

Child Development, Parental Investments, and Social Capital

Qianyao Ye

Xiamen University

ABFER 12th Annual Conference
May, 2025

Motivation

- Early years development is critical in shaping lifetime outcomes

Motivation

- Early years development is critical in shaping lifetime outcomes
- Recent studies and experiments suggest neighborhoods matter (e.g. Chetty et al., 2016; Chetty and Hendren, 2018; Chyn et al., 2022)

Motivation

- Early years development is critical in shaping lifetime outcomes
- Recent studies and experiments suggest neighborhoods matter (e.g. Chetty et al., 2016; Chetty and Hendren, 2018; Chyn et al., 2022)
- What is it about a neighborhood that influences child development?

Motivation

- Early years development is critical in shaping lifetime outcomes
- Recent studies and experiments suggest neighborhoods matter (e.g. Chetty et al., 2016; Chetty and Hendren, 2018; Chyn et al., 2022)
- What is it about a neighborhood that influences child development?
- **Explore an important neighborhood input: social capital**

Motivation

- Early years development is critical in shaping lifetime outcomes
- Recent studies and experiments suggest neighborhoods matter (e.g. Chetty et al., 2016; Chetty and Hendren, 2018; Chyn et al., 2022)
- What is it about a neighborhood that influences child development?
- **Explore an important neighborhood input: social capital**
- The importance of social capital in the creation of human capital (Coleman, 1988)

What is social capital?

"features of social life – networks, norms and trust – that enable a community to act together and pursue shared objectives effectively."

- Robert D. Putnam

What is social capital?

"features of social life – networks, norms and trust – that enable a community to act together and pursue shared objectives effectively."

- Robert D. Putnam

- A community's ability to work together for the well-being of the children

What is social capital?

"features of social life – networks, norms and trust – that enable a community to act together and pursue shared objectives effectively."

- Robert D. Putnam

- A community's ability to work together for the well-being of the children
- Use a list of markers that reflect neighborhood connectedness and neighbors' engagement in supporting and monitoring children ▶ markers

This project

- How do we measure social capital?
 - A novel dataset: the Project on Human Development in Chicago Neighborhoods

This project

- How do we measure social capital?
 - A novel dataset: the Project on Human Development in Chicago Neighborhoods
- What is the causal effect of social capital on child development?
 - Exploit a natural experiment: public housing demolitions in Chicago

This project

- How do we measure social capital?
 - A novel dataset: the Project on Human Development in Chicago Neighborhoods
- What is the causal effect of social capital on child development?
 - Exploit a natural experiment: public housing demolitions in Chicago
- How does the impact of social capital compare to that of parental investments?
 - Social capital has a positive impacts on both cognitive and socio-emotional skills
 - Its effect size on cognitive skills is about one-third that of parental investments

Literature I

- **Neighborhood effects on child outcomes:** Damm and Dustmann (2014), Chetty et al. (2016), Altonji and Mansfield (2018), Chetty and Hendren (2018), Chyn (2018), Agostinelli et al. (2020), Deutscher (2020), List et al. (2020), Laliberté (2021), Chyn et al. (2022)
 - Identify an important neighborhood input that affects child development

Literature I

- **Neighborhood effects on child outcomes:** Damm and Dustmann (2014), Chetty et al. (2016), Altonji and Mansfield (2018), Chetty and Hendren (2018), Chyn (2018), Agostinelli et al. (2020), Deutscher (2020), List et al. (2020), Laliberté (2021), Chyn et al. (2022)
 - Identify an important neighborhood input that affects child development
- **Child development:** Todd and Wolpin (2007), Cunha et al. (2010), Del Boca et al. (2014), Andrew et al. (2019), Attanasio et al. (2020a), Attanasio et al. (2020b), Attanasio et al. (2020c), Carneiro et al. (2022), Agostinelli and Wiswall (2023)
 - Study the roles of social capital and parental investments within a unified framework

Literature II

- **Social capital and social interaction:** Coleman (1988), Putnam (1995), Knack and Keefer (1997), Paxton (1999), Putnam (2000), Durlauf and Fafchamps (2003), Guiso et al. (2004), Tabellini (2010), Carrell et al. (2011), Beaman (2012), Nannicini et al. (2013), Putnam (2016), List et al. (2020), Barrios Fernández et al. (2021), Chetty et al. (2022), Cattán et al. (2023), Durante et al. (2023)
 - Quantify social capital using a neighborhood survey
 - Identify its causal effect on child development

Literature II

- **Social capital and social interaction:** Coleman (1988), Putnam (1995), Knack and Keefer (1997), Paxton (1999), Putnam (2000), Durlauf and Fafchamps (2003), Guiso et al. (2004), Tabellini (2010), Carrell et al. (2011), Beaman (2012), Nannicini et al. (2013), Putnam (2016), List et al. (2020), Barrios Fernández et al. (2021), Chetty et al. (2022), Cattán et al. (2023), Durante et al. (2023)
 - Quantify social capital using a neighborhood survey
 - Identify its causal effect on child development
- **Public housing:** Currie and Yelowitz (2000), Oreopoulos (2003), Jacob (2004), Chyn (2018)
 - Focus on children who were **not** displaced
 - Study the effects of public housing demolition on social capital

Outline

Data

The Human Capital Accumulation Process

Results

Conclusion

Data

Primary data: Project on Human Development in Chicago Neighborhoods (PHDCN)

- 343 neighborhood clusters (around 8000 people each NC)

Primary data: Project on Human Development in Chicago Neighborhoods (PHDCN)

- 343 neighborhood clusters (around 8000 people each NC)
- Longitudinal Cohort Study [▶ sampling](#)
 - 7 cohorts (age 0, 3, 6, 9, 12, 15, 18) and their primary caregivers were interviewed and followed in 80 of the 343 NCs

Primary data: Project on Human Development in Chicago Neighborhoods (PHDCN)

- 343 neighborhood clusters (around 8000 people each NC)
- Longitudinal Cohort Study [▶ sampling](#)
 - 7 cohorts (age 0, 3, 6, 9, 12, 15, 18) and their primary caregivers were interviewed and followed in 80 of the 343 NCs
 - Information on child development measures and parental investments [▶ skills](#) [▶ investments](#)

Primary data: Project on Human Development in Chicago Neighborhoods (PHDCN)

- 343 neighborhood clusters (around 8000 people each NC)
- Longitudinal Cohort Study [▶ sampling](#)
 - 7 cohorts (age 0, 3, 6, 9, 12, 15, 18) and their primary caregivers were interviewed and followed in 80 of the 343 NCs
 - Information on child development measures and parental investments [▶ skills](#) [▶ investments](#)
 - Three waves: 1994-1996, 1997-1999, and 2000-2001
 - Focus on 6, 9, 12, and 15 cohorts in the first two waves

Primary data: Project on Human Development in Chicago Neighborhoods (PHDCN)

