

Black Men's Imprisonment and Black Women's Non-Martial Fertility Rate:  
A County-Level Analysis

Yujin Kim

R. Kelly Raley

Department of Sociology and the Population Research Center

The University of Texas at Austin

## ABSTRACT

Unequal expansion of incarceration among black men with less education has influenced black men's lives along many dimensions including family formation behaviors, education, and employment. However, prior studies have paid little attention to the potential effect of black men's incarceration on black women's family formation behaviors, especially out of wedlock births at the aggregate level. Thus, this study investigated the following research questions: 1) how much does the non-marital fertility rate among blacks vary by county? and 2) what is the association between black men's incarceration and black women's non-marital fertility rate within counties? To investigate these research questions, I used fixed effect models on data from three sources: the National Correctional Reporting Program (NCRP), the U.S. Census, and the birth data from the vital statistics in 1985, 1990, and 2000. Findings show that black women's non-marital fertility rates vary by county in all three years, and that the level of changes in black men's conditional release rate is positively associated with changes in black women's non-marital fertility rate within a county even after adjusting for an extensive set of controls including changes in employment, education, sex ratio, and poverty.

## INTRODUCTION

The non-marital fertility rate for blacks has remained higher than that of any other race in the United States. In 2007, the non-marital fertility rate for blacks was 72.6 per 1,000 unmarried black women, and the corresponding rate for whites was 33.3 (Martin, Hamilton, Sutton, Ventura, Mathews, Kimeyer, and Osteman 2010). It is possible, however, that black's non-marital fertility rate may not high in every area, but that varies by area. Indeed, the U.S. showed different patterns of family formation behaviors by state and county (Lesthaeghe and Neidert 2006); Southern areas (South California, Alabama, Mississippi, Louisiana, Tennessee, Oklahoma, and Arkansas) tended to have early marriage, little cohabitation, and a high proportion of teenage mothers and single mothers. In contrast, Northeastern areas tended to have late marriage, moderate levels of cohabitation, and a low rate of teenage fertility. Interestingly, Southern states also have a higher proportion of the black population than Northeastern areas. Therefore, we might expect non-marital fertility rates among blacks to differ by area and over time.

One potential reason to suspect variation in black women's non-marital fertility rate by area and over time might be the unequal expansion of the percentage of young men incarcerated in the US over last three decades. One in 30 men aged 20-34 is behind bars, but this number is one in nine among black men (Warren, Gelb, Horowitz, and Riordan 2008). Interestingly, Southern areas have the highest incarceration rate as well as the highest proportion of single mothers, and Northeastern areas have the lowest incarceration rate and the lowest proportion of single mothers (Lesthaeghe and Neidert 2006; Sabol, Couture, and Harrison 2007). However, prior studies investigating the relationship between detrimental effects of disadvantaged communities and women's risk

of having a non-marital birth (Moffitt 2001; South and Baumer 2000) have mainly focused on the role of poverty, welfare benefits, education, and employment, paying little attention to the potential relationship between black men's incarceration and black women's non-marital fertility rate at the aggregate level.

Thus, this study investigates the relationship between black men's incarceration and black women's non-marital fertility rate at the aggregate level by answering following research questions. First, how much does the non-marital fertility rate among blacks vary by area? Second, what is the association between black men's incarceration and black women's non-marital fertility rate is within counties? To investigate these research questions, I used data from three datasets—the National Correctional Reporting Program (NCRP), the U.S. Census, and the birth data from the vital statistics in 1985, 1990, and 2000—to estimate OLS regression models with county fixed effects, year fixed effects, county-specific time trends, and an extensive set of controls.

## BACKGROUND

### BLACK MEN'S MASS IMPRISONMENT

Imprisonment has expanded substantially since 1980. The imprisonment rate from 1930 to 1970 was constant at 110.2 prisoners per 100,000 population (Blumstein and Cohen 1973), but has continuously increased since then, reaching 478 prisoners per 100,000 people in 2000 (West, Sabol, and Greenman 2010). In addition, the number of inmates released from prison has tripled over the past two decades: about 725,000 inmates were released from prison in 2000, up from 220,000 in 1980 (Travis 2002).

This incarceration boom has been particularly concentrated among black males with less education. Black male high school dropouts who were born between 1965 and 1969 had nearly a 60 percent chance of serving time in prison by the end of the 1990s. As a result, imprisonment competed with other life events such as military service and college graduation among black males (Pettit and Western 2004).

This unequal distribution of incarceration deepened disadvantages faced by less educated minorities. That is, even though ex-inmates were already disadvantaged in their human capital even before their incarceration, these disadvantages became worse after their release. Not only do ex-inmates carry a negative social stigma of having a “criminal record” throughout their entire life, but they also have worse health conditions (Massoglia 2008), are less likely to get married (Huebner 2007; Lopoo and Western 2005), are more likely to divorce (Lopoo and Western 2005; Massoglia 2011), and are less likely to get a job (Hagan 1993; Pager 2003) than their counterparts without a criminal record. Even worse, recently released prisoners in 1997 were less likely to participate in prison programs such as education and vocational programs, which were designed to enhance the chances of finding a job after release, than they were in 1991 (Lynch and Sabol 2001).

Moreover, currently, more than 80 percent of releases are conditional (Travis 2002), which generally refers to releases from prison as parolees. Parolees are usually released to the communities where they were arrested, so it is highly possible that they will stay in the same communities after finishing their sentence. Parolees are usually supervised by parole officers, and they need to meet the release conditions including regular reporting to parole officers and drug tests (Travis 2002). If they violate these

conditions, they must return to prison. Indeed, about 70 percent of parolees in 1994 were rearrested within 3 years (Langan and Levin 2002). These conditions severely disadvantage parolees, and as a result, parolees' lives look very different from the lives of individuals without a criminal record. In Alice Goffman (2009)'s ethnographic study of a Philadelphia ghetto, one parolee could not go to the hospital, even though he was severely hurt, because he worried that his parole officer might serve him a violation for breaking his curfew. Another parolee could not report to police even though he was robbed by his neighbors (Goffman 2009). Thus, incarceration clearly places individuals on different life trajectories from those without a criminal record.

