Incarceration of African American Men and the Impacts on Women and Children

Sitian Liu
Queen’s University

ASSA

January 4, 2020
Research Questions

1. Causal effects of incarceration of African American men on
   - Women’s marriage and labor market outcomes;
   - Children’s family structure, long-run educational outcome, and income.
Research Questions

1. Causal effects of incarceration of African American men on

   ▶ Women’s marriage and labor market outcomes;
   ▶ Children’s family structure, long-run educational outcome, and income.

2. Different effects of black men who serve relatively short and long terms of imprisonment.
Research Questions

1. Causal effects of incarceration of African American men on
   - Women’s marriage and labor market outcomes;
   - Children’s family structure, long-run educational outcome, and income.

2. Different effects of black men who serve relatively short and long terms of imprisonment.

Why important?

- Evaluation of sentencing policies.
- Understanding of inequality and racial gap.
Literature Review

- Impacts of Incarceration
Literature Review

▶ Impacts of Incarceration


▶ Measurement: metropolitan statistical area (MSA);
  Identification: sentencing policies;
  Outcomes: children and intergenerational mobility.

▶ Sex Ratios and Marriage Markets


▶ Race-specific sex ratios.

▶ Sentencing Policies and Prison Population

▶ Panel regressions

Literature Review

- Impacts of Incarceration
  - Measurement: metropolitan statistical area (MSA);
    Identification: sentencing policies;
    Outcomes: children and intergenerational mobility.

- Sex Ratios and Marriage Markets
  - Race-specific sex ratios.
Literature Review

▶ Impacts of Incarceration
  ▶ Measurement: metropolitan statistical area (MSA);
    Identification: sentencing policies;
    Outcomes: children and intergenerational mobility.

▶ Sex Ratios and Marriage Markets
  ▶ Race-specific sex ratios.

▶ Sentencing Policies and Prison Population
  ▶ Panel regressions
Data and Measurement

- National Corrections Reporting Program (NCRP)
  - Demographic and sentence information (e.g., offense, sentence, county of sentence).
  - Incarceration rate by gender, race, year, and MSA where sentence was imposed.

Perpetual Inventory Method
Estimated & Reported MSA Population 2004-2008
Estimated & Reported State Population
Data and Measurement

National Corrections Reporting Program (NCRP)

- Demographic and sentence information (e.g., offense, sentence, county of sentence).
- Incarceration rate by gender, race, year, and MSA where sentence was imposed.

Uniform Crime Reporting (UCR) Program

- Arrests by year, state, offense and gender/ race.
Data and Measurement

- National Corrections Reporting Program (NCRP)
  - Demographic and sentence information (e.g., offense, sentence, county of sentence).
  - Incarceration rate by gender, race, year, and MSA where sentence was imposed.

- Uniform Crime Reporting (UCR) Program
  - Arrests by year, state, offense and gender/race.

- Household data: 5% Census, ACS, CPS.
  - Women’s and children’s outcomes.
Empirical Strategy

Impact of black male incarceration on women and children:

\[ y_{i,m,t} = \beta_0 + \beta_1 incar_{m,t} + X_{i,m,t} \pi + \theta_t + \mu_m + \epsilon_{i,m,t}. \]

- \( i \): individual; \( m \): MSA; \( t \): year.
- \( y \): women’s or children’s outcome.
- \( incar \): the incarceration rate of black men.
Empirical Strategy

Impact of black male incarceration on women and children:

\[ y_{imt} = \beta_0 + \beta_1 \text{incar}_{mt} + X_{imt} \pi + \theta_t + \mu_m + \epsilon_{imt}. \]

- \( i \): individual; \( m \): MSA; \( t \): year.
- \( y \): women’s or children’s outcome.
- \( \text{incar} \): the incarceration rate of black men.

Endogeneity of the incarceration rate: pre-arrest criminal or police behaviors (e.g., prevalence of illicit drugs).
Empirical Strategy

- Impact of black male incarceration on women and children:

  \[ y_{imt} = \beta_0 + \beta_1 incar_{mt} + X_{imt} \pi + \theta_t + \mu_m + \epsilon_{imt}. \]

- \( i \): individual; \( m \): MSA; \( t \): year.
- \( y \): women’s or children’s outcome.
- \( incar \): the incarceration rate of black men.

