Moved to Opportunity: The Long-Run Effects of Public Housing Demolition on Children

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Content

▶ Chicago's housing authority began reducing its stock of public housing during the 1990s and targeted **some buildings** with poor maintenance for **demolition** while leaving **nearby buildings untouched**.

▶ Forced **low-income households** to relocate to **less disadvantaged neighborhoods** using **housing vouchers**.

▶ **Compares the young adult outcomes** of displaced and non-displaced children from the same public housing development.

▶ Because these two groups of children and their households were **similar before the demolition**, **differences in long-run outcomes** can be attributed to **neighborhood relocation**.

▶ **Displaced children**: more likely to be employed, earn more in young adulthood, have fewer violent crime arrests, at young ages have lower high school dropout rates.

Overview

1. History of Public Housing Demolition in Chicago

2. Expected Effects of Demolition on Children

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6. Mediating Mechanisms

7. Discussion and Comparison with Previous Studies & Cost-Benefit Analysis

8. Conclusion & Discussion

History of Public Housing Demolition in Chicago

I. History of Public Housing Demolition in Chicago

▶ The Chicago Housing Authority (CHA) owned and managed 17 **housing developments ("projects")**, consisted of a collection of **apartment buildings** (many have high-rise structures with 75 to 150 **units**).

▶ **Low-income households** were eligible to live in public housing if their income was at or below 50 percent of Chicago's median income (eligible families typically spent years on **waiting lists** and usually accepted the **first** public housing unit that was offered to them).

▶ To address maintenance issues (pipes burst,flooding heating systems, harsh winter weather, ...), authorities laid plans to **replace project-based housing assistance with vouchers** and gradually eliminate public housing through building **demolition**.

▶ Provided **Section 8 housing vouchers** to displaced residents which allowed recipients to **rent housing** on the private market.

▶ Or provided option of **transfering to another unit** in their current project or another unit in **a different CHA project**.

▶ Vouchers **should not mechanically affect the income of assisted households** because the program and rent rules for vouchers and project-based assistance were similar.

Expected Effects of Demolition on Children

II. Expected Effects of Demolition on Children

▶ One possibility is that displaced households used their vouchers to **move to lower-poverty neighborhoods**. Children may benefit because:
  ▶ Affluent adults serve as role models.
  ▶ Expose to higher-income peers and provide job information.
  ▶ Provide displaced parents with better access to job-finding networks, more likely to work and invest in goods that promote child development.

▶ Another way demolition and relocation may affect children is through **changes in the quality of schooling**.
  ▶ Better teachers and smaller classes generates notable gains.
  ▶ Access to better school.

▶ Finally, even if their households did not relocate to less disadvantaged neighborhoods — **physical design and density of public housing projects** fosters criminal and other negative behavior.

Data Sources and Sample Construction

III. Data Sources and Sample Construction

Data Sources:

- ▶ Building records from the CHA
- ▶ Social assistance (i.e., TANF/AFDC, Food Stamps, and Medicaid) case files (1994–1997) from the Illinois Department of Human Services (IDHS).
- ▶ Unemployment insurance wage records (1995–2009) from the (IDES)
- ▶ Comprehensive arrest records (up to 2009) from the Illinois State Police (ISP)
- ▶ IDHS assistance files (1989–2009)
- ▶ Records from the Chicago Public Schools (CPS) and the National Student Clearinghouse (NSC)

A. Sample of Public Housing Buildings

- ▶ During the **initial wave of housing demolitions** in 1995–1998.
- ▶ Contains 53 high-rise buildings located in 7 projects.
- ▶ 20 demolished (**treated**) buildings and 33 comparison (**control**) group buildings that did not close during the 1995–2000 period.

B. Linking Households to the Public Housing System

- ▶ Rely on social assistance records that provide exact street addresses for welfare recipients, matching a building in the public housing project sample **in the year prior to building closure** for demolition.
- ▶ Sample definition is unrelated to any impact of displacement on public assistance participation.
- ▶ Assistance data contain 5,676 adult recipients who lived in public housing in the year before building closure.