#### BLACK MEN'S IMPRISONMENT AND BLACK WOMEN'S NON-MARITAL FERTILITY RATE

Black men's imprisonment could be related to black women's non-marital fertility by shaping the pool of marriageable men. Because of race and class inequality in the US incarceration system, mass imprisonment has withdrawn black males, predominantly ages 20-34, especially from disadvantaged communities. Wilson and Neckerman (1987) argued that this unequal incarceration might influence women's marriage by influencing the quantity and quality of available men in the community. Indeed, they identified these factors as major contributors to the rise of single mothers and female-headed households, especially among black women. The unbalanced sex ratios might decrease women's marital opportunities due to a scarcity of possible mates (Fossett and Kiecolt 1991). Additionally, once ex-inmates come back to their community, making the sex ratio closer to balanced, women's marital opportunities may still be affected by ex-inmates'

unfavorable economic circumstances such as unstable employment, low prestige jobs, and low earnings. As prior research has shown, the number of economically attractive men and economic circumstances of men in the local area is important in women's marriage (Lichter, Kephart, McLaughlin, and Landry 1992; Lichter, Leclere, and McLaughlin 1991; Oppenheimer 1988; Wilson 1987) and childbearing.

Several prior studies have investigated Wilson and Neckerman's argument, but found inconsistent results. One study showed support for Wilson and Neckerman's argument by finding that the removal of men from the community due to incarceration is related to an increase in the number of female-headed household between 1980 and 1990 at the county level (Sabol and Lynch 1998). However, this study relies on prevalence of female-headed household instead of the incidence of non-marital births, so it is difficult to determine whether marriage market conditions through men's incarceration that prevailed at the time and place is related to women's true non-marital fertility rate (South and Lloyd 1992). On the other hand, another study investigating the same relationship at the individual level does not strongly support this (Myers and Wilkins 2000), and one potential reason might be that women in their sample from the NLSY79 data did not experience the prison boom until their adulthood. Because of this, this study revisits Wilson and Neckerman's argument by analyzing the relationship between black men's incarceration in the community and black women's non-marital fertility rate at the aggregate level from 1985 to 2000.

Besides shrinking the pool of marriageable men due to ex-inmates' unfavorable economic circumstances, black men's imprisonment might influence black women's non-marital fertility through non-economic aspects such as the negative social stigma of a

criminal record. Women care not only about men's economic perspectives but also about men's honesty, trust, and respectability (Western and Wildeman 2009). Women, especially women with low income, worry about these noneconomic aspects in their marriage decision since they do not trust men to remain faithful, stay working, not beat or abuse them, stay out trouble with the law and so on (Edin and Kefalas 2005). Poor black women worry about these issues mostly due to black men's criminal behavior, incarceration, and drug abuse (Edin and Kefalas 2005). Women may think that men who have had a problem with the legal system in the past may have additional problems with the legal system in the future. Mistrust toward men due to incarceration may lower women's marriage expectation and/or chances, which might increase the risk of having a birth outside of marriage.

Black men's imprisonment might also influence black women's non-marital fertility by weakening the formal and informal social controls in the community. High incarceration rates in an area may damage social networks due to high rates of "coercive mobility" (Clear, Rose, Waring, and Scully 2003; Rose and Clear 1998). Unlike voluntary residential moves, incarceration produces involuntary residential mobility when residents go to prisons and come back home (Clear et al 2003). High levels of this type of involuntary residential mobility might be one of the disorganizing factors that disrupts social networks in the community (Rose and Clear 1998). More specifically, high rates of mobility may lower the degree of social integration among residents (Crutchfield, Geerken, and Gove 1982), their sense of commitment to their neighborhood (Warner and Pierce 1993), and the social controls over collective life because



establishing social ties between residents take time (Sampson, Raudenbush, and Earls 1997).

This Diminished social control and social ties due to high incarceration might result in that community losing the ability to regulate the behavior of its members (Park and Burgess 1925), which might promote residents in the community to be exposed to heterogeneous mix of cultures, lifestyles or orientations (Bursik and Grasmick 1993; Harding 2007). According to organization theory, socially organized communities are better able to enforce common values, so residents in these communities usually share a homogeneous culture, or similar expectations and beliefs for others to follow normative behaviors (Harding 2007) unlike communities with little social control. Indeed, Anderson (1999) argues that the presence of both “street” and “decent” families in disadvantaged community, which might lead to diverse thoughts on early parenthood. For example, some teenagers might think early parenthood prohibits their future success, but others want to join in “baby club” for the attention and admiration from their peers (Anderson 1999). Additionally, some women in disadvantaged communities follow the mainstream romantic relationship pathway by dating their partner, marrying, living together, and then having a child, but others in this community may have date for a short time period, and then have a pregnancy or live together at almost the same time (Edin and Kefalas 2005). Harding (2007) also demonstrated that adolescents in disadvantaged communities have a wide array of competing and conflicting cultural models (scripts or frames) on sexual behavior and romantic relationship.

Under heterogeneous culture, lifestyles, and orientations toward romantic relationships and sexual behaviors in disadvantaged communities, women have more

alternative options to choose from if one particular option does not work out (Harding 2007). If women cannot have a child within marriage even though they want to do, then they might choose the alternatives of having a child outside of marriage. Importantly, they are less likely to be stigmatized when they choose alternative options since they likely have neighbors who are already engaging in similar behaviors.

