Miller 1995; Bronars & Grogger 1994; Williams et al. 2011; Williams et al. 2013). The consequences of nonmarital childbearing are also stark for children. Scholarship suggests that growing up in a single-parent household is associated with a reduction in a child's educational attainment, economic security, and physical and psychological well-being (McLanahan, Tach, & Schndneider 2013; Sigle-Rushton and McLanahan 2004). Thus, since nonmarital childbearing is concentrated among disadvantaged segments of the population and has negative implications, it is contributing to inequality among both adults and children (McLanahan 2004).

1.2 Moving Beyond Parental Incarceration

Almost all of the literature exploring the consequences of incarceration has focused on parental incarceration (for exceptions, see Farrington et al. 2001; Gjelsvik, Dumont, Nunn, & Rosen 2014; Nichols & Loper 2012; Whalen & Loper 2014). Parents play a crucial part in the lives of children, so the focus on parental incarceration is understandable. However, older siblings and extended household members also often play an important role in children's lives; thus, there is reason to believe that the incarceration of siblings and extended household members may have important implications.

Scholarship has demonstrated the importance of siblings in the lives of children. Older siblings often provide companionship and affection; they also often serve as confidants and role models (Davies 1991; Hofferth & Goldscheider 2010; Worden 1999). It is therefore not surprising that studies have found that the death of a sibling often has a negative impact on children (Davies 1991; Worden 1999). In fact, Worden (1999) found that the death of a sibling was just as impactful as the loss of a parent. Like sibling death, the incarceration of a sibling leads to the removal of an important person in the child's life from the household. Thus, it is quite possible that the incarceration of an older sibling will have important implications for children.

As is the case with siblings, extended family members often play an important role in the everyday experience of children, particularly as the traditional nuclear family has become less common. Research has found that roughly 15% of children who live with a parent live with an extended household member (Kreider 2008; Mollborn, Fomby, & Dennis 2011). Living with an extended household member has been found to be especially common among ethnic minority and low-income families, the groups who are also at the greatest risk of experiencing incarceration (Krieder 2008; Mollborn, Fomby, & Dennis 2011). In addition to shared living arrangements, research has found that extended family members provide a variety of important services that are likely to have a bearing on the child's context, including financial support (Angel & Tienda 1982; Gottlieb, Pilkauskas, & Garfinkel 2014) and childcare (SmithBattle 1996). Importantly, extended family appears to matter for child outcomes, as close ties to extended family have been found to be associated with better academic outcomes for children (Pallock & Lamborn 2006). Given their substantial influence on a child's environment, the incarceration of extended household members may have important implications for children.

1.3 Theoretical Perspectives on Household Incarceration's Consequences

A number of perspectives have been introduced to explain how parental incarceration may influence children (See Hagan & Dinovitzer 1999 for a thorough review). Although these perspectives were designed with parental incarceration in mind, for the reasons described above, I argue, like Nichols and Loper (2012), that they are also applicable to household member incarceration more generally. In this paper, I do not attempt to adjudicate between these perspectives, but present them to illustrate why incarceration may be associated with risk of premarital first birth.

Three of these perspectives suggest that household incarceration will increase a child's risk of premarital first birth. The economic strain perspective suggests that household incarceration leads to lower levels of and greater fluctuations in family income, both of which have been found to increase the risk of experiencing a premarital first birth (Hagan & Dinovitzer 1999; Wu 1996). Prior research has found that incarceration reduces employment (Pager 2003), educational opportunities (Arditti & Few 2006), and wages (Western 2002), suggesting that incarceration is likely to have direct implications for the level and stability of family income. Moreover, if the incarcerated household member provided childcare, the incarceration will likely influence family income either by forcing working members of the household to work fewer hours to provide care or by increasing child care costs.

The second perspective emphasizes the importance of social control and socialization. Prior research has demonstrated that close relationships with adults, positive role models, and effective discipline are important protective factors against growing up to have a nonmarital birth (Hofferth & Goldschieder 2010). If the incarcerated individual made positive contributions to the household, this perspective suggests that the incarceration is likely to reduce effective parenting, eliminate an important source of support for the child, and take away an important role model both directly through the incarcerated household member's absence and indirectly by negatively impacting other caregivers (Hagan & Dinovitzer 1999; Nichols & Loper 2012).

The third perspective emphasizes the stigma attached to incarceration. Qualitative research suggests that children are cognizant of the negative labels attributed to them because of their parent's incarceration (Murray, Loeber, & Pardini 2012; Nesmith & Ruhland 2008). If children are aware of these negative labels, labeling has the potential to produce feelings of anger, rejection, shame, and low self-esteem (Hagan & Dinovitzer 1999; Scheff & Retzinger 1991). Importantly, low self-esteem has been found to be associated with negative outcomes for young adults, such as an increased risk of engaging in criminal behavior (Trzesniewski et al., 2006). Given that having a premarital first birth is a behavioral outcome, it is quite possible that low self-esteem is a risk factor for this outcome as well.