- 343 neighborhood clusters (around 8000 people each NC)
- Longitudinal Cohort Study ▶ sampling
 - 7 cohorts (age 0, 3, 6, 9, 12, 15, 18) and their primary caregivers were interviewed and followed in 80 of the 343 NCs
 - Information on child development measures and parental investments ▶ skills ▶ investments
 - Three waves: 1994-1996, 1997-1999, and 2000-2001
 - Focus on 6, 9, 12, and 15 cohorts in the first two waves
- Community Survey ▶ sampling
 - Adults were randomly selected for interview in wave 1 in all NCs

Primary data: Project on Human Development in Chicago Neighborhoods (PHDCN)

- 343 neighborhood clusters (around 8000 people each NC)
- Longitudinal Cohort Study [▶ sampling](#)
 - 7 cohorts (age 0, 3, 6, 9, 12, 15, 18) and their primary caregivers were interviewed and followed in 80 of the 343 NCs
 - Information on child development measures and parental investments [▶ skills](#) [▶ investments](#)
 - Three waves: 1994-1996, 1997-1999, and 2000-2001
 - Focus on 6, 9, 12, and 15 cohorts in the first two waves
- Community Survey [▶ sampling](#)
 - Adults were randomly selected for interview in wave 1 in all NCs
 - Information on the neighborhood environment
 - Basic demographic information of respondents

[▶ summary statistics](#)

Markers for social capital

- Neighbors do something about kids skipping school
- Neighbors do something about kids defacing buildings
- Neighbors scold a kid for not showing respect
- Parents know their children's friends
- Parents generally know each other
- Adults know who local children are
- Adults watch out for children
- Children look up to adults in the neighborhood

The Human Capital Accumulation Process

Objective

- Estimate the skill production function

$$\theta_{ir,t+1}^c = f(\theta_{ir,t}^c, \theta_{ir,t}^s, l_{ir,t}, SC_{ir,t}, \mathbf{X}_{ir,t}, \epsilon_{ir,t}),$$

$$\theta_{ir,t+1}^s = g(\theta_{ir,t}^c, \theta_{ir,t}^s, l_{ir,t}, SC_{ir,t}, \mathbf{X}_{ir,t}, \eta_{ir,t}),$$

- where i , r , and t represent individuals, neighborhoods, and time periods, respectively.
- $\theta_{ir,t}^c$ and $\theta_{ir,t}^s$ are cognitive and socio-emotional skills, respectively
- $l_{ir,t}$ are parental investments
- $SC_{ir,t}$ is social capital
- $\mathbf{X}_{ir,t}$ is a vector of demographic variables
- $\epsilon_{ir,t}$ and $\eta_{ir,t}$ are shocks to the production function, unobserved by researchers

Main challenges: (1) Measurement

- Skills, parental investments, and social capital are unobservable

Main challenges: (1) Measurement

- Skills, parental investments, and social capital are unobservable
- Using imperfect proxies can introduce estimation bias

Main challenges: (1) Measurement

- Skills, parental investments, and social capital are unobservable
- Using imperfect proxies can introduce estimation bias
- Model skills, parental investments, and social capital as latent factors
 - Develop and estimate a measurement system that links the observed markers to latent factors (Cunha et al., 2010)

Main challenges: (1) Measurement

- Skills, parental investments, and social capital are unobservable
- Using imperfect proxies can introduce estimation bias
- Model skills, parental investments, and social capital as latent factors
 - Develop and estimate a measurement system that links the observed markers to latent factors (Cunha et al., 2010)
 - Account for measurement errors
 - Summarize efficiently the information contained in multiple markers

Main challenges: (1) Measurement

- Skills, parental investments, and social capital are unobservable
- Using imperfect proxies can introduce estimation bias
- Model skills, parental investments, and social capital as latent factors
 - Develop and estimate a measurement system that links the observed markers to latent factors (Cunha et al., 2010)
 - Account for measurement errors
 - Summarize efficiently the information contained in multiple markers
- Rich variation within a neighborhood
 - Immigration status shows the highest correlations with social capital level, conditional on neighborhood fixed effects

Main challenges: (1) Measurement

- Skills, parental investments, and social capital are unobservable
- Using imperfect proxies can introduce estimation bias
- Model skills, parental investments, and social capital as latent factors
 - Develop and estimate a measurement system that links the observed markers to latent factors (Cunha et al., 2010)
 - Account for measurement errors
 - Summarize efficiently the information contained in multiple markers
- Rich variation within a neighborhood
 - Immigration status shows the highest correlations with social capital level, conditional on neighborhood fixed effects
 - Construct a U.S.-born and immigrant-specific social capital measure to precisely estimate its effects

Main challenges: (2) Endogeneity

- Parents' investment decisions and residential choices can respond to unobserved shocks to child development
 - Illness, negative influences from current neighborhoods

Main challenges: (2) Endogeneity

- Parents' investment decisions and residential choices can respond to unobserved shocks to child development
 - Illness, negative influences from current neighborhoods
- More generally, social capital can be correlated to (unobserved) neighborhood characteristics that affect child development due to sorting
 - Average education attainments, average income

Main challenges: (2) Endogeneity

- Parents' investment decisions and residential choices can respond to unobserved shocks to child development
 - Illness, negative influences from current neighborhoods
- More generally, social capital can be correlated to (unobserved) neighborhood characteristics that affect child development due to sorting
 - Average education attainments, average income
- Requires exogenous variation in social capital and parental investments
 - Public housing demolition in Chicago
 - Household resources and female labor market shocks

Why demolition?

- Demolition of public housing in Chicago began during the 1990s

Why demolition?

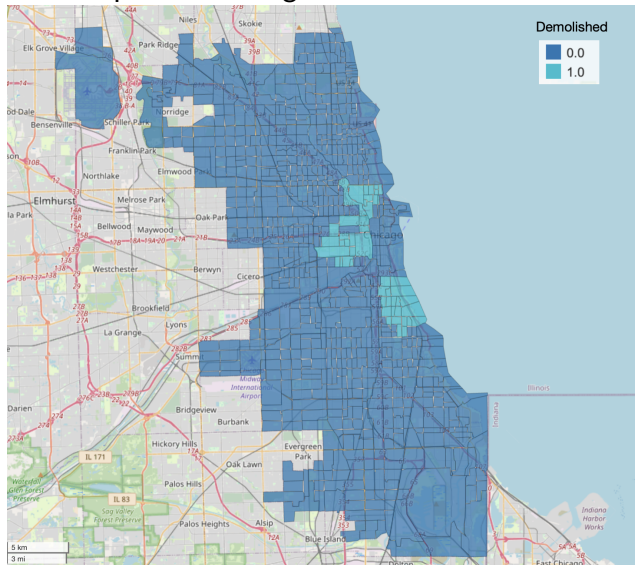
- Demolition of public housing in Chicago began during the 1990s
- Responded to serious housing management problems and physical decline
 - Common issues of public housing at that time (U.S. National Commission On Severely Distressed Public Housing, 1992)

Why demolition?

- Demolition of public housing in Chicago began during the 1990s
- Responded to serious housing management problems and physical decline
 - Common issues of public housing at that time (U.S. National Commission On Severely Distressed Public Housing, 1992)
- The timing of demolitions was often driven by unforeseen events or logistical challenges
 - Heating system breakdowns, pipe bursts, and a class-action lawsuit against the Chicago Housing Authority for neglect and mismanagement

Demolition

728 public housing units were demolished



What happened to the demolished neighborhoods?