Non-marital births among black women in disadvantaged communities likely do not reflect “ghetto specific norms” or “oppositional culture”. Rather, black women may modify or reinterpret the mainstream culture due to their lack of resources and unfavorable circumstances (Anderson 1999; Edin and Kefalas 2005; Harding 2007). Black women in disadvantaged communities may not be able to get enough trust, respectability, and support from black men to have a child within marriage due to incarceration. They are also more exposed to alternative options to choose from without being as stigmatized from others. Moreover, if black women notice that their current unfavorable situation will not be better in the future, they do not have any reason to postpone their childbearing after marriage; that is, they may be less likely to have a “wait and see” attitude. Some research even argues that it is better to have a birth earlier rather than later due to disadvantaged social environments for poor black women (Geronimus 1987). This is because as they age, poor black women have worse reproductive and overall health status due to unfavorable life conditions throughout the life course (Geronimus 1987).

## METHOD AND DATA

### METHOD

To investigate the relationship between black men's incarceration and black women's non-marital fertility rate at the county level in 1985, 1990, and 2000, this study follows two steps. In the first step, I measure how much black women's non-marital fertility rate varies across counties and investigate whether black men's incarceration is related to black women's non-marital fertility rate at the county level for each time period (1985, 1990, and 2000) using OLS models. This analysis is to examine whether black men's incarceration is positively associated with black women's non-marital fertility rate. If black men's incarceration has a positive relationship with black women's non-marital fertility rate, it implies that black women in a county with a high rate of black men's incarceration have a higher chance of having a birth outside of marriage than black women in a county with lower rates of black men's incarceration. However, even though OLS estimation provides the direction and significance of this relationship, it is possible that this estimation is biased. One possible reason is that this relationship can be spurious due to other unmeasured area characteristics that might be associated with black men's incarceration and/or black women's non-marital fertility. Because of this, it might be difficult to know whether this relationship is due to black men's incarceration or other area specific characteristics. To deal with this problem, this study employed fixed effects modeling as a second step.

Fixed effects modeling is suitable in addressing the association between black men's incarceration and black women's non-marital fertility rate because this model can control unobserved county specific effects that do not change over time but are associated

with the observed county specific characteristics (Allison 2009). The potential problem of unobserved county specific characteristics is that these might confound the relationship between black men's incarceration and black women's non-marital fertility rate. Fixed effects modeling can make this relationship clear by controlling for unobserved county-specific characteristics because fixed effect modeling only uses the within-county changes that produce unbiased estimates of black men's incarceration on black women's non-marital fertility rate (Allison 2009). However, one disadvantage of fixed effects modeling is that this model cannot control for unmeasured county-specific characteristics that change over time.

In this study, the fixed effects models examine the relationship between the level of changes in black men's incarceration and the level of changes in black women's non-marital fertility rate within counties over time. Below is the equation to examine this research question.

$$y_{jt} = \alpha_t + x_{jt} \beta + z_{jt} \beta + v_j + \varepsilon_{jt} \quad (1)$$

In the equation (1),  $j$  refers to each county, and  $t$  refers to time, which is year in this model.  $Y$  is black women's non-marital fertility rate,  $x$  is black men's incarceration,  $z$  is the observed county characteristics such as employment rate and educational level,  $\alpha$  is the intercept that may be different for each year,  $v$  is the county specific residual that only varies across county, and  $\varepsilon$  is the usual residual. To estimate equation (1), it is necessary to construct a set of dummy variables to distinguish the counties in the dataset. The coefficients for the dummy variables created from each county are the estimate of the  $v_j$  in equation (1). However, the problem with the dummy variable method is that it is burdensome to create all the dummy variables unless researchers have a particular

interest on the coefficients of the dummy variables (Allison 2009). Thus, this study used a mean deviation model which provides the exact same results with the dummy variable method but more efficient. Below is the equation for a mean deviation model.

$$(y_{jt} - \bar{y}_j) = (\alpha_t - \bar{\alpha}) + (x_{jt} - \bar{x}_j)\beta + (z_{jt} - \bar{z}_j)\beta + (\epsilon_{jt} - \bar{\epsilon}_j) \quad (2)$$

In the equation (2),  $\bar{y}_j$ ,  $\bar{x}_j$ ,  $\bar{z}_j$  refer to a mean value of black women's non-marital fertility rate, black men's incarceration, and county specific characteristics for each county in all three years. The interpretation of the coefficient in the mean deviation model is the same as that of the dummy variable model; coefficients of fixed effects model represent how much one-unit change in the county-level incarceration for black men is associated with changes in black women's non-marital fertility rate. Importantly, there is no more county specific effect ( $v$ ), so this provides the fixed effects model estimates.

## DATA

This study used three data sets: the NCRP, the US census, and the birth data from the vital statistics. The first data set is the 1985, 1990, and 2000 NCRP, which were used to estimate black men's conditional release rates by county. These data provide annual detailed information on the number of inmates who were admitted to prison, the number of inmates who were released from prison, and the number of inmates who were conditionally released from prison since 1983. These data also provide basic demographic information on inmates such as sex, race, ethnicity, age, and education. The strength of these data is that they provide the information on the county where inmates were sentenced before admission to prison. This is important information to know because

it indicates to which county inmates will likely return after released from prison, especially in the case of conditional release. To my knowledge, this is the only crime data that are available at the county level from almost all states. Unlike other prior studies (Charles and Luoh 2010), the reason to choose county as a unit of analysis in this study is that states might not be the ideal units to measure the marriage market since it overbounds marriage markets (Fossett and Kiecolt 1991). However, neighborhoods might underbound the marriage market because people usually have a different residential area from their working area or entertaining area where there is a high chance for women to meet their potential partners (Fossett and Kiecolt 1991). Another advantage of these data is that they provide race-specific information on admission and release from prison by county and state while the Bureau of Justice Statistics does not publish the race-specific imprisonment rate by state.

The second data set is the 1985, 1990, and 2000 birth data from vital statistics, which I used to estimate the non-marital fertility rate for black women. Birth data provide not only the number of births but also the mother's marital status at a child's birth, so this will provide the information on the number of births to unmarried women. The third data source is the 1980, 1990, and 2000 US census (downloaded from (MPC Minnesota Population Center)), which I used to determine county-specific characteristics such as employment rate, education level, sex ratio, poverty level, median household income and so on.