Although these three perspectives suggest that household incarceration is likely to increase a child's risk of having a premarital first birth, two other perspectives suggest that there will be either no association or that household incarceration will be associated with a reduction in risk. The selection perspective suggests that any association between household incarceration and a child's risk of having a premarital first birth is spurious (Hagan & Dinovitzer 1999). From this perspective, children who experience household incarceration

come from households that are disadvantaged prior to the incarceration spell, and these preexisting disadvantages explain any association between household incarceration and risk of a premarital first birth (Hagan & Dinovitzer 1999; Murray, Loeber, & Pardini 2012).

Lastly, the reduced strain perspective suggests that household incarceration actually reduces strain in the household. From this perspective, household members who become incarcerated are bad influences on children and families and produce great strain when they are present in the household, which in turn, has a negative impact on outcomes for children (Hagan & Dinovitzer 1999). Specifically, some research suggests that domestic violence is common among high offending men (Murray & Farrington, 2008; Western & Wildeman 2009) and that removing badly behaved men from households may benefit children (Jaffee et al. 2003). Since negative role models and home environment are important risk factors for nonmarital childbearing (Hofferth & Goldscheider 2010), household incarceration may reduce a child's risk of having a premarital first birth if the household member was a negative influence.

1.4 Household Incarceration in Early Adolescence

The majority of the literature on the consequences of familial incarceration focuses on the experience of incarceration prior to the adolescent years (Wildeman & Muller 2012). Prior research suggests that this is an important limitation because early adolescence is a sensitive period for neural development (Masten 2014). As Ernst et al. (2005) and Steinberg (2007) argue, whether an individual engages in risky behavior is largely influenced by the relative influence of socioemotional and cognitive control networks. During early adolescence, the socioemotional parts of the brain become far more sensitive, while the cognitive control parts change only gradually (Steinberg 2007). When the socioemotional parts of the brain are dominant relative to the cognitive control part, stimuli and stress lead to an increase in risky behavior because the short-term rewards of behavior are made more salient than the possible costs (Steinberg 2007). Therefore, in response to the stress and stimuli induced by household incarceration, early adolescents may be particularly likely to engage in risky behavior with long-term implications lasting into adulthood (Crews, He, & Hodge 2007; Lupien, McEwen, Gunnar, & Heim 2009; Steinberg 2007).

2. Existing Empirical Research

As mentioned previously, scholarship has consistently found that parental incarceration is associated with negative outcomes for children in early childhood. The research on long-term outcomes and familial incarceration is far more mixed and has rarely focused on implications for fertility. In a meta-analysis, Murray, Farrington, and Sekol (2012) found a relatively strong negative association between parental incarceration and antisocial behavior, but did not find robust associations between incarceration and mental health, educational performance, or drug use (Murray, Farrington, & Sekol 2012). However, as Murray, Loeber, and Pardini (2012) concluded, results from these studies are difficult to interpret because most of the work either fails to control for a wide range of variables that may be associated both with parental incarceration and the negative outcomes (leading to selection concerns and likely overstated findings), or includes control variables measured post-incarceration,

many of which are better thought of as mediators rather than controls (likely leading to understated findings).

The few studies that have explored the implications of incarceration for fertility behavior have also produced mixed results. In one study, Massey & Brodmann (2014) explored the impact of paternal incarceration on the risk of nonmarital childbearing and found no association. However, the purpose of this analysis was quite broad (the focus was not just on paternal incarceration), so many of the control variables were measured post-incarceration and may serve to explain incarceration's effect rather than rule out a spurious association (Murray, Loeber, and Pardini 2012). In a second study, Whalen and Loper (2014) found that household incarceration increased a girl's risk of teenage pregnancy. However, this study did not explore whether there were differences in the association for different types of household incarceration and was not able to include control variables that clearly preceded the incarceration spell.

Three additional studies (other than Whalen and Loper 2014) have moved beyond parental incarceration to include the incarceration of other family/household members. Farrington et al. (2001) found that the incarceration of non-parental relatives was associated with an increase in a boy's risk of engaging in delinquent behavior. Nichols and Loper (2012) and Gjelsvik et al (2014), unlike Farrington et al (2001), focused exclusively on household incarceration. Nichols and Loper (2014) found that having an extended household member incarcerated (but not other types of household members) increased risk of extended absence in high school and high school dropout. Gjelsvik et al (2014) found that the incarceration of a household member was associated with poorer adult health, but did not distinguish by type of household incarceration.

