Early Childhood Education and Crime

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Why Crime? Why Males? Why Early Education?

- Crime and the criminal justice system impose substantial costs on society (Anderson, 1999, 2012)
- Early intervention builds the skill base for enhancing the productivity of later investment (Cunha and Heckman, 2007)
- Moffitt (1993, 2018) notes the early emergence of externalizing behavior that predicts participation in adult crime

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Why Crime? Why Males? Why Early Education? (contd)

- One of the primary benefits of the Perry Preschool Program was reducing violent crime among boys (Heckman et al., 2010b)
- Early childhood education promotes self-control and reduces externalizing behaviors
- . . . Important mediators for reducing involvement in criminal behavior (Blackwell and Piquero, 2005; Heckman et al., 2013)

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Our Project

- We analyze the impact of the ABC/CARE on the criminal activity of participants
  - ABC/CARE: intensive early childhood program starting at eight weeks and continuing through age 5

- Women have a lower base rate of criminal participation. Proportionately more women than men decrease their involvement with crime

- The dollar value of the social cost of criminal activity averted is higher for males because they commit the more costly violent crimes

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Source of Gender Differences

- García et al. (2018): differences in the treatment effects occur across many outcomes
- Source of these differential benefits by gender: worse home environments for girls with greater scope for enhancement by the program
- This paper: for both genders, treatment effects are stronger for the least advantaged children where advantage is measured by the mother's education

The ABC/CARE Program

- Program: randomized controlled trial implemented at the University of North Carolina, Chapel Hill (1972-1980)
- Enrollment: from 0 to 5, 8 hours per day and 50 weeks per year
- Target: disadvantaged children
- Goal: promote language and cognitive development
  - Center-based curriculum; close teacher-student interaction
  - Small student-staff ratio, focus on individual learning
  - Children were offered nutritious meals and medical check-ups

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The ABC/CARE Data

- Several data were collected frequently on the children throughout the duration of the program
- ABC/CARE follow-ups occurred at ages 12, 15 (only for ABC), 21, 30, and 34
- Adult data collections: measures of education, employment, health, criminal activity, and family structure
- We use the crime data, collected through both self-reports and administrative records

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Table 1: Number of Individuals in the Crime Data

	Criminal Activity?					
	No			Yes		
	Male	Female	Total	Male	Female	Total
Control	16	20	36	21	17	38
Treatment	11	21	32	26	11	37
			68			75

Table 2: Summary of Crime Variables

	Control		Treatment	
	Male	Female	Male	Female
Property	2.486	1.351	3.243	0.281
	(5.581)	(3.953)	(7.466)	(0.683)
Drug	2.757	0.973	1.784	0.250
	(4.879)	(2.455)	(3.473)	(0.762)
Violent	2.378	0.324	2.324	0.219
	(4.518)	(0.915)	(3.432)	(0.608)
Other	4.811	2.514	4.297	0.438
	(10.82)	(9.066)	(8.794)	(0.914)
Total	12.43	5.162	11.65	1.188
	(21.58)	(15.01)	(17.83)	(2.306)
Incarceration	363.2	58.89	447.7	1.562
[days]	(926.6)	(246.9)	(1073.7)	(8.839)