I merged all three data sets together by year and by county using FIPS codes. The 1985 birth data and 1985 NCRP data were merged with the 1980 US census. This is because the 1983 is the earliest data of the NCRP, but the NCRP started to collect crime

information from almost all states since 1985. The birth data from vital statistics only provided the information for counties with population over 100,000 (n=1,396). In addition, the NCRP collected information from almost all states, but not all states specified county code, so state information that did not specify county code was not included (see more detailed information from Appendix 1). Thus, I retained 1,095 counties. I then limited the sample to counties where all the information is available, making the total sample for this study 912 counties with complete information for 1985, 1990 and 2000 (304 counties per year).

## MEASURES

Almost all of the variables were created as race-specific and county specific in this study, and 15 main variables were constructed. First, *black women's non-marital fertility rate* is estimated by dividing the number of births to unmarried black mothers in a county by the number of unmarried black women ages 15 - 44 in that county multiplied by 1000. Second, I measure black men's incarceration by *black men's conditional release rate*, which I calculated by dividing the number of black men conditionally released from prison by the number of black males ages 15 and above in that county multiplied by 1000. There are several ways of measuring black men's incarceration. Prior studies (Charles and Luoh 2010; Kamdar 2007; Mechoulan 2011) mostly used an imprisonment rate or incarceration rate, but the problem with these measures is that these rates could be biased due to the location of prison or jail. A particular county with a state prison probably has a higher imprisonment rate than a county without a state prison. Even worse, a high incarceration rate in this county does not necessarily reflect that this county has more

residents with a criminal record. To know the influence of incarceration on residents' family formation behaviors in a county, it would be better to know how many people come back to a county after release instead of measuring how many people are behind bars. The conditional release rate is the most preferable indirect way of knowing how many black men with a criminal record reside in the community because parolees are often requested to come back to the county where they got sentence to finish their sentence. This rate is more accurate than the release rate because not every ex-prisoner returns home after release, even though many of them return to the same neighborhoods where they resided prior to incarceration (Kirk 2009). Moreover, parolees need to stay in the community until finishing their sentence, so it will be more beneficial to know the long-term effect of ex-inmates on black women's family formation behaviors in the community. Third, I included county-specific characteristics that are relevant to black's non-marital fertility rate and black men's incarceration: black's educational level for men and women, employment rate for men and women, median household income, poverty level, and reliance on the welfare benefits. These measures are used to assess whether the relationship between black men's incarceration and black women's non-marital fertility rate is because of black men's incarceration or other characteristics of these men, such as their lack of education, unemployment, low income, and so on. These are also to analyze whether incarceration has an additional impact on black women's non-marital fertility rate besides potential economic disadvantages of incarceration. *Educational level for men and women* is the percentage black individuals who do not have any college experience (less than high school and high school diploma) among blacks ages 25 and above. *Employment rate for men and women* is the percentage employed among blacks who are



ages 16 and above. *Poverty level* is the percentage people who are under poverty among people whose poverty status is determined. *Reliance on the welfare receipt* is the percentage of blacks who get any public assistant income. Additionally, in order to measure the effect of unbalanced sex ratio in the community on non-marital births, I estimated the *sex ratio* by dividing the number of non-institutionalized black men between the ages of 16 and 64, by the number of non-institutionalized black women between the ages of 16 and 64. I also consider whether the state employed sentencing guidelines, which are based on a “tough on crime” approach that increases punishment, especially for violent offenders (Lubitz and Ross 2001). Most inmates from states with sentencing guidelines serve more time in prison than counterparts from states without such laws (Lubitz and Ross 2001), so this might affect the characteristics of ex-inmates as well as the number of in-mates. For example, ex-inmates from states with sentencing guidelines are more likely to be older and face more challenges after release due to longer stays in prison (Lubitz and Ross 2001), which might be related to black women’s non-marital fertility. Finally, the percentage foreign born among blacks and the residence in a rural area were constructed using the US census data, and these measure county-specific characteristics might affect women’s non-marital fertility rate. *The percentage foreign born* is the percentage blacks who were born outside of the US. *The residence in the rural area* is the percentage of people who lived in rural areas.

## RESULTS

In Graph 1, I present the scatter plot of black women's non-marital fertility rate by counties in 1985, 1990, and 2000. This graph also includes the mean of black women's non-marital fertility rate for three years by each county.

[Graph 1 is about here]

As seen from Graph 1, black women's non-marital fertility rate in each county is concentrated around 70 to 90 per 1000 unmarried black women, but more importantly, it varies across counties. In 1985, only half of counties have black women's non-marital fertility rate between 58 and 95 per 1000 unmarried black women, with the rest are outside of this range (less than 58 or higher than 95). This variation in black women's non-marital fertility rate is observed in all three years.

Table 1 demonstrates black women's non-marital fertility rate in 1985, 1990, and 2000.

[Table 1 is about here]

About 75 black women per 1000 unmarried black women ages 15-44 had a birth outside of marriage in 2000, and it was about 76 in 1985. These estimates are consistent with the estimates from the national vital statistics report (Ventura and Bachrach 2000). My estimate in 1990 is lower than the estimate from the national vital statistics report. This might be because my estimate was based on counties where the population was 100,000 and above while the estimate of national vital statistics reports was based on all counties, so my estimate included about 60% black population in 1990. If black women in rural small counties had high non-marital fertility rates in 1990, my estimate could be biased, but there is no way to check this. However, my estimate for white women's non-

marital fertility rate is almost the same as the estimate from the national vital statistics report in all three years (not shown in this table but available upon request).

[Table 2 is about here]

As seen in Table 2, black men's conditional release rate has continuously increased. About 18 per 1000 black men ages 15 and above were conditionally released from prison in 2000, up from 9.6 in 1985. Black men's release rate and admission rate have also increased. White men's conditional release rate was far smaller than blacks, with one or two per 1000 white men (not shown in this table but available upon request). This implies that mass imprisonment had occurred predominantly among black men. Like black women's non-marital fertility rate, black men's conditional release rate also varied by county.