While these studies have provided evidence about the importance of moving beyond a parent-centered incarceration focus, none explored the consequences of household incarceration in early adolescence in particular (respondents who experienced familial incarceration during this period were lumped together with respondents who experienced it in other periods). In the limited research focusing on timing of parental incarceration, the research has generally found that incarceration experienced in early adolescence has negative consequences (Besemer et al. 2011; Cho 2010; Johnson 2009; Murray, Loeber, & Pardini 2012).

3. Data and Method

3.1 Data

The data for the analyses come from the NLSY79, the Children of the NLSY79, and the Young Adults of the NLSY79. The NLSY79 is a nationally representative longitudinal survey of more than 12,600 men and women first interviewed between the ages 14 and 21 in 1979, with detailed information on family, work, and educational experiences (Center for Human Resource Research [CHRR] 2001). Starting in 1986, children of the NLSY79 mothers (age 0-14) were interviewed every other year (Bureau of Labor Statistics, 2002). Data from the NLSY79 and the children of the NLSY79 are used to obtain detailed information on the young adult's mother and the child's household situation growing up in

order to control for factors that are likely to influence both a child's risk of experiencing household incarceration and his or her risk of experiencing a premarital first birth.

Beginning in 1994, the mothers' young adult children 15 years of age and older were assessed biennially (Bureau of Labor Statistics, 2002). Although the young adult survey (unlike the original NLSY79 data) is not nationally representative, it has a number of advantages that make it ideal for these analyses. In addition to having detailed information on nonmarital childbearing and the incarceration of household members between ages 10 and 14, the data set is larger, more nationally representative, and has followed respondents for a longer period of time than most similar studies (Aughinbaugh, Pierret, & Rothstein 2005; Berger 2007).

The analytic sample consists of young adults who were interviewed between 1994 (the first year data on young adults was collected) and 2010 (N=7612). Analyses are restricted to young adults who were born in 1979 (the year the original NLSY79 was first administered) or later, since most variables that may be related to selection into household incarceration were not available prior to 1979. Therefore, 791 respondents who were born before 1979 were dropped from the sample. Another 112 cases were dropped because it was unclear whether respondents experienced a premarital first birth. Two hundred ninety four respondents were missing data on household incarceration, so they were dropped from the analyses. An additional 359 cases were dropped because respondents either gave birth at 15 years and 9 months or younger¹ or were not interviewed after turning 15 years and 9 months old. Multiple imputation was used to impute values for missing data on the other covariates, a technique that uses observed data to estimate values for respondents with missing data (Allison 2002)². Overall, the final sample consists of 6,027 individuals. The sample is 51 percent male, 44 percent White, 32 percent Black, and 22 percent Hispanic. Approximately 25 percent of respondents experienced a premarital first birth and roughly 5 percent experienced household incarceration between ages 10 and 14.

3.2 Premarital First Birth

The dependent variable is whether and when the respondent experienced a premarital first birth once he or she reached 15 years and 9 months of age. Once the young adults turn 15 years and 9 months old, they are coded as "0" for each month they do not experience a premarital first birth and "1" for the month when a premarital first birth occurs. Once respondents have a premarital first birth or get married, they are no longer analyzed because they are no longer at risk of having a premarital first birth. Respondents who never give birth to a child over the course of observation are coded as "0" for each month data is available.

¹By excluding respondents without data after 15 years and 9 months, I ensure temporal priority, since the focus is on incarceration occurring between ages 10 and 14. I use 15 years and 9 months instead of 15 years of age as the cutoff because this ensures that the premarital conception occurred after the household incarceration. Results using 15 years of age as the cutoff, like Hognas and Carlson (2012), are very similar. Starting the risk period at age 10 and ensuring that all premarital first births are included (but not ensuring temporal priority) produces results that are also very similar.

²I imputed five data sets and took the average estimate from these 5 data sets. I also estimated analyses on the data without imputing for missing values (not shown), and the findings were very similar.

3.3 Household Incarceration

The household incarceration variables (the key independent variables) include a dichotomous measure indicating whether any individual in the respondent's household was incarcerated when the respondent was between 10 and 14 years old. Separate dichotomous variables are also created indicating whether the respondent's father (including stepfather), mother (including stepmother), sibling, or other household member (aunt, uncle, cousin, grandparent, other relative, or nonrelative) was incarcerated during years 10 to 14 of the respondent's life. Data for these variables come from two responses from either the 2006, 2008, or 2010 young adult survey: (1) The youth responded yes to the question, "Any adult living with the respondent gone to prison/jail since respondent was 10 years old³?" and (2) The youth indicated his or her age at the time of the household member incarceration based on three separate items: (a) age of respondent (R) when household member was first imprisoned; (b) most recently imprisoned; (c) imprisoned. Respondents who indicated that they were between ages 10 and 14 for any of the age at incarceration questions were coded as 1 for the household incarceration variable. Father, mother, sibling, and other household member incarceration variables were coded as "1" if that specific household member was incarcerated when the young adult was between 10 and 14 years old and "0" if that household member was not.