- The redevelopment process was slow
 - 38 percent of the demolished sites remained vacant in 2010 (Almagro et al., 2023)

What happened to the demolished neighborhoods?

- The redevelopment process was slow
 - 38 percent of the demolished sites remained vacant in 2010 (Almagro et al., 2023)
- Previous social ties and networks were disrupted
- The norms, trust, and support systems that regulate the behaviors of community members were weakened

What happened to the demolished neighborhoods?

- The redevelopment process was slow
 - 38 percent of the demolished sites remained vacant in 2010 (Almagro et al., 2023)
- Previous social ties and networks were disrupted
- The norms, trust, and support systems that regulate the behaviors of community members were weakened

"They watched one another's children, shopped together, shared food, stepped up when a family lost a loved one or was in need."

- Ben Austen

High-Risers: Cabrini-Green and the Fate of American Public Housing

IV for social capital: public housing demolition

- Focus on children who were not displaced
- Treatment group:
 - neighborhoods with public housing demolished
 - neighborhoods adjacent to a demolished building (within 1 km)

IV for social capital: public housing demolition

- Focus on children who were not displaced
- Treatment group:
 - neighborhoods with public housing demolished
 - neighborhoods adjacent to a demolished building (within 1 km)
- Control group: neighborhoods with public housing
 - Demolition decision primarily stemmed from the physical conditions and management problems of the buildings to be demolished

IV for social capital: public housing demolition

- Focus on children who were not displaced
- Treatment group:
 - neighborhoods with public housing demolished
 - neighborhoods adjacent to a demolished building (within 1 km)
- Control group: neighborhoods with public housing
 - Demolition decision primarily stemmed from the physical conditions and management problems of the buildings to be demolished
- Alternative control group (robustness check): neighborhoods with public housing to be demolished in later years
 - Exploit the randomness in the timing of demolitions across neighborhoods

IV for social capital: public housing demolition

- Exclusion restriction assumption:
 - Demolition affected children in the treatment group only through social capital (and parental investments)
- Robustness checks:
 - Demolition did not change education rating, school type, school resources, or peer quality
 - The results are robust to the inclusion of post-demolition criminal activity

▶ balance table

▶ school ▶ crime ▶ peer

IV for parental investments: household resources & labor market shocks

- Parents' investment decisions depend on their budget constraints

IV for parental investments: household resources & labor market shocks

- Parents' investment decisions depend on their budget constraints
- Household resources (Cunha et al. 2010; Agostinelli and Wiswall, 2016; Attanasio et al. 2020)

IV for parental investments: household resources & labor market shocks

- Parents' investment decisions depend on their budget constraints
- Household resources (Cunha et al. 2010; Agostinelli and Wiswall, 2016; Attanasio et al. 2020)
 - More household resources, as proxied by household income should result in higher investments

IV for parental investments: household resources & labor market shocks

- Parents' investment decisions depend on their budget constraints
- Household resources (Cunha et al. 2010; Agostinelli and Wiswall, 2016; Attanasio et al. 2020)
 - More household resources, as proxied by household income should result in higher investments
- Labor market shocks

IV for parental investments: household resources & labor market shocks

- Parents' investment decisions depend on their budget constraints
- Household resources (Cunha et al. 2010; Agostinelli and Wiswall, 2016; Attanasio et al. 2020)
 - More household resources, as proxied by household income should result in higher investments
- Labor market shocks
 - Percentage change in female employment by educational attainments

IV for parental investments: household resources & labor market shocks

- Parents' investment decisions depend on their budget constraints
- Household resources (Cunha et al. 2010; Agostinelli and Wiswall, 2016; Attanasio et al. 2020)
 - More household resources, as proxied by household income should result in higher investments
- Labor market shocks
 - Percentage change in female employment by educational attainments
 - A positive employment shock could induce mothers to work more and reduce time and efforts in investing in the kids, conditional on household incomes

▶ more

Empirical specification

$$\ln \theta_{ir,t+1}^p = \delta_0^p + \delta_1^p \ln \theta_{ir,t}^c + \delta_2^p \ln \theta_{ir,t}^s + \delta_3^p \ln I_{ir,t} + \delta_4^p \ln SC_{ir,t} + \mathbf{X}_{ir,t} \boldsymbol{\Gamma}_1^p + \epsilon_{ir,t}^p, \\ p \in \{c, s\}.$$

- i, r, t represent individuals, neighborhoods, and time periods, respectively
- $\theta_{ir,t}^c$ and $\theta_{ir,t}^s$ are cognitive skills and socio-emotional skills, respectively

Empirical specification

$$\ln \theta_{ir,t+1}^p = \delta_0^p + \delta_1^p \ln \theta_{ir,t}^c + \delta_2^p \ln \theta_{ir,t}^s + \delta_3^p \ln l_{ir,t} + \delta_4^p \ln SC_{ir,t} + \mathbf{X}_{ir,t} \boldsymbol{\Gamma}_1^p + \epsilon_{ir,t}^p, \\ p \in \{c, s\}.$$

- i, r, t represent individuals, neighborhoods, and time periods, respectively
- $\theta_{ir,t}^c$ and $\theta_{ir,t}^s$ are cognitive skills and socio-emotional skills, respectively
- $l_{ir,t}$ are parental investments
 - Instrumented by household resources and female employment growth

Empirical specification

$$\ln \theta_{ir,t+1}^p = \delta_0^p + \delta_1^p \ln \theta_{ir,t}^c + \delta_2^p \ln \theta_{ir,t}^s + \delta_3^p \ln l_{ir,t} + \delta_4^p \ln SC_{ir,t} + \mathbf{X}_{ir,t} \boldsymbol{\Gamma}_1^p + \epsilon_{ir,t}^p, \\ p \in \{c, s\}.$$

- i, r, t represent individuals, neighborhoods, and time periods, respectively
- $\theta_{ir,t}^c$ and $\theta_{ir,t}^s$ are cognitive skills and socio-emotional skills, respectively
- $l_{ir,t}$ are parental investments
 - Instrumented by household resources and female employment growth
- $SC_{ir,t}$ is social capital
 - Instrumented by demolition (dummy variable)

Empirical specification

$$\ln \theta_{ir,t+1}^p = \delta_0^p + \delta_1^p \ln \theta_{ir,t}^c + \delta_2^p \ln \theta_{ir,t}^s + \delta_3^p \ln l_{ir,t} + \delta_4^p \ln SC_{ir,t} + \mathbf{X}_{ir,t} \boldsymbol{\Gamma}_1^p + \epsilon_{ir,t}^p, \\ p \in \{c, s\}.$$

- i, r, t represent individuals, neighborhoods, and time periods, respectively
- $\theta_{ir,t}^c$ and $\theta_{ir,t}^s$ are cognitive skills and socio-emotional skills, respectively
- $l_{ir,t}$ are parental investments
 - Instrumented by household resources and female employment growth
- $SC_{ir,t}$ is social capital
 - Instrumented by demolition (dummy variable)
- $\mathbf{X}_{ir,t}$ is a vector of pre-demolition household and neighborhood characteristics: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, and the unemployment rate
- $\epsilon_{ir,t}$ is a shock to the production functions