Table 3 shows the correlation between black women's non-marital fertility rate and explanatory variables.

[Table 3 is about here]

All three measures of black men's incarceration are positively correlated with black women's non-marital fertility rate. More specifically, counties with high black men's conditional release rate also have high black women's non-marital fertility rate. The size of this positive correlation gets bigger as the observed year increases. The sex ratio is negatively correlated with black women's non-marital fertility rate, which is consistent with Wilson's argument that a lower sex ratio is related to a high chance of out of wedlock birth. Lower education and high poverty are positively correlated with black women's non-marital fertility rate. In contrast, household median income and employment are negatively correlated with black women's non-marital fertility rate.

A series of OLS regression were employed to investigate the relationship between black men's conditional release rate and black women's non-marital fertility rate with an extensive set of controls.

[Table 4 is about here]

Table 4 demonstrates that black men's conditional release rate is positively related to black women's non-marital fertility rate in all three years even with an extensive set of controls (control variables were not shown in the table but included in all models). It implies that black women in a county with a high rate of black men's conditional release have a higher chance of having a birth outside of marriage than black women in a county with a low rate of black men's conditional release. Additionally, if black men's incarceration affects black women's non-marital fertility only through economic aspects, then the effect of black men's conditional release rate should no longer be statistically significant in the model with employment variables, but this was not the case. Although it is possible that we are not perfectly measuring economic conditions, this implies that black men's incarceration might also affect black women's non-marital fertility rate via non-economic aspects such as the negative stigma of a criminal record and/or community atmosphere changes. However, it is possible that this positive relationship between black men's conditional release rate and black women's non-marital fertility rate can be spurious due to unmeasured county-specific characteristics. Because of this potential problem, Table 5 estimates county and year fixed effects models with adjustment of unmeasured and measured county specific characteristics.

[Table 5 is about here]

As seen in Table 5, in 1985-1990, the fixed effects model showed that changes in black men's conditional release rate was not statistically significantly associated with changes in black women's non-marital fertility rate after adjusting for county-specific characteristics (control variables were not shown in the table but included in all models). This insignificant relationship in the fixed effects model might occur for two reasons. The first reason is because of the effect of unmeasured county specific characteristics on black men's conditional release rate and/or black women's non-marital fertility rate. The second reason is that black men's incarceration probably has a long term and cumulative effect on black women's family formation behaviors, so a 5 year gap between 1985 and 1990 might be too short to see the significant effect of black men's incarceration on black women's childbearing behaviors. Additionally, the incarceration boom has expanded since 1980, so examining the incarceration effect in 1985 might be too early to see strong cumulative incarceration effects at the aggregate level. Black women might not change their family formation behaviors right after noticing an increase in black men's incarceration. It may take time for them realize their situation, to adjust to these unfavorable circumstances, and to make their decision on their childbearing under these circumstances.

Unlike in 1985-1990, in 1990-2000, black men's conditional release rate is positively associated with black women's non-marital fertility rate. According to these results, each additional black male parolee (per 1000 county black male residents ages 15 and above) is associated with an increase of .37 non-marital births (per 1000 unmarried black women ages 15 and 44) between 1990 and 2000 even after adjusting for county-specific characteristics such as changes in employment for black men and women,

educational attainment for black men and women, non-institutionalized black's sex ratio, poverty, and so on.

Lastly, a fixed effects model with all three years also shows a significant relationship between black men's conditional release rate and black women's non-marital fertility rate, but the size of effect becomes smaller (almost half) compared the effect in 1990-2000. This is because the relationship between black men's conditional release rate and black women's non-marital fertility rate between 1985 and 1990 is minimal (close to 0). The coefficients in this model imply that each additional black male parolee (per 1000 county black male residents ages 15 and above) is associated with an increase of .15 numbers of non-marital births (per 1000 unmarried black women ages 15 and 44) between 1985 and 2000.

## DICUSSSION AND CONCLUSION

This paper investigated the relationship between black men's incarceration and black women's non-marital fertility rate at the county level in 1985, 1990, and 2000. The first finding is that black women's non-marital fertility rate varies by county, and this variation stayed relatively constant between 1985 and 2000. Next, the changes in black men's conditional release rate at a county is positively related to the changes in black women's non-marital fertility rate within a county in 1985, 1990, and 2000 even after considering county-specific unmeasured and measured characteristics. This implies that black men's incarceration contributes to the risk of black women's chance of having a child outside of marriage due to these men's unfavorable characteristics such as low

employment and the negative stigma of a criminal record and changes in community atmosphere due to incarceration.

Like any study, this research also has some limitations. First, I could not include direct measures of community atmosphere changes due to incarceration and the effect of negative social stigma of a criminal record due to data limitation. Therefore, although I could examine the relationship between black men's incarceration and black women's non-marital fertility rate, I could not directly identify the mechanisms driving this relationship. I partially circumvented this problem by using an extensive set of controls that indirectly captured some of the effects of community atmosphere changes and the negative social stigma of a criminal record. Further research should examine these mechanisms using the data which includes direct measures of community atmosphere changes due to incarceration and the negative stigma of incarceration. Second, although I added several county-specific characteristics such as employment, education level, and poverty, there is a potential selection bias of incarceration because less marriageable men are more likely to be incarcerated. Third, there might also be unmeasured county specific characteristics that change over time, which a fixed effects model could not take into account.

The positive relationship between black men's incarceration and black women's non-marital fertility from this study might imply that the current disadvantages that black men and women experience transfer to their children since they have a high chance of living without a father due to incarceration or having a father with a criminal record. Researchers should pay attention to the unintended consequences of social policies such

as correctional systems on individual's family formation behaviors, and how such policies may serve to compound the cycle of disadvantage of minorities in the US.