3.4 Control Variables

In addition to household incarceration, I include a number of control variables that may be associated with having an incarcerated household member and with growing up to have a premarital first birth. Importantly, each of these variables is measured prior to the household incarceration experience between ages 10 and 14 to ensure proper temporal ordering. First, I control for a number of child characteristics: child's gender ("0" if female and "1" if male), child's race (White, Black, Hispanic, or Other), whether the child is the mother's first child ("1" if yes and "0" if not), and (to account for period effects) whether the child was born in the 1990s ("1" if yes and "0" if not)⁴.

Second, I control for a number of measures of household characteristics that are designed to measure the home environment the child experienced prior to household incarceration. Average family income in the first nine years of the child's life is converted to 2009 dollars and log transformed⁵. The number of adults in the household and number of children in the household are both measured continuously as the average number during the first nine years of the child's life. The number of residential transitions is a count of family structure transitions experienced in the first nine years of the child's life (the mother went from being single to cohabiting, single to married, married to single, or married to cohabiting; Fomby and Cherlin 2007). Consistent with Wu and Martinson (1993), the degree to which a child is socialized to a single-parent household structure is coded dichotomously, indicating whether the child spent 75 percent or more of available survey waves through age nine in a mother-

³Respondents are not asked about household incarceration prior to age 10 so I cannot explore whether associations in early adolescence are different from those in early stages of childhood.

⁴It is not necessary to include a control for age because the measure of exposure in the cox models represents the respondent's age, since exposure is measured in months since the child turned 15 years and 9 months old.

⁵All average variables are taken through age nine to ensure that they precede the household incarceration spell.

only household. I also control for family structure when the child was age nine or in the most recent wave available prior to age 10 (coded as married, cohabiting, or single). Parenting and home quality is measured continuously using the Home Observation Measure of the Environment-Short Form (HOME-SF). The HOME-SF contains 53 items relating to cognitive stimulation, emotional support, and home environment. The measure used is the average percentile HOME-SF score over the first nine years of the child's life, with higher scores indicative of more positive home environments. Lastly, I control for whether the child's mother lived in an urban area and in the south for most of the first 9 years of the child's life (both are measured dichotomously).⁶ I include the control for southern residence because this region of the country has the largest share of births occurring outside of marriage (Martin et al. 2015).

In addition to child and household characteristics, I also control for a number of maternal characteristics designed to further capture disadvantage experienced by the child. Mother's average education in the first nine years of the child's life, mother's IQ (using the Air Forces Qualification Test), and mother's self-esteem (using the Rosenberg Self Esteem Scale) are each measured continuously, with IQ and self-esteem measured as a percentile. Both mother's age at the time of the child's birth and mother's age when she had her first child are coded as "1" if the birth occurred in her teenage years and "0" if it did not. Mother's citizenship is also coded dichotomously ("1" if a citizen and "0" if not), as is mother's hard drug use ("1" if used drugs other than marijuana to get high in 1979 and "0" if not). Mother's delinquent behavior is measured as a scale based on responses to the 1980 wave of the NLSY79. Mothers were asked whether they had engaged in a variety of behaviors in the past year, including shoplifting, other theft, assault, or vandalism. I create a scale in which I divide the number of types of delinquent activities that the mother participated in by the total number of delinquency questions the mother answered.

3.5 Analytic Strategy

The dependent variable for these analyses is an event history variable because it captures both whether and when the respondent experienced a premarital first. Hazard models are typically used to analyze event history dependent variables because they allow for the use of all available information, even for respondents who have yet to experience a premarital first birth or first marriage (Fox 2002). In addition to accounting for whether an individual experienced a premarital first birth, the hazard modeling approach has the advantage of accounting for how long the individual went (while at risk) without experiencing a premarital first birth. For the purposes of this study, respondents are considered to be at risk of experiencing a premarital first birth in each month once the young adult reaches 15 years and 9 months of age. When a respondent has a premarital first birth or gets married, he or she is no longer analyzed because they are no longer at risk of having a premarital first birth.

Following much of the prior scholarship on childbearing outcomes, I choose to analyze the data using the cox proportional hazards modeling approach (Bumpass & McLanahan 1989;

⁶These variables are meant to capture whether the child lived in urban areas and the south. It is possible that the child did not live with the mother for all of this period, but this is likely true of only a small percentage of children, since children were sampled and followed based on their relationship to the mother.

Guzzo & Hayford 2009; Hognas & Carlson 2012; Wu & Thomson, 2001). This multivariate hazard approach is quite flexible because it uses the Cox partial likelihood method and treats time as continuous (Fox 2002). The model is semi-parametric because it makes no assumptions about the form of the baseline hazard, but treats as parametric the effect of covariates on the baseline hazard (Fox 2002)⁷.