- Endogeneity of the incarceration rate: pre-arrest criminal or police behaviors (e.g., prevalence of illicit drugs).
Empirical Strategy

- Impact of black male incarceration on women and children:

\[ y_{imt} = \beta_0 + \beta_1 incar_{mt} + X_{imt} \pi + \theta_t + \mu_m + \epsilon_{imt}. \]

- \( i \): individual; \( m \): MSA; \( t \): year.
- \( y \): women’s or children’s outcome.
- \( incar \): the incarceration rate of black men.
- Endogeneity of the incarceration rate: pre-arrest criminal or police behaviors (e.g., prevalence of illicit drugs).
Simulated Instrumental Variable

- **Simulated IV**: Variation in sentencing laws across states and over years.
  - Extensive: whether to incarcerate an arrestee.
  - Intensive: how long to imprison an inmate.
Simulated Instrumental Variable

- **Simulated IV**: Variation in sentencing laws across states and over years.
  - Extensive: whether to incarcerate an arrestee.
    - E.g., Arrested for stealing $400 shoes (GA: fine; FL: prison).
  - Intensive: how long to imprison an inmate.

- Identifying assumption: Changes in sentencing policies are exogenous.

- Confounding variables (e.g., crime rate, racial composition).
Simulated Instrumental Variable

- **Simulated IV**: Variation in sentencing laws across states and over years.
  - Extensive: whether to incarcerate an arrestee.
    - E.g., Arrested for stealing $400 shoes (GA: fine; FL: prison).
  - Intensive: how long to imprison an inmate.
    - E.g., FL’s truth in sentencing in 1995: ↑ time served.
Simulated Instrumental Variable

- Simulated IV: Variation in sentencing laws across states and over years.
  - Extensive: whether to incarcerate an arrestee.
    - E.g., Arrested for stealing $400 shoes (GA: fine; FL: prison).
  - Intensive: how long to imprison an inmate.
    - E.g., FL’s truth in sentencing in 1995: ↑ time served.

- Behavior-constant incarceration rate.
Simulated Instrumental Variable

- **Simulated IV**: Variation in sentencing laws across states and over years.
  - Extensive: whether to incarcerate an arrestee.
    - E.g., Arrested for stealing $400 shoes (GA: fine; FL: prison).
  - Intensive: how long to imprison an inmate.
    - E.g., FL’s truth in sentencing in 1995: ↑ time served.

- Behavior-constant incarceration rate.

- Construction: sufficient statistics of sentencing outcomes.
  - Probability of prison admission conditional on arrest;
  - Length of sentence served in prison.
  - Leave out the own MSA: local crimes and judges.
Simulated Instrumental Variable

- **Simulated IV**: Variation in sentencing laws across states and over years.
  - Extensive: whether to incarcerate an arrestee.
    - E.g., Arrested for stealing $400 shoes (GA: fine; FL: prison).
  - Intensive: how long to imprison an inmate.
    - E.g., FL’s truth in sentencing in 1995: ↑ time served.

- **Behavior-constant** incarceration rate.

- **Construction**: sufficient statistics of sentencing outcomes.
  - Probability of prison admission conditional on arrest;
  - Length of sentence served in prison.
  - Leave out the own MSA: local crimes and judges.

- **Identifying assumption**: Changes in sentencing policies are exogenous.
  - Confounding variables (e.g., crime rate, racial composition).
Simulation Model of Prison Population (I)

- $A_{mt}^c$: number of admissions for crime $c$, MSA $m$, and year $t$.
- $C_{mt}^c$: population of criminals – prevalence of crime.
- $\alpha_{mt}^c$: $\text{Pr}(\text{arrest} \mid \text{engagement in crime } c)$ – police effectiveness.
- $\gamma_{mt}^c$: $\text{Pr}(\text{prison admission} \mid \text{arrest for crime } c)$ – punitiveness of sentencing policies.

$$A_{mt}^c = C_{mt}^c \alpha_{mt}^c \gamma_{mt}^c$$
Simulation Model of Prison Population (II)

Assume that the prison population starts with zero at $t = 0$.