## REFERENCES

- Allison, Paul D. 2009. *Fixed Effects Regression Models*: SAGE Publications, Inc.
- Anderson, Elijah. 1999. *Code of the Street: Decency, Violence, and the Moral Life of the Inner City*: W.W. Norton & Company, Inc.
- Blumstein, Alfred and Jacqueline. Cohen. 1973. "Theory of Stability of Punishment." *Journal of Criminal Law & Criminology* 64:198-207.
- Bursik, Robert J., Jr and Harold G. Grasmick. 1993. *Neighborhoods and Crime: The Dimensions of Effective Community Control* New York: Oxford University Press.
- Charles, Kerwin Kofi and Ming Ching Luoh. 2010. "Male Incarceration, the Marriage Market, and Female Outcomes." *The review of Economics and Statistics* 92:614-627.
- Clear, T. R., D. R. Rose, E. Waring, and K. Scully. 2003. "Coercive Mobility and Crime: A Preliminary Examination of Concentrated Incarceration and Social Disorganization." *Justice Quarterly* 20:33-64.
- Crutchfield, R. D., M. R. Geerken, and W. R. Gove. 1982. "Crime Rate and Social Integration - the Impact of Metropolitan Mobility." *Criminology* 20:467-478.
- Edin, K. and M Kefalas. 2005. *Promise I Can Keep: Why Poor Women Put Motherhood before Marriage*. Berkeley, CA: University of California Press.
- Fossett, MA and KJ Kiecolt. 1991. "A Methodological Review of the Sex Ratio: Alternatives for Comparative Research." *Journal of Marriage and the Family*:941-957.
- Geronimus, Arline T. 1987. "On Teenage Childbearing and Neonatal Mortality in the United States." *Population and Development Review* 13:245-279.
- Goffman, A. 2009. "On the Run: Wanted Men in a Philadelphia Ghetto." *American Sociological Review* 74:339-357.
- Hagan, John. 1993. "The Social Embeddedness of Crime and Unemployment." *Criminology* 31:465-491.
- Harding, D. J. 2007. "Cultural Context, Sexual Behavior, and Romantic Relationships in Disadvantaged Neighborhoods." *American Sociological Review* 72:341-364.
- Huebner, Beth M. 2007. "The Effect of Incarceration on Marriage and Work over the Life Course." *Justice Quarterly* 22:3:281-303.
- Kamdar, Ameer. 2007. "Male Incarceration and Teen Fertility." University of Chicago Graduate School of Business.
- Kirk, D. S. 2009. "A Natural Experiment on Residential Change and Recidivism: Lessons from Hurricane Katrina." *American Sociological Review* 74:484-505.
- Langan, Patrick A. and David J. Levin. 2002. "Recidivism of Prisoners Released in 1994." Bureau of Justice Statistics.

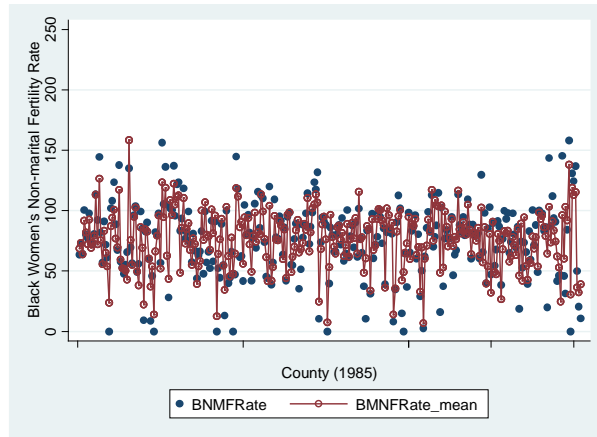


- Lesthaeghe, R. J. and L. Neidert. 2006. "The Second Demographic Transition in the United States: Exception or Textbook Example?" *Population and Development Review* 32:669-+.
- Lichter, D. T., G. Kephart, D. K. McLaughlin, and D. J. Landry. 1992. "Race and the Retreat from Marriage - a Shortage of Marriagable Men." *American Sociological Review* 57:781-799.
- Lichter, D. T., F. B. Leclere, and D. K. McLaughlin. 1991. "Local Marriage Markets and the Marital Behavior of Black-and-White Women." *American Journal of Sociology* 96:843-867.
- Lopoo, L. M. and B. Western. 2005. "Incarceration and the Formation and Stability of Marital Unions." *Journal of Marriage and Family* 67:721-734.
- Lubitz, Robin L. and Thomas W. Ross. 2001. "Sentencing & Corrections Issues for the 21 Century." National Institute of Justice.
- Lynch, James P. and William J. Sabol. 2001. "Prisoner Reentry in Perspective." Urban institute.
- Martin, Joyce A., Brady E. Hamilton, Paul D. Sutton, Stephanie J. Ventura, T.J. Mathews, Sharon Kimeyer, and Michelle J.K. Osteman. 2010. "Births: Final Data for 2007." Center for Disease Control and Prevention.
- Massoglia, M. 2008. "Incarceration as Exposure: The Prison, Infectious Disease, and Other Stress-Related Illnesses." *Journal of health and social behavior* 49:56.
- Massoglia, Michael. 2011. "Stigma or Separation? Understanding the Incarceration-Divorce Relationship." *Social Forces* 90 (1):133-155.
- Mechoulan, Stephane. 2011. "The External Effects of Black-Male Incarceration on Black Females." *Journal of Labor Economics*.
- Moffitt, Robert A. 2001. "Welfare Benefits and Female Headship in U.S. Time Series." in *Out of Wedlock: Causes and Consequences of Nonmarital Fertility*, edited by L. L. W. a. B. L. Wolfe. New York: Russell Sage Foundation.
- MPC. Minnesota Population Center. "National Historical Geographic Information System: Version 2.0." Minneapolis, MN : University of Minnesota 2011.
- Myers, Samuel L., Jr. and Roy Wilkins. 2000. "Unintended Impacts of Sentencing Guidelines on Family Structures." National Institutes of Justice.
- Oppenheimer, V. K. 1988. "A Theory of Marriage Timing." *American Journal of Sociology* 94:563.
- Pager, D. 2003. "The Mark of a Criminal Record 1." *American Journal of Sociology* 108:937-975.
- Park, Robert E. and Ernest W. Burgess. 1925. *The City*. Chicago, IL: University of Chicago Press.
- Pettit, B. and B. Western. 2004. "Mass Imprisonment and the Life Course: Race and Class Inequality in Us Incarceration." *American Sociological Review* 69:151-169.
- Rose, D. R. and T. R. Clear. 1998. "Incarceration, Social Capital, and Crime: Implications for Social Disorganization Theory." *Criminology* 36:441-479.
- Sabol, W.J. and James P. Lynch. 1998. "Assessing the Longer-Run Consequences of Incarceration: Effects on Families and Unemployment." in *Paper Presented at the 20th annual conference of the Association for Public Policy and Analysis*. New York.