In the first set of analyses, I explore whether there is an association between experiencing any household member incarceration in early adolescence and the risk of growing up to have a premarital first birth. In the first model, I assess whether there is a bivariate association between household incarceration and risk of a premarital first birth. In the second model, I explore whether the association between household incarceration and risk of a premarital first birth remains after controlling for child and household characteristics. In the third model, I explore whether the association remains once maternal characteristics are added to the controls in the second model.

In the second set of analyses, I explore whether there are differences in the association between household incarceration and risk of premarital first birth depending upon who in the household is incarcerated. In the first of these models, I explore whether there are differences in the associations between paternal, maternal, sibling, and extended household member incarceration without including any control variables. As with the previous set of analyses, I control for child and household characteristics in the second model, and then add maternal characteristics as covariates in the final model. For each model, results are presented from unweighted cox proportional hazard models because, when the sampling weights are not a function of the dependent variable, as is the case with the NLSY and premarital childbearing, unweighted regressions are more efficient than weighted regressions (Winship & Radbill 1994). All analyses were conducted in Stata 13.

4. Results

4.1 Descriptive Results

In Table 1, I explore whether there are descriptive differences between respondents who had a household member incarcerated and respondents who did not using t-tests for continuous variables and chi square tests for categorical variables. Among respondents with a household member incarcerated, approximately 34 percent had a premarital first birth compared to roughly 24 percent of those without a household member incarcerated. However, the bivariate analysis is limited for two reasons: it does not account for the amount of time respondents were exposed to the risk of a premarital first birth, and respondents with a household member incarcerated are generally disadvantaged compared to respondents without a household member incarcerated. For instance, respondents with a household member incarcerated are significantly more likely to have mothers with less education, to have mothers who first gave birth as a teenager, and to have spent 75% of childhood without a father figure in the household. Therefore, I test this association further in a multivariate

⁷The model assumes that the impact of covariates does not change as exposure time increases. None of the incarceration variables violated this assumption. A few of the covariates did violate this assumption. Interacting the covariates that violated this assumption with time did not substantively change the incarceration coefficients (these results are available from the author upon request). Thus, for simplicity of interpretation, I present results without these interactions.

context with models that account for the amount of time exposed to the risk of having a premarital first birth.

4.2 Results from Cox Proportional Hazards Models

In Table 2, I present results from cox proportional hazards models estimating the impact of household incarceration on risk of a premarital first birth. Results are presented as hazard ratios for ease of interpretation. In cases where the hazard ratio is greater than one, the coefficient can be interpreted as a percent increase by subtracting one from the coefficient. In cases where the hazard ratio is less than one, the coefficient can be interpreted as a percent decrease by subtracting the coefficient from one. In Model 1, I explore whether there is a bivariate association between household incarceration and risk of a premarital first birth once the amount of time at risk is accounted for. The results indicate that having a household member incarcerated between ages 10 to 14 is associated with a 77 percent increase in a child's risk of growing up to have a premarital first birth ($P<0.01$).

In Model 2 of Table 2, I test whether the bivariate association remains after controlling for child and household characteristics observed prior to the incarceration spell. The inclusion of these controls leads to a reduction in the household incarceration coefficient of approximately 28 percent, yet household incarceration remains significantly associated with the risk of having a premarital first birth. Specifically, having a household member incarcerated between ages 10 to 14 is associated with a 51 percent increase in a child's risk of growing up to have a premarital first birth ($P<0.01$). In Model 3 of Table 2, I add controls capturing maternal disadvantage to further account for environmental disadvantages experienced by the child. Inclusion of these controls reduces the household incarceration coefficient by an additional 17 percent. However, experiencing household incarceration between ages 10 and 14 remains significantly associated with an increased risk (41 percent) of having a premarital first birth.

Table 3 presents results from analyses that explore whether the association between household incarceration and risk of a premarital first birth varies depending upon who in the household is incarcerated. In Model 1, I explore these associations without including any control variables. The results suggest that experiencing paternal incarceration, sibling incarceration and the incarceration of an extended household member are all associated with substantial increases in the risk of premarital first birth. There is no evidence that maternal incarceration is associated with an increased risk of premarital first birth; however, this result should be interpreted with caution given the small number of respondents who experienced maternal incarceration.

In Model 2 of Table 3, I add controls capturing child and household characteristics. The inclusion of these controls reduces each of the significant incarceration coefficients from the previous model. Experiencing paternal incarceration is now associated with a 44 percent increase in a child's risk of having a premarital first birth ($P<0.05$), while the incarceration of extended household members and siblings are associated with 84 percent ($P<0.01$) and 47 percent ($P<0.10$) increases, respectively. In Model 3, I add covariates capturing maternal characteristics. Once these controls are included, sibling incarceration is no longer associated with an increased risk of premarital first birth. However, both paternal and

extended household member incarceration remain significantly associated with a child's risk of having a premarital first birth. Specifically, paternal incarceration is associated with an increased risk of 41 percent, while extended household incarceration is associated with a 65 percent increase.