The prison population of year-end 1 sentenced from MSA $m$ ($I_{m1}$) is:

$$I_{m1} = \sum_{c=1}^{N} I_{m1}^c = \sum_{c=1}^{N} A_{m1}^c = \sum_{c=1}^{N} C_{m1}^c \alpha_{m1}^c \gamma_{m1}^c$$

prisoners admitted in year 1

The prison population of year-end 2 sentenced from MSA $m$ ($I_{m2}$) is:

$$I_{m2} = \sum_{c=1}^{N} A_{m2}^c + \sum_{c=1}^{N} A_{m1}^c \mathbb{1}\{\bar{S}_{m1}^c > 1\}$$

$$= \sum_{c=1}^{N} C_{m2}^c \alpha_{m2}^c \gamma_{m2}^c + \sum_{c=1}^{N} C_{m1}^c \alpha_{m1}^c \gamma_{m1}^c \mathbb{1}\{\bar{S}_{m1}^c > 1\}$$

prisoners admitted in year 2

unreleased prisoners from year 1

where $\bar{S}_{mt}^c$ is average time served.
Simulation Model of Prison Population (III)

The prison population of year-end $t$ sentenced from MSA $m$ ($I_{mt}$) is:

$$I_{mt} = \sum_{c=1}^{N} C^c_{mt} \alpha^c_{mt} \gamma^c_{mt} + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C^c_{mj} \alpha^c_{mj} \gamma^c_{mj} \mathbb{I}\{\bar{S}^c_{mj} > t - j\}.$$

- $C^c_{mt}$: prevalence of crime
- $\alpha^c_{mt}$: police effectiveness
- $\gamma^c_{mt}$ and $\bar{S}^c_{mt}$: punitiveness of sentencing policies
The prison population of year-end $t$ sentenced from MSA $m$ ($I_{mt}$) is:

$$I_{mt} = \sum_{c=1}^{N} C_{mt}^c \alpha_{mt}^c \gamma_{mt}^c + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C_{mj}^c \alpha_{mj}^c \gamma_{mj}^c \mathbb{1}\{\bar{S}_{mj}^c > t-j\}.$$  

- $C_{mt}^c$: prevalence of crime (endogenous: criminal behavior)
- $\alpha_{mt}^c$: police effectiveness (endogenous: police behavior)
- $\gamma_{mt}^c$ and $\bar{S}_{mt}^c$: punitiveness of sentencing policies
Simulation Model of Prison Population (III)

The prison population of year-end $t$ sentenced from MSA $m$ ($I_{mt}$) is:

$$I_{mt} = \sum_{c=1}^{N} C_{mt}^c \alpha_{mt}^c \gamma_{mt}^c + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C_{mj}^c \alpha_{mj}^c \gamma_{mj}^c \mathbb{1}\{\bar{S}_{mj}^c > t - j\}.$$

- $C_{mt}^c$: prevalence of crime (*endogenous: criminal behavior*)
- $\alpha_{mt}^c$: police effectiveness (*endogenous: police behavior*)
- $\gamma_{mt}^c$ and $\bar{S}_{mt}^c$: punitiveness of sentencing policies

To construct simulated IV, hold behavior constant!
Simulation Model of Prison Population (III)

The prison population of year-end $t$ sentenced from MSA $m$ ($I_{mt}$) is:

$$I_{mt} = \sum_{c=1}^{N} C_{mt}^c \alpha_{mt}^c \gamma_{mt}^c + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C_{mj}^c \alpha_{mj}^c \gamma_{mj}^c \mathbb{I}\{\bar{S}_{mj}^c > t - j\}.$$

- $C_{mt}^c$: prevalence of crime (endogenous: criminal behavior)
- $\alpha_{mt}^c$: police effectiveness (endogenous: police behavior)
- $\gamma_{mt}^c$ and $\bar{S}_{mt}^c$: punitiveness of sentencing policies

To construct simulated IV, hold behavior constant!

Let $C_{mt}^c \alpha_{mt}^c$ be constant: $C\alpha$ – normalization

$$I_{mt}\big|_{\text{arrest}} = \sum_{c=1}^{N} C\alpha \gamma_{mt}^c + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C\alpha \gamma_{mj}^c \mathbb{I}\{\bar{S}_{mj}^c > t - j\}.$$
Simulation Model of Prison Population (III)

The prison population of year-end \( t \) sentenced from MSA \( m \) \((I_{mt})\) is:

\[
I_{mt} = \sum_{c=1}^{N} C_{mt}^c \alpha_{mt}^c \gamma_{mt}^c + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C_{mj}^c \alpha_{mj}^c \gamma_{mj}^c \mathbb{1}\{\bar{S}_{mj}^c > t - j\}.
\]

- \( C_{mt}^c \): prevalence of crime \((\text{endogenous: criminal behavior})\)
- \( \alpha_{mt}^c \): police effectiveness \((\text{endogenous: police behavior})\)
- \( \gamma_{mt}^c \) and \( \bar{S}_{mt}^c \): punitiveness of sentencing policies

To construct simulated IV, hold behavior constant!