► Focus on children who were **age 7-18** in the year of demolition. With this sample, I observe **adult (age > 18) outcomes** for **at least 3** years and **at most 14** years for each child.

► 1995—>age 18,2009—>age 18+14=32; 1995—>age 7,2009—>age 7+14=21)

► The final sample comprises 5,250 children from 2,767 households.

► A panel at the **person-year level**, which covers the period from displacement to 2009 (the last year of my administrative data on labor market and welfare outcomes). The number of observations per individual is determined by the displacement date.

► **Merge** this panel **with administrative data** on labor market outcomes, social assistance receipt, and criminal arrests.

Empirical Approach

IV. Empirical Approach

▶ Compares children who lived in buildings selected for demolition to their counterparts living in non-demolished buildings.

$$Y_{it} = \alpha + \beta D_{b(i)} + \psi_{p(i)} + \epsilon_{it},$$

▶ **i** is an individual and **t** represents years. **b(i)** and **p(i)** are the building and project for individual i.

▶ $\psi_{p(i)}$ is a set of project fixed effects.

▶ $D_{b(i)} = 1$ if an individual lived in a building slated for demolition.

▶ β represents the **net impact of relocation due to demolition on children's outcomes** (capture effects of changing the form of housing assistance, vouchers to public housing assistance).

▶ **Cluster standard errors** at the building level.

▶ The validity of design depends on whether the selection of buildings for demolition was **uncorrelated with characteristics of children** living in public housing.

▶ **Examine** characteristics measured in the (baseline) year prior to building closure for demolition.

TABLE 1—COMPARISON OF DISPLACED AND NON-DISPLACED CHILDREN AND ADULTS AT BASELINE
(Prior to Demolition)

	All children		Male children		Female children		Adults	
	Control mean (1)	Difference: treated–control, within estimate (2)	Control mean (3)	Difference: treated–control, within estimate (4)	Control mean (5)	Difference: treated–control, within estimate (6)	Control mean (7)	Difference: treated–control, within estimate (8)
Demographics								
Age	11.714	0.035 (0.159)	11.548	0.145 (0.196)	11.873	−0.070 (0.186)	28.851	0.810 (0.312)
Male (= 1)	0.489	−0.008 (0.017)					0.128	−0.001 (0.011)
Teen mom (= 1)†							0.371	−0.018 (0.024)
Past arrests (#)								
Violent	0.015	0.005 (0.007)	0.028	0.011 (0.014)	0.004	−0.003 (0.009)	0.185	−0.017 (0.032)
Property	0.011	0.010 (0.009)	0.018	0.015 (0.014)	0.004	0.004 (0.010)	0.156	0.016 (0.020)
Drugs	0.025	0.000 (0.013)	0.054	0.017 (0.023)	0.000	−0.018 (0.012)	0.166	0.031 (0.022)
School outcomes								
Enrolled (= 1)	0.948	0.003 (0.015)	0.946	−0.009 (0.017)	0.949	0.014 (0.016)		
Reading score (SD)	−0.443	0.024 (0.074)	−0.477	−0.045 (0.087)	−0.410	0.074 (0.074)		
Math score (SD)	−0.449	0.048 (0.061)	−0.509	0.007 (0.077)	−0.393	0.073 (0.065)		
Economic activity								
Employed (= 1)							0.173	0.006 (0.016)
Earnings‡							$1,493.75	−$45.91 (193.358)
Observations (individuals)		5,250		2,547		2,703		4,331

Notes: Children are age 7 to 18 at baseline while adults are over age 18. The control mean statistics in columns 1, 3, 5, and 7 refer to the averages for non-displaced individuals. For each outcome (row), I compute the difference between displaced (treated) and non-displaced individuals using equation (1). This difference is reported in columns 2, 4, 6, and 8. Standard errors are presented below each estimate and are clustered at the building level. †Outcome is only defined for women. ‡Data on employment begin in the first quarter of 1995. For individuals who experience displacement in 1995, I use this quarter of earnings (scaled to an annual figure) to measure earnings prior to displacement because this quarter precedes demolition. See text for details on data sources.