5. Discussion

In recent years, a burgeoning scholarship has begun to explore the impact that mass incarceration has had on children in the United States. This scholarship has consistently found that parental incarceration has negatively impacted young children (Geller, Garfinkel, & Western 2011; Turney & Haskins 2014; Wakefield & Wildeman 2013; Wildeman 2010). However, there is much less evidence and consensus on: 1) Whether the incarceration of family members other than parents impacts children; 2) Whether familial incarceration has an impact on long-term outcomes; and 3) Whether familial incarceration experienced in periods other than early childhood is impactful (Murray, Farrington, & Sekol 2012; Nichols & Loper 2012; Wildeman & Muller 2012).

In this paper, I begin to fill some of the gaps in this scholarship by exploring whether children who experience household member incarceration in early adolescence are at greater risk of growing up to have a premarital first birth. Even after including controls for child, household, and maternal characteristics preceding the incarceration spell, I find that early adolescents who experience the incarceration of a household member are at significantly greater risk of experiencing a premarital first birth. Exploring this association further, I find that there are differences in the association between household incarceration and risk of premarital first birth depending on whom in the household is incarcerated. Analyses without controls suggest that paternal, sibling, and external household incarceration are associated with increased risk of premarital first birth, but that maternal incarceration is not. Once a full set of covariates is included, paternal and external household member incarceration both remain significantly associated with risk of premarital first birth, while the sibling incarceration association is reduced to non-significance. Thus, the results provide evidence suggesting that the association between paternal and external household incarceration and a child's risk of growing up to have a premarital first birth may only be partially driven by selection into incarceration.

It is important to consider these findings alongside their limitations. First, the reader should be cautious interpreting the non-significant results for maternal and sibling incarceration. Given the small sample sizes for different household incarceration types, particularly in the case of maternal incarceration, statistical power is limited, making it difficult to capture significant associations. Second, this study did not incorporate intersectionality into the analysis. Ideally, the study would have explored whether the associations between household incarceration and premarital first birth differed by race and gender. However, the number of respondents experiencing different types of incarceration is particularly small when broken down by race and gender, precluding this type of analysis. Future studies with larger samples of different household incarceration types should reexamine the implications of maternal and sibling incarceration and explore whether the association between household incarceration and premarital childbearing is moderated by race and gender.

Third, although this study documents that there is an association between household incarceration and a child's risk of growing up to have a premarital first birth, it does not explain why this association exists. Future scholarship exploring whether increased economic strain, stigma, and reduced social control are mechanisms behind this association is crucial because it will provide insight into what types of policies are best suited to help children who experience household incarceration.

Lastly, the NLSY79 young adult sample is not nationally representative so the results cannot be generalized to the United States as a whole. Since the study oversamples disadvantaged segments of the population (low-income and ethnic minority individuals), it is not surprising that respondents in this sample are more likely to have premarital first births than individuals in the United States more generally (Guzzo & Furstenberg 2007). Although this is a limitation, the NLSY79 young adult sample is more representative than most other data sets that can be used to answer the questions posed in this study (Aughinbaugh, Pierret, & Rothstein 2005; Berger 2007). Moreover, the fact that the NLSY79 young adult study oversamples disadvantaged segments of the population leads to less concern than if more privileged respondents were oversampled since the population of interest (people who experience household incarceration) tends to be disadvantaged. As a result, regression results estimating the consequences of household incarceration may be more precise.

Despite these limitations, this paper makes a number of contributions that have implications for public policy. Although this study does not provide evidence regarding what types of interventions will best help children, it does provide important insights into which children interventions should target. A wide range of scholarship has documented that children who experience parental incarceration in early childhood are at risk for negative outcomes and, therefore, should be the target of interventions. The results from this study provide evidence that children who experience household incarceration in early adolescence are also at great risk of negative outcomes and, therefore, are also in need of interventions. Additionally, results from this study provide support for the view that children who experience paternal incarceration are at great risk for negative outcomes. However, the findings also lead to the conclusion that focusing on children who experience paternal incarceration is not enough. It is also crucial for policy-makers to provide support to children who experience the incarceration of extended household members.

Taken together, without effective interventions, household incarceration has important implications for the reproduction of disadvantage across generations. Incarceration is much more concentrated among disadvantaged than advantaged segments of the population. Therefore, individuals who experience the incarceration of a household member are, on average, disadvantaged to begin with. By experiencing household incarceration, individuals who are already disadvantaged are placed at an even greater risk of having premarital first birth, an outcome that has negative implications both for the parent and his or her child (who was born outside of marriage). In this way, household incarceration reproduces disadvantage across generations through family structure. This provides further evidence that the huge spike in incarceration has had important collateral consequences and helped to reinforce and perpetuate disadvantage in the United States.