Let \( C_{mt}^c \alpha_{mt}^c \) be constant: \( C \alpha - \text{normalization} \)

\[
I_{mt}^*_{\text{arrest}} = \sum_{c=1}^{N} C \alpha \gamma_{s(m)t}^c + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C \alpha \gamma_{s(m)j}^c \mathbb{1}\{\bar{S}_{-mj}^c > t - j\}
\]
Simulated IV

Simulated instrument for the incarceration rate:

\[
IV_{mt} = \frac{\sum_{c=1}^{N} C\alpha \gamma_{s(m)t}^{c} + \sum_{c=1}^{N} \sum_{j=1}^{t-1} C\alpha \gamma_{s(m)j}^{c} \mathbb{1}\{\bar{S}_{c-mj} > t - j\}}{P_{mt}}
\]

where

- \(\gamma_{s(m)t}^{c}\): Pr(admission to prison | arrest).
- \(\bar{S}_{c-mt}\): Average length of sentence served.
- \(C\alpha\): Average number of arrests.
- \(P_{mt}\): Resident population.
Behavior-constant Prison Population

Arkansas

Note: Voluntary sentencing guideline and determinate sentencing in 1994, and three-strikes law in 1995.
Threats to Identification

1. Sentencing outcomes may be driven by severity of crimes.  
   Detail

2. Large MSAs may dominate a state’s policy-making.  
   Detail

3. Harsher sentencing policies may be initiated by confounding factors.  
   Detail

4. Sentencing policies may affect women directly or through female incarceration.  
   Detail

5. Prison overcrowding may affect sentencing outcomes.  
   Detail
Findings

Incarceration rate of black men

► Black women:
  ► ↓ married or marrying up
  ► ↑ employed

► Black children:
  ► ↑ born out of wedlock
  ► ↑ living in a mother-only family
  ► ↓ obtaining some college education
Findings

Incarceration rate of black men (↑ 1 pp):

- **Black women:**
  - ↓ married (3 pp) or marrying up (2 pp);
  - ↑ employed (3 pp).

- **Black children:**
  - ↑ born out of wedlock (4.3 pp);
  - ↑ living in a mother-only family (3.5 pp);
  - ↓ obtaining some college education (4 pp).
Findings

Incarceration rate of black men (↑ 1 pp):

- **Black women:**
  - ↓ married (3 pp) or marrying up (2 pp);
  - ↑ employed (3 pp).

- **Black children:**
  - ↑ born out of wedlock (4.3 pp);
  - ↑ living in a mother-only family (3.5 pp);
  - ↓ obtaining some college education (4 pp).

LATE (compliers)
Former prisoners

Other Outcomes
Findings

Incarceration rate of black men (↑ 1 pp):

- **Black women:**
  - ↓ married (3 pp) or marrying up (2 pp);
  - ↑ employed (3 pp).
- **Black children:**
  - ↑ born out of wedlock (4.3 pp);
  - ↑ living in a mother-only family (3.5 pp);
  - ↓ obtaining some college education (4 pp).

Black men at different margins of incarceration:

- **Extensive-margin incarceration:** more-educated women;
- **Intensive-margin incarceration:** less-educated women, children.
Findings

Incarceration rate of black men (↑ 1 pp):

- **Black women:**
  - ↓ married (3 pp) or marrying up (2 pp);
  - ↑ employed (3 pp).

- **Black children:**
  - ↑ born out of wedlock (4.3 pp);
  - ↑ living in a mother-only family (3.5 pp);
  - ↓ obtaining some college education (4 pp).

Black men at different margins of incarceration:

- **Extensive-margin incarceration:** more-educated women;
- **Intensive-margin incarceration:** less-educated women, children.

Harsher sentencing policies:

- ↑ black-white intergenerational income gap for men.
Crime Rates (Black Adults)

Perpetual Inventory Method

- $I_{mt}^{rs}$: the number of prisoners in custody of race $r$ and sex $s$, sentenced from MSA $m$ at yearend $t$.
- $A_{mt}^{rs}$: the number of persons admitted to prison.
- $R_{mt}^{rs}$: the number of persons released from prison.
- Change of prison population between yearend $t - 1$ and $t$:
  \[ \Delta I_{mt}^{rs} = A_{mt}^{rs} - R_{mt}^{rs}. \]
- Back out the number of prisoners in custody before 2009:
  \[
  I_{m,2008}^{rs} = I_{m,2009}^{rs} - \Delta I_{m,2009}^{rs} \\
  I_{m,2007}^{rs} = I_{m,2008}^{rs} - \Delta I_{m,2008}^{rs} \\
  \ldots \\
  I_{m,1983}^{rs} = I_{m,1984}^{rs} - \Delta I_{m,1984}^{rs}.
  \]
Estimated & Reported Prison Population: MSA Level