The Effect of Moving Out of Project-Based Public Housing:

- ▶ Using **building demolition as an IV**. These results represent the "dose effect" of **spending an additional year in high-rise public housing**, interest to policymakers.
- ▶ Two-stage least squares system (2SLS):

$$P_i = \gamma + \tau D_{b(i)} + \psi_{p(i)} + \eta_{it},$$
$$Y_{it} = \pi + \theta P_i + \psi_{p(i)} + \epsilon_{it},$$

- ▶ P_i is the number of years spent living in project-based public housing (including the period prior to demolition).
- ▶ OLS estimates of equation (3) will be biased because **households selectively participate in public housing**. The demolition setting address this issue.

Testing for Attrition and Spatial Spillovers:

- ▶ **Missing data problem**: displaced children are more likely to move out of state. An individual who moves out of state will have zero earnings in the Illinois data even if they are working in their new state of residence.
  - ▶ follow Grogger (2013) and **use terminal runs of zeros** to measure permanent out-of-jurisdiction attrition. (no evidence)
- ▶ **Spatial spillovers stemming from demolition**. Control group of non-displaced children could be affected by the demolition of neighboring buildings and the relocation of their peers.
  - ▶ **Additional indicators** for living in a comparison group building that is **immediately adjacent** to a demolition building. (no evidence)

Main Results

A. Effects of Demolition on Household Location

Test whether displaced public housing residents moved to lower-poverty neighborhoods.

TABLE 2—IMPACT OF DEMOLITION ON HOUSEHOLD NEIGHBORHOOD CHARACTERISTICS

May be biased if demolition has an impact on a household's participation in social assistance programs:

	3 years after demolition		8 years after demolition	
	Control mean (1)	Difference: treated–control, within estimate (2)	Control mean (3)	Difference: treated–control, within estimate (4)
HH has address (= 1) No difference	0.777	0.014 (0.021)	0.656	0.011 (0.020)
Only HHs with address Tract characteristics:				
Black (percent)	94.897	−2.801 (1.125)	90.042	−1.055 (1.257)
Below poverty (percent)	64.208	−14.264 (2.729)	40.858	−2.771 (2.353)
Violent crime rate	68.855	−29.522 (5.807)	30.801	−2.371 (4.714)
Observations (HHs)		2,767		2,767
Observations (HHs with address)		2,162		1,824

Displaced (treated) households moved to **better quality neighborhoods** relative to their non-displaced (control) peers.

21%↓   42%↓   Differences in neighborhood conditions became **smaller over time** (control households gradually move from public housing).

Notes: The control mean statistics in columns 1 and 3 refer to averages for non-displaced households. The mean difference between displaced and non-displaced households are reported in columns 2 and 4 as computed from a regression specified in equation (1). This analysis follows households regardless of whether a child is still present. Robust standard errors are clustered at the public housing building level. See Section III for further description of data sources.

A large share of displaced residents relocated and **lived in neighborhoods** with notably **lower poverty rates** relative to residents of the comparison group buildings.
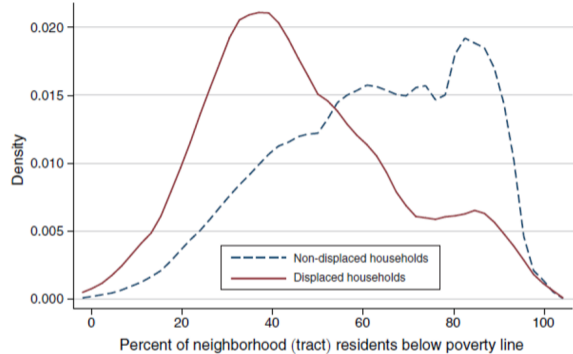

FIGURE 1. DENSITY OF NEIGHBORHOOD POVERTY AFTER DEMOLITION

Notes: The figure shows statistics for the duration-weighted average poverty rate for each household in the sample ($N = 2{,}767$). I compute the average over all locations for the household regardless of whether a child is still present.