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Highlights

- Explores the association between household member incarceration in early adolescence and a child's risk of premarital first birth.
- Summary measure capturing whether respondent experienced the incarceration of any household member suggests that household incarceration is risk factor for premarital first birth.
- More refined analyses show that associations differ depending on who in the household is incarcerated.
- Without accounting for selection, paternal, sibling, and extended household member incarceration are associated with increased risk of premarital first birth.
- Once controls for child, household, and maternal characteristics are introduced, the association holds for paternal and extended household members.

Table 1

Descriptive Statistics by Household Incarceration Status

Dependent Variable	Mean/% -Full sample (N=6027)	Mean/% -HH Incarceration (N=295)	Mean/% No HH Incarceration (N=5732)
Premarital Birth	24.84	33.90**	24.37
Household Incarceration			
Any Household Incarceration	4.89	100.00**	0
Paternal Incarceration	2.16	44.07**	0
Maternal Incarceration	0.43	8.81**	0
Sibling Incarceration	1.41	28.81**	0
Other HH Member Incarcerated	1.00	20.34**	0
Child Characteristics			
White	43.67	30.17**	44.36
Black	32.14	39.66**	31.75
Hispanic	22.30	27.80*	22.02
Other Race	1.89	2.37	1.87
First Born	40.04	31.53**	40.47
Male	51.17	54.24	51.01
Born in 1990s	24.26	32.20**	23.85
Household Characteristics			
# of Residential Transitions	0.70(1.02)	0.88(1.14)**	0.69(1.01)
Socialized to Single Parent HH	18.53	29.83**	17.95
Mean Household Income	57295.04(67846.65)	35434.03 (35214.26)**	58420.12 (68924.84)
Mean Number of Adults in HH	2.04(0.55)	2.09(0.68)	2.03(0.55)
Mean Number of Children in HH	2.36(1.06)	2.80(1.24)**	2.34(1.04)

	Mean/% -Full sample (N=6027)	Mean/% -HH Incarceration (N=295)	Mean/% No HH Incarceration (N=5732)
Mean Home Environment	46.06(24.50)	34.67(23.05)**	46.64(24.43)
Married when Child Age 9	61.31	44.07**	62.19
Cohabitation when Child Age 9	6.77	8.47	6.68
Single when Child Age 9	31.92	47.46**	31.12
South (Majority prior to age 10)	38.94	31.19**	39.34
Urban (Majority prior to age 10)	80.74	83.73	80.58
Maternal Characteristics			
Mom's Mean Education	12.27(2.33)	11.45(2.10)**	12.31(2.33)
Mom Teen at First Birth	31.21	44.41**	30.53
Mom Teen at Child's Birth	11.48	12.88	11.41
Mom's Delinquency	0.09(0.11)	0.11(0.12)*	0.09(0.11)
Mom's Hard Drug Use	14.98	18.31	14.81
Mom is a Citizen	94.21	94.58	94.19
Mom's IQ	39.02(29.71)	27.54(25.82)**	39.61(29.78)
Mom's Self Esteem Percentile	47.94(31.27)	43.75(28.07)*	48.16(31.41)

Note: T-tests are used to compare those with a household member incarcerated to those without a household member incarcerated for continuous variables, while chi square tests are used for categorical variables. Standard deviations are in parentheses for continuous variables.

+p<0.10

* p<0.05

** p<0.01 (two-tailed tests).

Table 2

Cox Proportional Hazards Models Predicting Association between Household Incarceration and Risk of Premarital First Birth

	Model 1	Model 2	Model 3
Household Incarceration			
Any HH Member Incarcerated	1.77 (1.44-2.19) ^{**}	1.51 (1.22-1.87) ^{**}	1.41 (1.14-1.75) ^{**}
Child Characteristics			
White (Reference=Black)		0.64 (0.54-0.75) ^{**}	0.69 (0.57-0.83) ^{**}
Hispanic (Reference=Black)		0.83 (0.71-0.98) [*]	0.82 (0.69-0.98) [*]
Other (Reference=Black)		1.27 (0.80-2.03)	1.36 (0.86-2.14)
First Born		0.98 (0.86-1.11)	1.07 (0.93-1.24)
Male		0.50 (0.45-0.55) ^{**}	0.49 (0.44-0.54) ^{**}
Born 1990s		0.58 (0.44-0.76) ^{**}	0.68 (0.51-0.90) ^{**}
Household Characteristics			
# of Residential Transitions		1.15 (1.09-1.22) ^{**}	1.11 (1.05-1.17) ^{**}
Socialized to Single Parent HH		1.19 (1.01-1.40) [*]	1.09 (0.92-1.30)
Mean Household Income (Logged)		0.89 (0.84-0.95) ^{**}	0.91 (0.86-0.96) ^{**}
Mean Number of Adults in HH		1.00 (0.92-1.10)	0.99 (0.90-1.09)
Mean Number of Children in HH		1.17 (1.10-1.24) ^{**}	1.08 (1.02-1.16) [*]
Mean Home Environment		0.99 (0.99-1.00) ^{**}	1.00 (0.99-1.00) ^{**}
Single when child age 9 (Ref=Married)		1.21 (1.03-1.42) [*]	1.19 (1.01-1.40) [*]
Cohabiting when child age 9 (Ref=Married)		1.26 (1.00-1.59) ⁺	1.21 (0.95-1.53)
South (Majority prior to age 10)		1.03 (0.91-1.16)	1.00 (0.88-1.13)
Urban (Majority prior to age 10)		0.97 (0.83-1.12)	1.03 (0.88-1.20)
Maternal Characteristics			
Mom's Mean Education			0.92 (0.89-0.95) ^{**}
Mom Teen First Birth			1.46 (1.25-1.70) ^{**}