Results

First stage: the impacts of demolition on social capital

Table: Estimates of the Investment Functions

	Social capital	Parental investments
Demolition	-1.172 [-1.633, -0.694]	0.048 [-0.07, 0.158]
Household resources	0.013 [-0.008, 0.035]	0.066 [0.046, 0.087]
Employment growth	0.383 [-5.209, 6.481]	-8.039 [-11.729, -4.192]
Rank test (p-value)		0.003
Test of joint significance: F-statistic (p-value)		
Demolition, resources, employment	26.010 (0.001)	44.329 (0.000)
Observations	1418	1412

Notes: Ninety percent confidence intervals are presented in brackets. Both the confidence intervals and the p-values are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. The rank test assesses the null hypothesis that the smallest eigenvalue of the 2×2 matrix $\beta' \beta$ is zero, where β is the 3×2 matrix of coefficients on demolition, household resources, and employment growth in the social capital and parental investments equations.

Fixed-effects estimates: the impacts of demolition on child skills

Table: Fixed-Effects Estimates

	Cognitive skills	Socio-emotional skills
Treatment * Post	-0.251*** (0.075)	-0.219*** (0.057)
Observations	3356	2930

Notes: Asymptotic standard errors, clustered at the neighborhood level, are reported in parentheses. Observations are at the individual $\times$ time period level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Production function estimates

Table: Production functions Estimates

	Cognitive skills w2		Socio-emotional skills w2	
	OLS	IV	OLS	IV
Social capital	0.01 [-0.022, 0.045]	0.109 [0.026, 0.208]	0.043 [0.012, 0.077]	0.214 [0.117, 0.359]
Parental investments	-0.005 [-0.046, 0.031]	0.319 [0.152, 0.504]	0.026 [-0.004, 0.053]	-0.016 [-0.199, 0.181]
Cognitive, w1	0.805 [0.504, 1.237]	0.607 [0.477, 0.734]	0.139 [0.056, 0.245]	0.111 [0.041, 0.189]
Socio-emo., w1	0.118 [0.032, 0.188]	0.12 [0.052, 0.189]	0.822 [0.696, 0.947]	0.852 [0.728, 0.974]
Observations	1415	1308	1298	1191

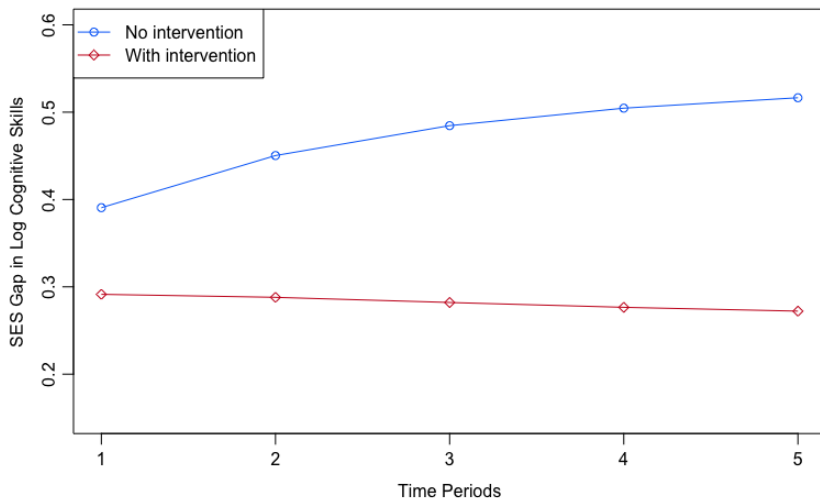
Notes: Ninety percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, and the unemployment rate. [► magnitude](#) [► estimation](#) [► first stage](#) [► reduced form](#)

Robustness check (1): restrict the sample to neighborhoods with demolitions only

	Cognitive skills w2		Socio-emotional skills w2	
	OLS	IV	OLS	IV
Social capital	0.061 [0.007, 0.118]	0.154 [0.002, 0.333]	0.148 [0.05, 0.264]	0.294 [0.136, 0.552]
Parental investments	0.025 [-0.009, 0.059]	0.288 [0.103, 0.521]	0.047 [0.001, 0.091]	-0.127 [-0.32, 0.057]
Cognitive, w1	0.547 [0.355, 0.817]	0.577 [0.443, 0.7]	0.12 [0.031, 0.223]	0.13 [0.042, 0.234]
Socio-emo., w1	0.204 [0.11, 0.306]	0.202 [0.112, 0.301]	0.794 [0.6, 1.03]	0.861 [0.68, 1.075]
Observations	362	337	356	332

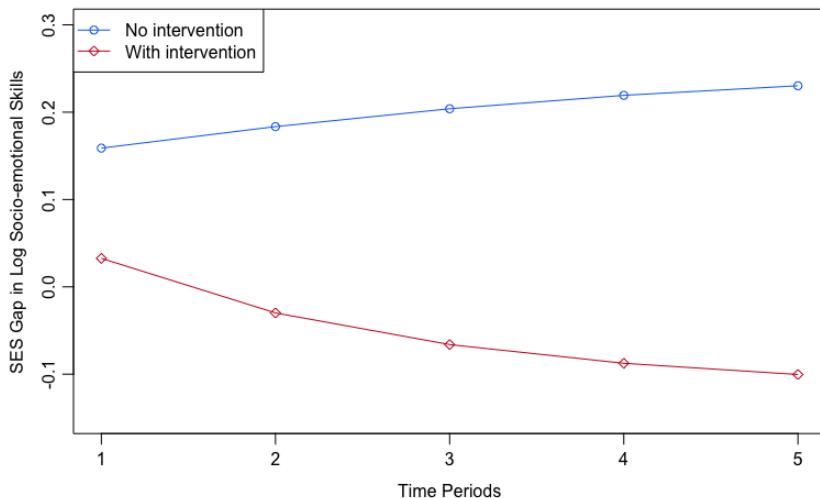
Notes: Ninety percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All four models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, and the unemployment rate.