B. Effects on Labor Market Activity

Table 3—Impact of Demolition on Adult Labor Market Outcomes of Children

	Control mean (1)	Difference: treated–control, within estimate (2)
Employed (= 1)	0.419	0.040 *4% ↑*
		(0.014)
Employed full-time (= 1) *35h/week*	0.099	0.013 *13% ↑*
		(0.006)
Earnings	$3,713.00	$602.27 *(one year)*
		(153.915)
Earnings (> 0)	$8,856.91	$587.56
		(222.595)
Observations		35,382
Individuals		5,246

Notes: The control mean statistic in column 1 refers to averages for non-displaced individuals. The mean difference between displaced and non-displaced children is reported in column 2 and is computed from a regression specified in equation (1). Robust standard errors are clustered at the public housing building level. All monetary values are in 2012 dollars. See Section III for further description of data sources.

The positive impact detected for the full sample is driven mainly by girls.

TABLE 4—IMPACT OF DEMOLITION ON ADULT LABOR OUTCOMES OF CHILDREN BY SEX

	Males		Females	
	Control mean (1)	Difference: treated–control, within estimate (2)	Control mean (3)	Difference: treated–control, within estimate (4)
Employed (= 1)	0.325	0.017 (0.019)	0.505	0.066 (0.014)
Employed FT (= 1)	0.080	0.013 (0.008)	0.117	0.015 (0.008)
Earnings	$2,946.51	$417.46 (236.705)	$4,416.94	$806.22 (188.520)
Earnings (> 0)	$9,055.43	$552.21 (439.299)	$8,739.53	$609.26 (274.111)
Observations		16,876		18,506
Individuals		2,546		2,700

Notes: The control mean statistics, columns 1 and 3, refer to averages for non-displaced children. The mean difference between displaced and non-displaced children is reported in column 2 for males and in column 4 for females. This difference is computed from a regression specified in equation (1). FT stands for full-time. Robust standard errors are clustered at the public housing building level. See Section III for further description of data sources.

The youngest children who relocated are followed **only until they are age 26** (earnings steeply rise as children complete education and enter the labor force) .
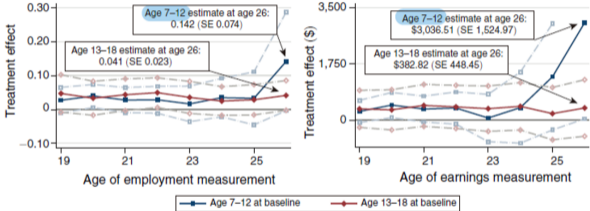
May **understate** the impact of relocation if treatment effects of relocation rise with age.

1995年：7-12岁，2009年21-26岁；1995年：13-18岁，2009年27-32岁

Estimating effects for subgroups based on age: examines the evolution of treatment effects for **young (age 7 to 12)** and **older children (age 13 to 18)**.

Panel A. Dependent variable: employed (= 1)   Panel B. Dependent variable: annual earnings ($)

Age 7–12 estimate at age 26: 0.142 (SE 0.074)

Age 13–18 estimate at age 26: 0.041 (SE 0.023)

Age 7–12 estimate at age 26: $3,036.51 (SE 1,524.97)

Age 13–18 estimate at age 26: $382.82 (SE 448.45)

Age of employment measurement   Age of earnings measurement

Age 7–12 at baseline   Age 13–18 at baseline

1. Treatment effects for **older children** are always positive and **show little trend over time**.

2. **Younger children** reveals that there is **an increase** in the size of the treatment effect **at older ages**.