	Model 1	Model 2	Model 3
Mom Teen at Child's birth			0.98(0.83-1.16)
Mom's Delinquency			1.32(0.80-2.18)
Mom's Hard Drug Use			1.03(0.86-1.23)
Mom's Citizenship			1.77(1.32-2.39)**
Mom's IQ			1.00(0.99-1.00)**
Mom's Self-esteem			1.00(1.00-1.00)

Note:
+ P<0.10
* p<0.05
**

*** (two-tailed tests). Coefficients are hazard ratios. 95% confidence intervals (based on robust standard errors clustered by household) in parentheses.

Table 3

Cox Proportional Hazards Models Predicting Association between Different Types of Household Incarceration and Risk of Premarital First Birth.

	Model 1	Model 2	Model 3
Household Incarceration			
Paternal Incarceration	1.57(1.16-2.12) ^{**}	1.44(1.07-1.95) [*]	1.41(1.06-1.89) [*]
Maternal Incarceration	1.26(0.61-2.61)	0.85(0.39-1.87)	0.85(0.41-1.76)
Sibling Incarceration	2.00(1.30-3.08) ^{**}	1.47(0.97-2.24) ⁺	1.31(0.85-2.01)
Other Household Member Incarcerated	2.04(1.34-3.12) ^{**}	1.84(1.18-2.87) ^{**}	1.65(1.04-2.62) [*]
Child Characteristics			
White (Reference=Black)		0.64(0.54-0.75) ^{**}	0.69(0.57-0.83) ^{**}
Hispanic (Reference=Black)		0.83(0.71-0.98) [*]	0.82(0.68-0.98) [*]
Other (Reference=Black)		1.28(0.80-2.04)	1.35(0.85-2.15)
First Born		0.97(0.86-1.10)	1.07(0.92-1.24)
Male		0.49(0.44-0.55) ^{**}	0.49(0.44-0.55) ^{**}
Born 1990s		0.58(0.44-0.77) ^{**}	0.68(0.52-0.91) ^{**}
Household Characteristics			
# of Residential Transitions		1.16(1.10-1.22) ^{**}	1.05-1.18) ^{**}
Socialized to Single Parent HH		1.18(1.00-1.39) [*]	1.09(0.92-1.30)
Mean Household Income (Logged)		0.89(0.84-0.95) ^{**}	0.91(0.86-0.96) ^{**}
Mean Number of Adults in HH		1.00(0.91-1.10)	0.99(0.90-1.09)
Mean Number of Children in HH		1.17(1.10-1.24) ^{**}	1.08(1.01-1.16) [*]
Mean Home Environment		0.99(0.99-1.00) ^{**}	1.00(0.99-1.00) ^{**}
Single when child age 9 (Ref=Married)		1.21(1.03-1.42) [*]	1.20(1.02-1.41) [*]
Cohabiting when child age 9 (Ref=Married)		1.26(0.99-1.59) [*]	1.21(0.95-1.53)
South (majority prior to age 10)		1.03(0.91-1.16)	1.00(0.88-1.13)
Urban (majority prior to age 10)		0.97(0.83-1.12)	1.03(0.89-1.20)

	Model 1	Model 2	Model 3
Maternal Characteristics			
Mom's Mean Education			** 0.92(0.89-0.95)
Mom Teen First Birth			** 1.46(1.25-1.70)
Mom Teen at Child's Birth			0.98(0.83-1.16)
Mom's Delinquency			1.31(0.79-2.18)
Mom's Hard Drug Use			1.03(0.86-1.22)
Mom's Citizenship			** 1.77(1.31-2.39)
Mom's IQ			** 1.00(0.99-1.00)
Mom's Self-Esteem			1.00(1.00-1.00)

Note:

+ P<0.10

* p<0.05

**

p<0.01 (two-tailed tests). Coefficients are hazard ratios. 95% confidence intervals (based on robust standard errors clustered by household) in parentheses.