Counterfactual experiment (1): foster social capital



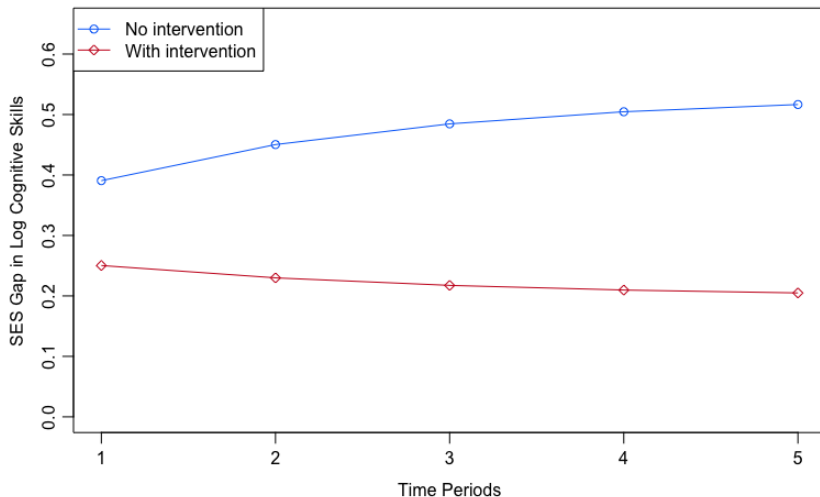
Note: This graph illustrates the gap in log cognitive skills between children from low-SES neighborhoods and those from high-SES neighborhoods. The intervention assigns the social capital level of high-SES neighborhoods to children in low-SES neighborhoods. The production function is assumed to have the same parameters over time. [▶ more](#)

Counterfactual experiment (1): foster social capital



Note: This graph illustrates the gap in log socio-emotional skills between children from low-SES neighborhoods and those from high-SES neighborhoods. The intervention assigns the social capital level of high-SES neighborhoods to children in low-SES neighborhoods. The production function is assumed to have the same parameters over time. [▶ more](#)

Counterfactual experiment (2): improve parental investments



Note: This graph illustrates the gap in log cognitive skills between children from low-SES neighborhoods and those from high-SES neighborhoods. The intervention assigns the level of parental investments in children from high-SES neighborhoods to children in low-SES neighborhoods. The production function is assumed to have the same parameters over time. [▶ more](#)

Conclusion

Conclusion

- This project

Conclusion

- This project
 - Construct a group-level social capital measure using a community survey in Chicago

Conclusion

- This project
 - Construct a group-level social capital measure using a community survey in Chicago
 - Identify an important neighborhood input - social capital through a natural experiment

Conclusion

- This project
 - Construct a group-level social capital measure using a community survey in Chicago
 - Identify an important neighborhood input - social capital through a natural experiment
 - Study the effects of social capital and parental investments within a unified framework

Conclusion

- This project
 - Construct a group-level social capital measure using a community survey in Chicago
 - Identify an important neighborhood input - social capital through a natural experiment
 - Study the effects of social capital and parental investments within a unified framework
- Key results
 - Social capital has positive impacts on both cognitive skills and social-emotional skills
 - Parental investments are effective in improving cognitive skills

Conclusion

- This project
 - Construct a group-level social capital measure using a community survey in Chicago
 - Identify an important neighborhood input - social capital through a natural experiment
 - Study the effects of social capital and parental investments within a unified framework
- Key results
 - Social capital has positive impacts on both cognitive skills and social-emotional skills
 - Parental investments are effective in improving cognitive skills
- Implications: Initiatives aimed at building social capital in disadvantaged communities can be crucial in reducing inequality

Appendix

Summary statistics

Table: Summary statistics in the Longitudinal Cohort Study

Variable	Obs	Mean	Std. Dev.
Child Characteristics			
Age	5930	8.319	5.757
Female	6187	0.502	0.5
Hispanic	6200	0.465	0.499
Black	6200	0.343	0.475
Other races	6226	0.195	0.397
Household Characteristics			
Number of siblings	6083	1.96	1.632
Income per capita (\$1,000)	5741	5.975	5.301
PC is cohabiting	5522	0.68	0.467
Number of years PC at current address	5461	5.3	6.323
Mom with higher education	6226	0.395	0.489
Dad with higher education	6226	0.305	0.461
U.S.-born family	5302	0.457	0.498

Notes: "PC" stands for "primary caregivers". "Higher education" refers to at least some college education. The statistics are computed using the entire sample from the Longitudinal Cohort Study.

Table: Respondent Characteristics in the Community Survey

Variable	Obs	Mean	Std. Dev.
Age	7956	42.584	16.636
Female	7634	0.59	0.492
Hispanic	7634	0.251	0.434
Black	7634	0.394	0.489
Other races	7634	0.355	0.479
Native	8622	0.845	0.362
Married	7634	0.374	0.484
Years of Education	7634	12.314	3.118
Annual Household Income			
Below \$15,000	7634	0.321	0.467
Below \$30,000	7634	0.621	0.485
Below \$60,000	7634	0.885	0.319

Notes: The Community Survey records annual household income in discrete categories. This table presents the distribution of respondents' income across three groups: below \$15,000, below \$30,000, and below \$60,000.

Sampling design of PHDCN

- Three-stage sampling design for Longitudinal Cohort Study
 - (1) Stratified random sampling 80 NCs
 - (2) Random sampling block groups within a NC
 - (3) Interviewed eligible households (with children at the target ages)
- Three-stage sampling design for Community Survey (covering all NCs)
 - (1) City blocks were sampled within each NC
 - (2) Dwelling units were sampled within blocks
 - (3) One adult resident was sampled within each selected dwelling unit

► data

Measures for child skills

- Cognitive skill is measured by
 - Reading test scores from the Wide Range Achievement Test (WRAT)
 - Word definition scores from the Wechsler Intelligence Scale for Children (WISC)
 - Attention duration
 - Amount of interview questions the child understood
- Socio-emotional skill is measured by
 - Child Behavior Checklist
 - Several sub-scales: anxious, depressed, somatic complaints, social problems, thought problems, rule-breaking behavior, aggressive behavior

Measures for parental investments

- Material investments
 - Number of books, board games, or CDs appropriate for the child's age
 - Whether the child has a dictionary, encyclopedia, or equipment/clothes for sports/activities
- Time investments
 - Frequency the primary caregiver (PC) encourages the child to read
 - Frequency the PC praises the child for accomplishments
 - Frequency the PC helps the child with homework

► data

Measurement

Measurement system

- Let m_{jki} denote the j th available marker relating to latent factor k for individual i

Measurement system

- Let m_{jki} denote the j th available marker relating to latent factor k for individual i
- For factors with continuous markers,

$$m_{jki} = \alpha_{jk} + \lambda_{jk} \ln \theta_{ki} + \epsilon_{jki}.$$

Measurement system

- Let m_{jki} denote the j th available marker relating to latent factor k for individual i
- For factors with continuous markers,

$$m_{jki} = \alpha_{jk} + \lambda_{jk} \ln \theta_{ki} + \epsilon_{jki}.$$

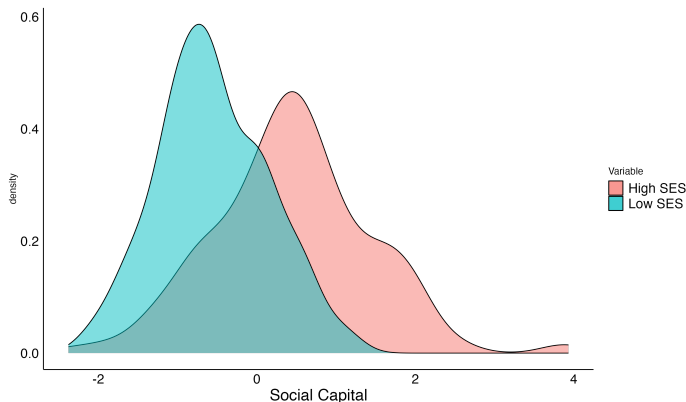
- For factors with categorical markers,

$$m_{jki}^* = \alpha_{jk} + \lambda_{jk} \ln \theta_{ki} + \epsilon_{jki},$$
$$m_{jki} = \begin{cases} 1 & \text{if } m_{jki}^* < \tau_{1,jk}, \\ 2 & \text{if } m_{jki}^* \in [\tau_{1,jk}, \tau_{2,jk}], \\ \dots & \\ n & \text{if } m_{jki}^* > \tau_{n-1,jk}, \end{cases}$$

where $\tau_{n,jk}$ is the n th threshold, and ϵ_{jki} is the measurement error.