FIGURE 2. IMPACT ON EMPLOYMENT AND EARNINGS BY AGE OF MEASUREMENT

Magnitude of benefits from relocating to better neighborhoods depends on the **length of exposure to such environments**.

Notes: Each point on the figure is an estimate from the following model:

$$Y_{it} = \sum_{j=19}^{26} \alpha_j D_{i,b} \, \mathbf{1}(age_{i,t} = j) + X_i' \theta + \psi_p + \delta_t + \epsilon_{it},$$

where i, t, b, and p index individuals, years, buildings, and projects, respectively. See Section IV for further details.

C. Effects on Social Assistance and Crime

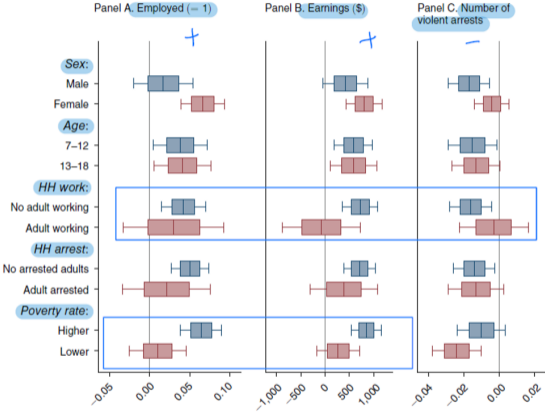Table 5—Impact of Demolition on Crime of Children

	All		Males		Females	
	Control mean (1)	Difference: treated–control, within estimate (2)	Control mean (3)	Difference: treated–control, within estimate (4)	Control mean (5)	Difference: treated–control, within estimate (6)
Number of arrests						
Violent	0.072	−0.010 (0.004)	0.106	−0.017 (0.006)	0.039	−0.004 (0.005)
Property	0.034	0.006 (0.003)	0.041	0.009 (0.006)	0.028	0.003 (0.003)
Drug	0.103	−0.005 (0.011)	0.193	−0.016 (0.018)	0.018	0.005 (0.008)
Other	0.154	−0.25 (0.011)	0.268	−0.037 (0.015)	0.046	−0.014 (0.008)
Observations	56,629		27,246		29,383	
Individuals	5,250		2,547		2,703	

measure of the **annual number of arrests**

may be **biased upward** due to a **higher probability of arrest** in **less disadvantaged neighborhoods**.

Notes: The control mean statistic in column 1 refers to averages for non-displaced individuals. The mean difference between displaced and non-displaced children in columns 2, 4, and 6 are computed from the regression specified in equation (1). Robust standard errors are clustered at the public housing building level.

D. Effects by Subgroup

Figure 3. Impact of Demolition by Subgroup

Treatment effects are **larger** for children from relatively **more disadvantaged circumstances**.

Notes: Rows present box and whisker plots for effects estimated separately for subgroups defined by baseline characteristics. See text for further details.

E. The Impact of Living in Public Housing on Labor Market Outcomes

Table 6—The Effect of Living in Public Housing

	Control mean (1)	Difference: treated–control, within est. (2)	
Panel A. First stage			
Years with PH Address	6.84	2.6 fewer years −2.634 (0.466)	***
Observations		5,250	
Individuals		5,250	

	Control mean (1)	Difference: treated–control, within est. (2)	2SLS (3)
Panel B. Labor market outcomes			
Employed (= 1)	0.419	0.04 *** (0.014)	−0.019 (0.012)
Earnings	$3,713.00	$602.27 *** (153.915)	−$277.36 * (162.431)
Observations		35,382	35,382
Individuals		5,246	5,246

Additional year spent living in public housing reduces labor market participation and annual earning.