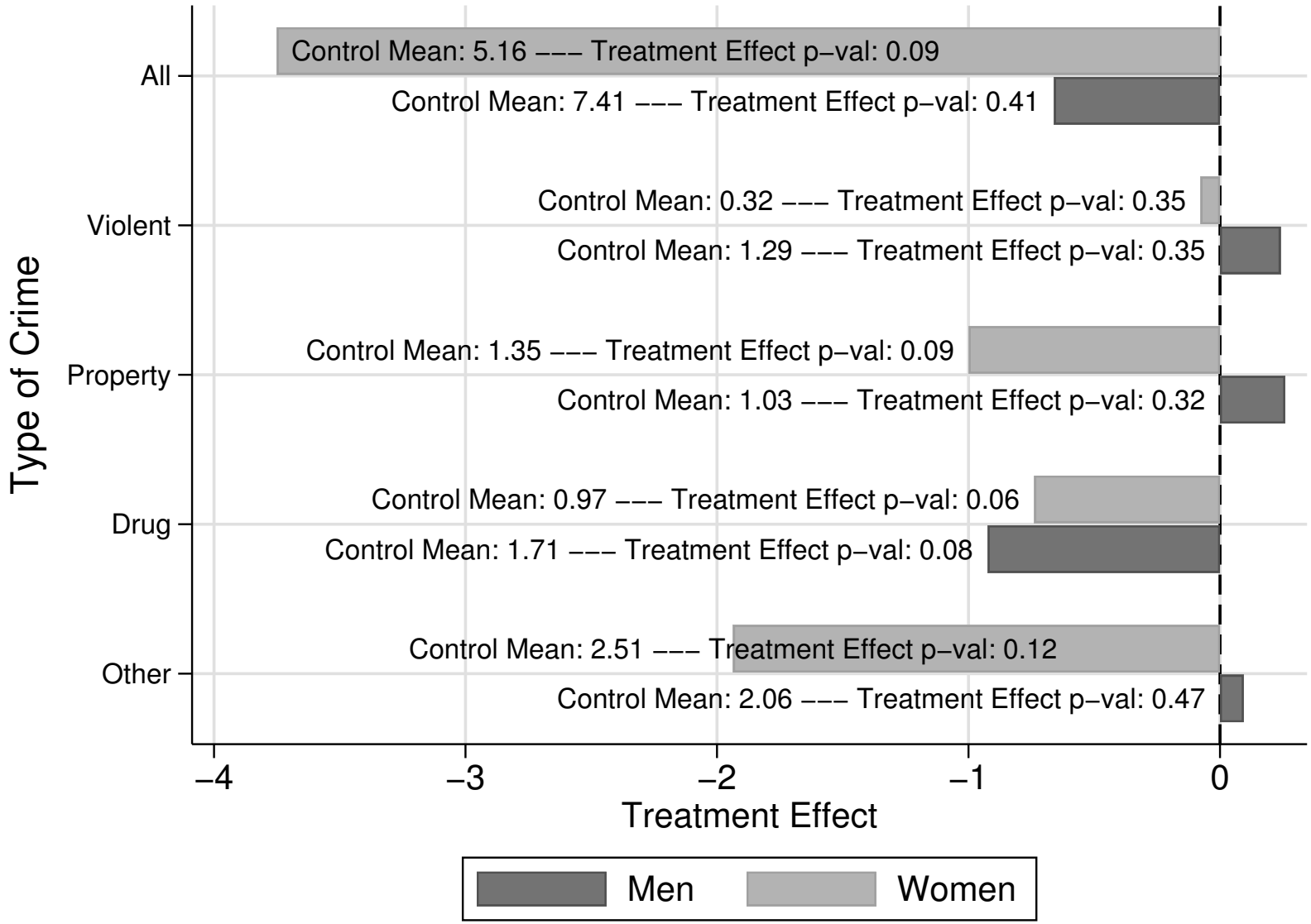
Treatment Effects on Crime

- C_T: total number of crimes committed
- C_V, C_P, C_D, C_O: number violent, property, drug, and other crimes respectively

- Randomization (denoted $R \in \{0, 1\}$) is tantamount to receipt of treatment

- Conditional treatment effects:
  $\mathbb{E}[C_k|R = 1, X = x] - \mathbb{E}[C_k|R = 0, X = x]$ for
  $k \in \{T, V, P, D, O\}$