Characterization of social capital

Figure: Distribution of social capital by neighborhood SES



Notes: This figure displays the distribution of neighborhood-level social capital by neighborhood socioeconomic status, using the average factor scores for all respondents within each neighborhood.

Correlation with neighborhood characteristics

Variables	Social capital
Average age	0.045*** (0.008)
Female share	0.462 (0.329)
White share	0.655*** (0.177)
U.S.-born share	1.054*** (0.382)
Married share	1.103*** (0.349)
Average years of education	-0.018 (0.047)
Average household income (\$5,000)	0.104*** (0.028)
Observations	343

Notes: This table presents the coefficient estimates from a multivariate regression of neighborhood-level social capital on the neighborhood characteristics listed above, with robust standard errors shown in parentheses. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

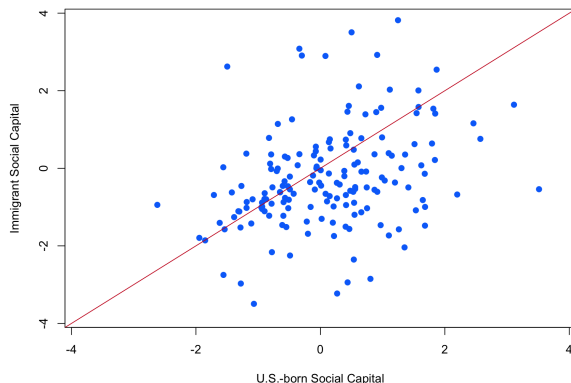
Correlation with individual characteristics

Variables	Social capital
Above median age	0.069** (0.028)
Female	0.002 (0.026)
White	-0.017 (0.036)
U.S.-born	0.117*** (0.041)
Married	0.058** (0.027)
HS graduate	0.008 (0.033)
High income	0.078*** (0.029)
Neighborhood fixed effects	Yes
Observations	5,490

Notes: This table presents the coefficient estimates from a multivariate regression of individual-level social capital on the individual characteristics listed above, controlling for neighborhood fixed effects. The robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

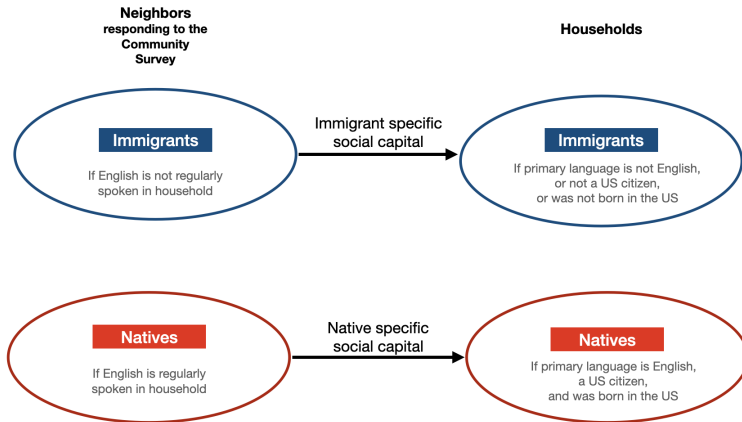
Within-neighborhood comparison

- Access to social capital is different for immigrants and natives (Volker et al. 2008; Behtoui, 2022)



Notes: This figure compares neighborhood-level social capital between immigrants and U.S.-born individuals. Each point represents one neighborhood, with values calculated using the average factor scores of immigrant and U.S.-born respondents in that neighborhood.

Assignment process



Notes: This figure illustrates the process of assigning a social capital measure to households based on their immigration status after obtaining the factor scores of respondents in the Community Survey.

Model assumptions

- Measurement errors are mean zero, independent of each other, and independent of the latent factors
- Measurement errors follow a normal distribution
- Latent factors follow a log-normal distribution

► Measurement

Normalization assumptions

- Set the scale and location of the latent factors

Normalization assumptions

- Set the scale and location of the latent factors
- Fix the scale of the latent factors to be equal to one of the markers
 - set the factor loading of m_{1k} to be one, $\lambda_{1k} = 1$ for factor k

Normalization assumptions

- Set the scale and location of the latent factors
- Fix the scale of the latent factors to be equal to one of the markers
 - set the factor loading of m_{1ki} to be one, $\lambda_{1k} = 1$ for factor k
- Set the location of the latent factors
 - Set the mean to be zero for social capital and parental investments

Normalization assumptions

- Set the scale and location of the latent factors
- Fix the scale of the latent factors to be equal to one of the markers
 - set the factor loading of m_{1ki} to be one, $\lambda_{1k} = 1$ for factor k
- Set the location of the latent factors
 - Set the mean to be zero for social capital and parental investments
 - Allow skills to change over time (Agostinelli and Wiswall, 2016)

Normalization assumptions

- Set the scale and location of the latent factors
- Fix the scale of the latent factors to be equal to one of the markers
 - set the factor loading of m_{1ki} to be one, $\lambda_{1k} = 1$ for factor k
- Set the location of the latent factors
 - Set the mean to be zero for social capital and parental investments
 - Allow skills to change over time (Agostinelli and Wiswall, 2016)
 - Constraint the intercepts to be equal for the same measurement at different periods

Normalization assumptions

- Set the scale and location of the latent factors
- Fix the scale of the latent factors to be equal to one of the markers
 - set the factor loading of m_{1ki} to be one, $\lambda_{1k} = 1$ for factor k
- Set the location of the latent factors
 - Set the mean to be zero for social capital and parental investments
 - Allow skills to change over time (Agostinelli and Wiswall, 2016)
 - Constraint the intercepts to be equal for the same measurement at different periods
- Additional assumptions for categorical markers
 - Normalize all the intercepts to be zero for categorical items
 - Normalize the variance of the latent items m_{jki}^* to be one

Three-step estimation procedure

- Step one: estimate the measurement systems
 - recover the distribution of latent factors and measurement errors, intercepts, thresholds, and factor loadings based on the observed covariance and mean of markers

Three-step estimation procedure

- Step one: estimate the measurement systems
 - recover the distribution of latent factors and measurement errors, intercepts, thresholds, and factor loadings based on the observed covariance and mean of markers
- Step two: estimate the factor scores using the maximum likelihood estimator

Three-step estimation procedure

- Step one: estimate the measurement systems
 - recover the distribution of latent factors and measurement errors, intercepts, thresholds, and factor loadings based on the observed covariance and mean of markers
- Step two: estimate the factor scores using the maximum likelihood estimator
- Step three: implement a bias-correction procedure (Heckman et al., 2013)
 - Apply the procedure to the reduced form and the first stage
 - Recover the structural parameters with a minimum distance estimator