Notes: The control mean statistics in column 1 refer to averages for non-displaced children. The mean difference between displaced and non-displaced children in column 2 is computed from the regression specified in equation (1). The 2SLS results in column 3 are estimates obtained from estimating equations (2) and (3). See Section III for further description of data sources.

Mediating Mechanisms

VI. Mediating Mechanisms

Why does demolition have a large impact on the young adult labor market outcomes of children? —— parents invest, living in less crime neighborhood，affecting schooling

Table 7—Impacts on High School Graduation and Postsecondary Schooling

	Control mean (1)	Difference: treated–control, within est. (2)
Panel A. Children age 7 to 12 at baseline		
HS dropout (= 1)	0.631	−0.051*
		(0.029)
Attend two-year post-sec (= 1)	0.149	0.042*
		(0.026)
Individuals		2,429

	Control mean (1)	Difference: treated–control, within est. (2)
Panel B. Children age 13 to 18 at baseline		
HS dropout (= 1)	0.636	−0.021
		(0.046)
Attend two-year post-sec (= 1)	0.095	0.008
		(0.022)
Individuals		1,685

Notes: This table reproduces analysis of the impact of demolition on long-run schooling outcomes from Chyn, Jacob, and Ludwig (2017). The control mean statistics in column 1

Discussion and Comparison with Previous Studies & Cost-Benefit Analysis

Discussion and Comparison with Previous Studies

Panel A. Employed (= 1)

Panel B. Earnings ($)

MTO estimates for standard Section 8 vouchers are **negative**.
1. different effects on **neighborhood quality**: poverty rate of 83% v.s. 56%.
2. **different type of household**: no ability to control whether demolition affected them v.s opting to participate in a voluntary relocation program.
3. MTO have **returned** to their original neighborhood to visit friends after moving.
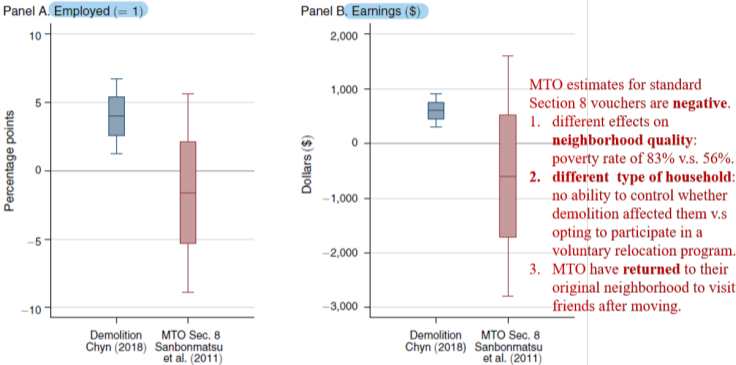
Figure 4. Effects on Children across Studies

Notes: Panel A shows box and whisker plots of the effects on adult labor market employment for children (age 7 to 18 at baseline) from different studies. Panel B similarly compares the effects on adult labor market earnings. See Section VIII for details.

Cost-Benefit Analysis

▶ Relocating children from public housing generates a high rate of
  return on investment, since the value of **increased lifetime earnings**
  is about $24,000 for a family with two children and the main cost
  comes from **moving expenses** which are most likely around $1,100
  per family.

▶ Government would gain about $1,300 (= $24,000 × 0.10 - $1,100) per
  family.

Conclusion & Discussion

Conclusion & Discussion

Conclusion:

- ▶ Provides the first evidence on the long-run causal impacts of demolition and relocation for children who lived in severely distressed public housing.
- ▶ children displaced by public housing demolition have notably better labor market outcomes measured in early adulthood compared with their non-displaced peers.
- ▶ There are larger positive impacts for children who were young (age 7 to 12) when they moved.
- ▶ Likely yield a net gain for government budgets.

Discussion:

- ▶ Data merge and subsample discussion.
- ▶ Solution to bias.
- ▶ Comparison with other projects.