Figure 1: Treatment Effects



Predicting Number of Crimes by Maternal Education

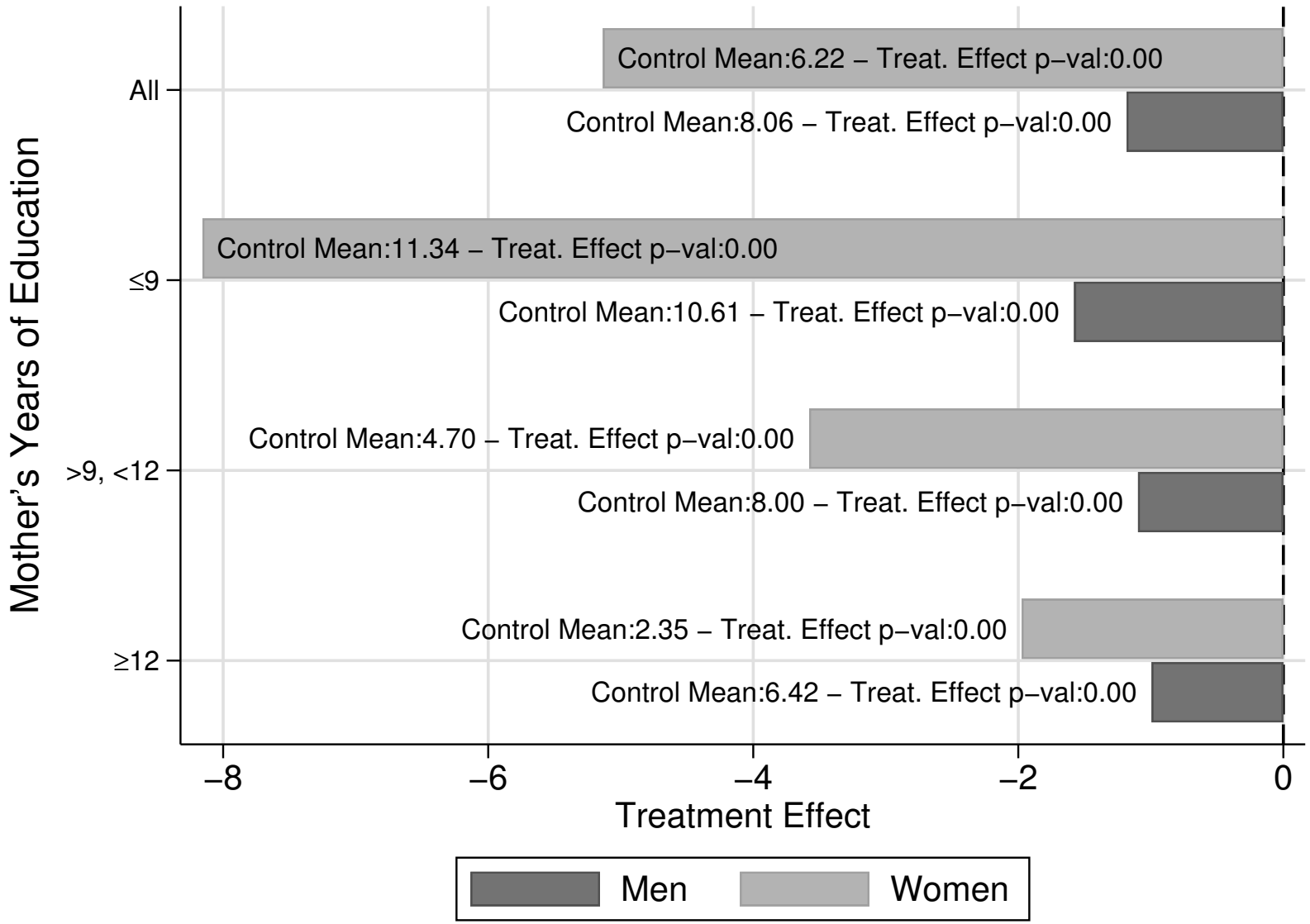
- Across all groups, the distribution is highly skewed with the majority of subjects committing fewer than ten crimes
- We use a negative binomial or mixed-Poisson model

- We write the conditional mean for a count variable, C_T, as a function of the dispersion and the mean:

$$\mathbb{E}[C_T|X = x, R, \varepsilon] = h\lambda, \tag{1}$$

$h = exp(\varepsilon)$: follow a gamma distribution with one parameter: $\Gamma(\theta, \theta)$. Mean of 1 and a variance of $\frac{1}{\theta}$

Figure 2: Predicted Number of Crimes by Maternal Education



Treatment Effects by Gender

Table 3: ABC/CARE Treatment Effect Aggregates by Gender

	Average Effect Size	% > 0 Treatment Effect	% > 0 , Significant Treatment Effect
Females	**0.242**	**100.000**	**100.000**
Males	-0.093	**33.333**	0.000

Source: Reproduced from García et al. (2018).

Weighting the Treatment Effects

- Weighting the treatment effects on crime by the costs of the crimes accounts for the severity of the crime averted and reveals a different pattern than the treatment effects on the quantity of crime

Table 4: Summary of Cost

Program	Statistic	Females	Males	Pooled
ABC/CARE	NPV	167,488	951,597	659,221
ABC/CARE	B/C	**2.61** (0.73)	**10.19** (2.93)	**7.33** (1.84)
ABC/CARE	NPV without crime	32,790	661,550	466,318
ABC/CARE	B/C without crime	**2.34** (0.62)	4.08 (2.18)	**3.06** (1.01)
PPP	B/C high murder cost	4.5 (1.4)	8.6 (3.7)	7.1 (2.3)
PPP	B/C low murder cost	11.6 (7.1)	12.1 (8.0)	12.2 (5.3)
PPP	B/C without crime	3.3 (1.4)	4.9 (1.4)	4.2 (1.1)

Gender Difference: Some Explanations

- Release of hormones, for example testosterone, affects the development of the fetal brain in different ways depending on sex (Schore, 2017; Zahn-Waxler and Marceau, 2008)

- Males are more vulnerable during the prenatal and perinatal stage due to the rate of gestation and the larger size of male fetuses (Beeghly et al., 2017; Jaffee, 2009; Marwha et al., 2017; Tan et al., 2016)

- Parents invest in their children is affected by sex of the child (Dahl and Moretti, 2008; Lundberg, 2005)

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Gender Difference: Some Explanations

- For ABC/CARE, García et al. (2018) document a significant difference between boys and girls in an index that contains mother's age, education, IQ, marital status, and employment, as well as the number of siblings and father's presence at home
- Teachers respond more positively to children of the same sex. (Holmlund and Sund, 2008)
- Finally, it is possible that there are gender differences in the social contexts of the outcomes studied