Three-step estimation procedure

- Step one: estimate the measurement systems
 - recover the distribution of latent factors and measurement errors, intercepts, thresholds, and factor loadings based on the observed covariance and mean of markers
- Step two: estimate the factor scores using the maximum likelihood estimator
- Step three: implement a bias-correction procedure (Heckman et al., 2013)
 - Apply the procedure to the reduced form and the first stage
 - Recover the structural parameters with a minimum distance estimator
- Bootstrap 1000 samples with clusters at the neighborhood level and repeat the three steps 1000 times

► Measurement

► Empirical specification

► Production function

► Investment function

Magnitude interpretation (1): Correlation Between Social Capital and Neighborhood Characteristics

Variables	Social capital
Average age	0.045*** (0.008)
Female share	0.462 (0.329)
White share	0.655*** (0.177)
U.S.-born share	1.054*** (0.382)
Married share	1.103*** (0.349)
Average years of education	-0.018 (0.047)
Average household income (\$5,000)	0.104*** (0.028)
Observations	343

Notes: This table presents the coefficient estimates from a multivariate regression of neighborhood-level social capital on the neighborhood characteristics listed above, with robust standard errors shown in parentheses. Significance levels are indicated as follows:

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ [▶ intro](#) [▶ results](#)

Magnitude interpretation (2)

- The scale of the social capital latent factor is normalized to be the same as one of the measures:
 - "the likelihood that neighbors would do something about kid skipping school"
- Based on the measurement system estimates, a 1.25 SD increase in social capital on average shifts the likelihood from "likely" to "very likely"
- A 0.7 SD increase in parental investments is equivalent to increasing the frequency that primary caregivers encourage the child to read from less than once a month to about once a month
- Further improving the frequency to a few times a month is equivalent to a 1.55 SD increase

Measurement system estimates

Table: Factor loading estimates

Marker	Social capital
Neighbors do something about kids skipping school	1.000
Neighbors do something about kids defacing bldg	0.973
Neighbors scold a child for not showing respect	0.877
Children look up to adults in the neighborhood	0.728
Adults watch out for children	0.911
Parents know their children's friends	0.908
Adults know who local children are	0.909
Parents generally know each other	0.930

Notes: This table presents the estimated factor loadings for all social capital markers. The marker "neighbors do something about kids skipping school" is normalized to a factor loading of one.

Measurement system estimates

Table: Signal-to-noise ratio

Latent factor	Marker	Ratio
Social capital	Neighbors do something about kids skipping school	0.598
	Neighbors do something about kids defacing bldg	0.566
	Neighbors scold a kid for not showing respect	0.461
	Children look up to adults in the neighborhood	0.317
	Adults watch out for children	0.497
	Parents know their children's friends	0.493
	Adults know who local children are	0.495
	Parents generally know each other	0.517

Notes: This table shows the fraction of the variance in each marker that is explained by the variance in signal.

Measurement invariance

- Social capital items should have the same relationship with the latent factor to use the immigrant status-specific measure above

Table: Comparison of models' fit for measurement invariance

	df	χ^2	RMSEA	CFI	RMSR
Baseline model	40	4285.205	0.157	0.946	0.085
Threshold invariance	56	4322.539	0.133	0.945	0.087
Threshold and loading invariance	63	4368.153	0.126	0.945	0.088
Threshold, loading, and intercept invariance	70	4603.012	0.123	0.942	0.093

Relative Fit to the Baseline model				
	p-value ($\Delta\chi^2$)	Δ RMSEA	Δ CFI	Δ RMSR
Threshold invariance	0	-0.024	-0.001	0.002
Threshold and loading invariance	0	-0.031	-0.001	0.003
Threshold, loading, and intercept invariance	0	-0.034	-0.004	0.008

Notes: RMSEA stands for the root mean squared error of approximation, CFI for the comparative fit index, and RMSR for the root mean square residual.

- Thresholds for rejecting measurement invariance: $\Delta RMSEA > 0.015$, $\Delta CFI < -0.010$, and $\Delta RMSR > 0.010$ (Chen, 2007)
- Tests based on $\Delta\chi^2$ are known to display high Type I error rates (Sass, Schmitt, and Marsh, 2014)

What happened to residents that were displaced?

- Two options were provided
 - (1) Use the Section 8 voucher to rent housing in private markets
 - (2) Transfer to a different public housing unit
- Average moving distance from the original residence is 4.4 - 8.4 km (Thomas Kingsley et al., 2003; Jacob, 2004)

► neighborhoods

Balance table

Variable	Control group (1)	Control group (2)	Treatment group	Difference (1) [p value]	Difference (2) [p value]
Child characteristics					
Cognitive, wave 1	-0.036 (0.993)	-0.156 (0.969)	-0.062 (0.914)	-0.026 [0.837]	0.094 [0.495]
Socio-emotional, wave 1	-0.007 (0.999)	-0.043 (1.008)	0.072 (0.831)	0.079 [0.497]	0.115 [0.363]
Age	11.437 (4.211)	11.265 (4.244)	11.827 (3.964)	0.390 [0.257]	0.562 [0.136]
Female	0.494 (0.500)	0.491 (0.500)	0.526 (0.501)	0.032 [0.455]	0.035 [0.457]
Hispanic	0.524 (0.500)	0.523 (0.500)	0.442 (0.498)	-0.082 [0.749]	-0.082 [0.771]
Black	0.297 (0.457)	0.371 (0.483)	0.474 (0.501)	0.177 [0.479]	0.103 [0.706]
Other races	0.182 (0.386)	0.106 (0.308)	0.084 (0.279)	-0.097 [0.129]	-0.021 [0.787]

Notes: Columns 1, 2, and 3 display means and standard deviations in parentheses for control group 1, control group 2, and the treatment group, respectively. Columns 4 and 5 present p-values for the test of equality of means, derived by regressing each characteristic on a treatment dummy variable and clustering standard errors by neighborhood. All characteristics are from wave 1.

Balance table (cont.)

Variable	Control group (1)	Control group (2)	Treatment group	Difference (1) [p value]	Difference (2) [p value]
Household characteristics					
Number of siblings	2.168 (1.662)	2.313 (1.731)	2.289 (1.634)	0.121 [0.475]	-0.024 [0.894]
Income per capita (\$1,000)	5.815 (5.041)	4.753 (4.397)	4.627 (4.833)	-1.188 [0.257]	-0.126 [0.910]
PC is cohabiting	0.690 (0.462)	0.655 (0.476)	0.538 (0.500)	-0.153 [0.212]	-0.118 [0.366]
Number of years PC at current address	5.698 (6.304)	6.314 (7.316)	7.999 (10.572)	2.301 [0.128]	1.684 [0.295]
Mom with higher education	0.363 (0.481)	0.314 (0.465)	0.312 (0.465)	-0.051 [0.569]	-0.003 [0.978]
Dad with higher education	0.264 (0.441)	0.200 (0.400)	0.214 (0.412)	-0.050 [0.446]	0.015 [0.834]
Immigrant family	0.594 (0.491)	0.511 (0.500)	0.518 (0.502)	-0.076 [0.738]	0.007 [0.978]
F test statistic of joint significance [p value]				0.34 [0.986]	0.62 [0.817]
Observations	2,903	776	154	3,057	930

Notes: Columns 1, 2, and 3 display means and standard deviations in parentheses for control group 1, control group 2, and the treatment group, respectively. Columns 4 and 5 present p-values for the test of equality of means, derived by regressing each characteristic on a treatment dummy variable and clustering standard errors by neighborhood. The F test statistic and the p-value for the joint significance test are derived by regressing the treatment variable on all baseline characteristics and clustering standard errors by neighborhood. All characteristics are from wave 1. 'PC' stands for the primary caregiver. 'Higher education' refers to at least some college.