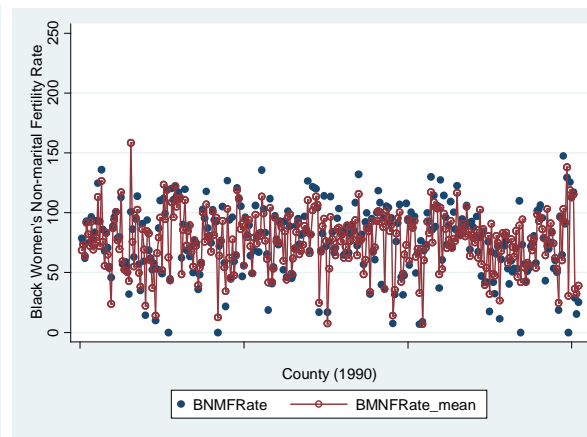
- Sabol, William J., Heather Couture, and Paige M. Harrison. 2007. "Prisoners in 2006." U.S. Department of Justice Office of Justice Program.
- Sampson, R. J., S. W. Raudenbush, and F. Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277:918-924.
- South, S. J. and E. P. Baumer. 2000. "Deciphering Community and Race Effects on Adolescent Premarital Childbearing." *Social Forces* 78:1379-1407.
- South, S. J. and K. M. Lloyd. 1992. "Marriage Markets and Nonmarital Fertility in the United-States." *Demography* 29:247-264.
- Travis, J. 2002. "Beyond the Prison Gates: The State of Parole in America."
- Ventura, Stephanie J. and Christine A. Bachrach. 2000. "Nonmarital Childbearing in the United States, 1940-99." National Vital Statistics Reports, 48(16) Hyattsville, MD: National Center for Health Statistics.
- Warner, B.D. and G.L. Pierce. 1993. "Reexamining Social Disorganization Theory Using Calls to the Police as a Measure of Crime." *Criminology* 31:493-517.
- Warren, J., A. Gelb, J. Horowitz, and J. Riordan. 2008. "One in 100: Behind Bars in America 2008." *The Pew Center on the States. Washington, DC: The Pew Charitable Trusts.*
- West, Heather C., William J. Sabol, and Sarah J. Greenman. 2010. "Prisoners in 2009." Bureau of Justice Statistics, U.S. Department of Justice.
- Western, B. and C. Wildeman. 2009. "The Black Family and Mass Incarceration." *Annals of the American Academy of Political and Social Science* 621:221-242.
- Wilson, W. J. 1987. "The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy." *Chicago, London.*

Graph1. Black Women's Non-Marital Fertility Rate by Year and County (n=912)

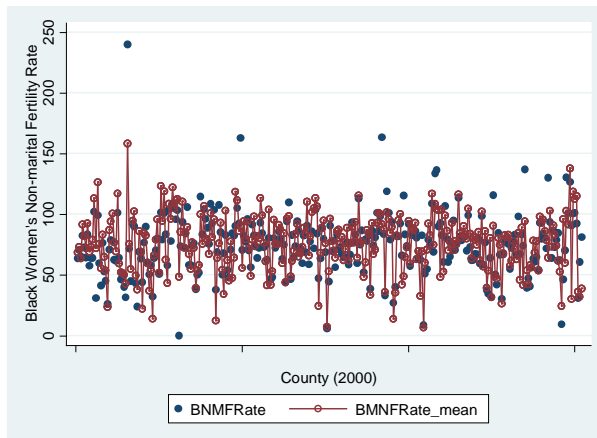
1985



1990



2000



Note: BNMFRate refers to black women's non-marital fertility rate, BNMFRate\_mean refers to mean of black women's non-marital fertility rate for all three years by each county

Table 1. *Black Women's Non-marital Fertility Rate by Year and Age (n=912)*

Age	Author's Estimation	NCHS
1985		
15-44	76.1	77.0
15-19	70.8	87.6
20-24	114.0	113.1
25-29	99.9	79.3
30-34	63.3	47.5
35-44	15.4	
1990		
15-44	77.3	90.5
15-19	93.7	106.0
20-24	127.8	144.8
25-29	89.0	105.3
30-34	52.9	61.5
35-44	12.0	
2000		
15-44	74.9	70.5
15-19	84.3	75.0
20-24	147.9	129.0
25-29	103.3	85.9
30-34	56.2	50.2
35-44	14.9	

*Note:* Author's estimation is based on women in counties of 100,000 populations and above  
 NCHS report is based on women in all counties (Ventura and Bachrach 2000).