Graphs by year

- 2004
- 2005
- 2006
- 2007
- 2008

Reported MSA Prison Population of Black Males

Estimated MSA Prison Population of Black Males

- MSA Prison Population
- 45-Degree Line

Back
Estimated & Reported Prison Population: State Level

Graphs by state

- California
- Michigan
- New Jersey
- New York
- South Carolina
- Tennessee
- Texas
- Virginia
- Wisconsin

Estimated from NCRP NPS

Prison population of black males (thousands)

Year

1980 1990 2000 2010

Correlation = 0.935
Threats to Identification

1. Sentencing outcomes may be driven by severity of crimes.
   - Leave-one-out means.
   - Sentencing outcomes have been more punitive towards almost all types of offenses. Admission / 1000 Arrests
   - Anti-Drug Abuse Act. Drug Possession

2. Large MSAs may dominate a state’s policy-making.

3. Harsher sentencing policies may be initiated by confounding factors.

4. Sentencing policies may affect women directly or through female incarceration.

5. Prison overcrowding may affect sentencing outcomes.
Threats to Identification

1. Sentencing outcomes can be driven by criminal behaviors.

2. Large MSAs may dominate a state’s policy-making.
   - HHI: relative black population of MSAs within states.

3. Harsher sentencing policies may be initiated by confounding factors.

4. Sentencing policies may affect women directly or through female incarceration.

5. Prison overcrowding can affect sentencing outcomes.
Threats to Identification

1. Sentencing outcomes can be driven by criminal behaviors.

2. Large MSAs may dominate a state’s policy-making.

3. Harsher sentencing policies may be initiated by confounding factors.
   - Control for lags and leads of the IV.
   - Correlation between the IV and potential confounding factors (e.g., crime rates and proportion of the black population).
   - Control for state-specific time trends.

4. Sentencing policies may affect women directly or through female incarceration.

5. Prison overcrowding can affect sentencing outcomes.
Threats to Identification

1. Sentencing outcomes can be driven by criminal behaviors.
2. Large MSAs may dominate a state’s policy-making.
3. Harsher sentencing policies may be initiated by confounding factors.
4. **Sentencing policies may affect women directly or through female incarceration.**
   - Policies may not be salient to the general population.
   - Female incarceration rate is very low.
   - Other channels, other than black male incarceration, that would induce lower marriage, more out-of-wedlock children, and higher female employment at the same time?
5. Prison overcrowding can affect sentencing outcomes.
Threats to Identification

1. Sentencing outcomes can be driven by criminal behaviors.

2. Large MSAs may dominate a state’s policy-making.

3. Changes in sentencing policies may be driven by confounding factors.

4. Sentencing policies may affect women directly or through female incarceration.

5. Prison overcrowding can affect sentencing outcomes.
   - Control for lags and leads of the IV.
   - Judges’ discretion to impose alternatives to incarceration due to guidelines (Conaboy, 1997).
   - Prison overcrowding should not affect sentencing outcomes of a state’s prisoners sent to federal prisons.
Pr(Prison Admission | Arrest)

Black Offenders, Drug Possession

![Graph showing the likelihood of incarceration per arrestee from 1980 to 2010.](image)

Drug Trafficking

Drug Possession

Incarcerated in 1990

Incarcerated in 2000

Admissions per 1,000 Arrests

Years Served

Graphs by Category of Offenses

- Incarcerated in 1990
- Incarcerated in 2000

Graphs by Category of Offenses
Fraction of black men in Correctional Facilities

<table>
<thead>
<tr>
<th>Year</th>
<th>Probation</th>
<th>Parole</th>
<th>Jail</th>
<th>Prison</th>
<th>Current and former prisoners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>0.04</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>1991</td>
<td>0.08</td>
<td>0.03</td>
<td>0.02</td>
<td>0.04</td>
<td>0.11</td>
</tr>
<tr>
<td>1997</td>
<td>0.08</td>
<td>0.03</td>
<td>0.02</td>
<td>0.02</td>
<td>0.14</td>
</tr>
<tr>
<td>2001</td>
<td>0.09</td>
<td>0.02</td>
<td>0.02</td>
<td>0.06</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.06</td>
</tr>
</tbody>
</table>

Back to Findings