Table 2. *Black Men's Criminal Justice Involvement by Year (n=912)*

	Black		
	Mean	25th percentile	75th percentile
1985			
Conditional Release Rate	9.6	4.4	12.7
Release Rate	11.8	5.6	14.3
Admission Rate	14.4	7.9	17.8
1990			
Conditional Release Rate	13.8	5.8	18.2
Release Rate	16.5	8.0	21.1
Admission Rate	20.8	11.3	27.1
2000			
Conditional Release Rate	17.9	6.8	21.8
Release Rate	22.2	10.6	26.7
Admission Rate	24.1	12.2	30.8

Table 3. Correlation between Black Women's Non-Marital Fertility Rate and Potential Explanatory Variables (n=912)

	Non Marital Fertility Rate			
	Total	1985	1990	2000
Conditional Release Rate	0.1754*	0.1151*	0.2187*	0.2333*
Release Rate	0.1519*	0.0189	0.1966*	0.2749*
Admission Rate	0.2029*	0.044	0.2582*	0.3310*
Sex Ratio	-0.2092*	-0.3058*	-0.2762*	0.0169
% Foreign Born	-0.2240*	-0.2062*	-0.2677*	-0.2076*
% High School and Below (Men)	0.4146*	0.4535*	0.5806*	0.2918*
% High School and Below (Women)	0.3852*	0.4266*	0.5635*	0.3655*
Median Household Income	-0.2570*	-0.1783*	-0.4220*	-0.4269*
% Below Poverty	0.3292*	0.2193*	0.3997*	0.3650*
Employment Rate (Men)	-0.06	0.0589	-0.1504*	-0.1211*
Employment Rate (Women)	-0.1735*	-0.0255	-0.3458*	-0.1938*
% Reliance on Welfare Benefit	0.2431*	0.2194*	0.3740*	0.1844*
% Residence in Rural	-0.1085*	-0.2369*	-0.1172*	0.0911
Sentencing Guideline	0.02	-0.0415	-0.0182	0.1450*

Note: \* p<0.05

Table 4. OLS Regression Results for Black Women's Non-marital Fertility Rate by Year (n=912)

Variables	1985			1990			2000		
	M1	M2	M3	M1	M2	M3	M1	M2	M3
Conditional Release Rate	0.53** (0.173)			0.31** (0.110)			0.41*** (0.077)		
Release Rate		0.08 (0.114)			0.26* (0.109)			0.40*** (0.071)	
Admission Rate			0.15 (0.120)			0.36*** (0.098)			0.43*** (0.072)

Note: All models include sex ratio, percentage foreign born, education level for men and women, employment rate for men and women, median household income, dependence on the welfare benefits, residence in rural, region, and sentencing guidelines

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ , ~ $p < 0.1$

Table 5. A Fixed Effects Model of Black Women's Non-marital Fertility Rate in 1985, 1990, and 2000 (n=912)

	1985-1990	1990-2000	1985, 1990, and 2000
Conditional Release Rate	0.03 (0.108)	0.37*** (0.104)	0.15* (0.069)
Release Rate	-0.08 (0.081)	0.29** (0.098)	0.05 (0.058)
Admission Rate	-0.09 (0.087)	0.26** (0.099)	0.08 (0.063)

Note: All models include sex ratio, percentage foreign born, education level for men and women, employment rate for men and women, median household income, dependence on the welfare benefits, residence in rural, and sentencing guideline

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ , ~ $p < 0.1$

Appendix 1. NCRP Data Collection Information by State and Year

State	1985	1990	2000	All Three Years
Alabama	O	O	O	O
Alaska	X	Δ	O	
Arizona	X	Δ	Δ	
Arkansas	O	O	O	O
California	O	O	O	O
Colorado	O	O	O	O
Connecticut	X	Δ	Δ	
Delaware	Δ	Δ	Δ	
District of Columbia	O	Δ	Δ	
Florida	O	Δ*	Δ	
Georgia	X	O	O	
Hawaii	O	O	O	O
Idaho	Δ	Δ	Δ	
Illinois	O	O	O	O
Indiana	X	Δ	X	
Iowa	O	O	O	O
Kansas	X	Δ	Δ	
Kentucky	O	O	O	O
Louisiana	X	Δ	O	
Maine	O	Δ	O	
Maryland	O	O	O	O
Massachusetts	O	O	X	
Michigan	O	O	O	O
Minnesota	O	O	O	O
Mississippi	O	O	O	O
Missouri	O	O	O	O
Montana	X	Δ	Δ	
Nebraska	O	O	O	O
Nevada	X	O	O	
New Hampshire	O	O	O	O
New Jersey	O	O	O	O
New Mexico	X	O	Δ	
New York	O	O	O	O
North Carolina	O	O	O	O
North Dakota	O	O	O	O
Ohio	O	O	O	O
Oklahoma	O	O	O	O
Oregon	O	O	O	O
Pennsylvania	O	O	O	O
Rhode Island	O	Δ	Δ	



South Carolina	O	O	O	O
South Dakota	O	O	O	O
Tennessee	O	O	O	O
Texas	O	O	O	O
Utah	O	O	O	O
Vermont	X	Δ	Δ	
Virginia	O	O	O	O
Washington	O	O	O	O
West Virginia	O	O	O	O
Wisconsin	O	O	O	O
Wyoming	O	Δ	X	
Total Number	38	36	37	32

Note: O= collect data, X= no data, Δ = collect data but did not specify the county code (999)

\* collected only admission data

Total number of state that were used for the analysis did not include the state that did not specify the county code(999)

#### Appendix 2. State Lists Employing Sentence Guidelines by Year

	1985	1990	2000
Minnesota	Minnesota	Minnesota	
Pennsylvania	Pennsylvania	Pennsylvania	
Florida	Florida	Florida	
Utah	Utah	Utah	
Washington	Washington	Washington	
	Delaware	Delaware	
	Oregon	Oregon	
	Tennessee	Tennessee	
		Louisiana	
		Kansas	
		Arkansas	
		North Carolina	
		Virginia	
		Wisconsin	
		Michigan	
		Maryland	
		Ohio	
		Missouri	

Source: Bureau of Justice Assistance, *National Assessment of Structural Sentencing*, Washington, DC: Bureau of Justice Assistance, 1996 P. 20-21

Kauder, Neal B. and Brian J. Ostrom 2008, "State Sentencing Guidelines Profiles and Continuum" National Center for State Courts