First stage: the impacts of demolition on social capital

Table: Estimates of the Investment Functions

	Social capital	Parental investments
Demolition	-1.172 [-1.633, -0.694]	0.048 [-0.07, 0.158]
Household resources	0.013 [-0.008, 0.035]	0.066 [0.046, 0.087]
Employment growth	0.383 [-5.209, 6.481]	-8.039 [-11.729, -4.192]
Rank test (p-value)		0.003
Test of joint significance: F-statistic (p-value)		
Demolition, resources, employment	26.010 (0.001)	44.329 (0.000)
Observations	1454	1282

Notes: Ninety percent confidence intervals are presented in brackets. Both the confidence intervals and the p-values are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. The rank test assesses the null hypothesis that the smallest eigenvalue of the 2×2 matrix $\beta' \beta$ is zero, where β is the 3×2 matrix of coefficients on demolition, household resources, and employment growth in the social capital and parental investments equations.

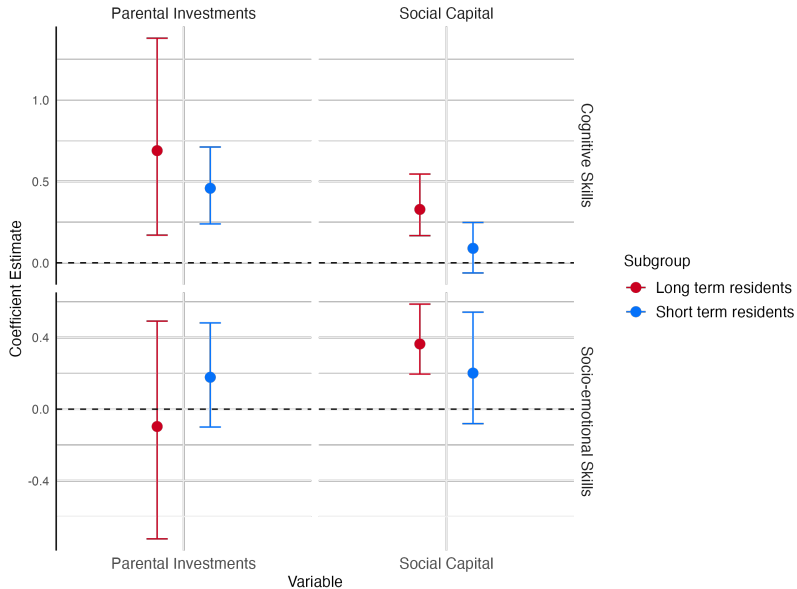
Reduced form: the impacts of demolition on child skills

Table: Reduced Form Estimates

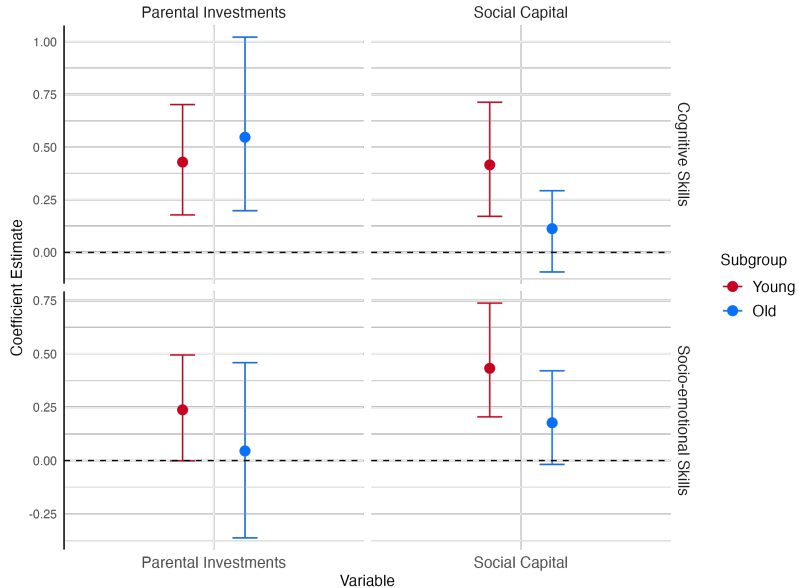
	Cognitive skills	Socio-emotional skills
Demolition	-0.098 [-0.166, -0.027]	-0.233 [-0.299, -0.165]
Household resources	0.019 [-0.002, 0.037]	-0.001 [-0.016, 0.014]
Employment growth	-0.093 [-2.699, 2.643]	0.756 [-3.376, 4.925]
Cognitive, w1	0.756 [0.489, 1.096]	0.128 [0.054, 0.23]
Socio-emo., w1	0.123 [0.05, 0.193]	0.846 [0.719, 0.981]
Observations	1482	1333

Notes: Ninety percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, and the unemployment rate. [► Production function](#)

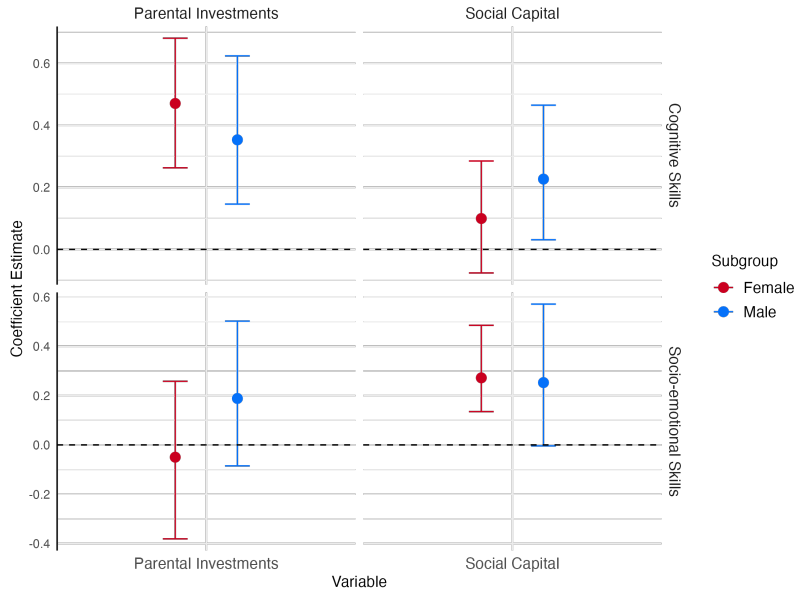
Results by years lived in the neighborhood



Results by age

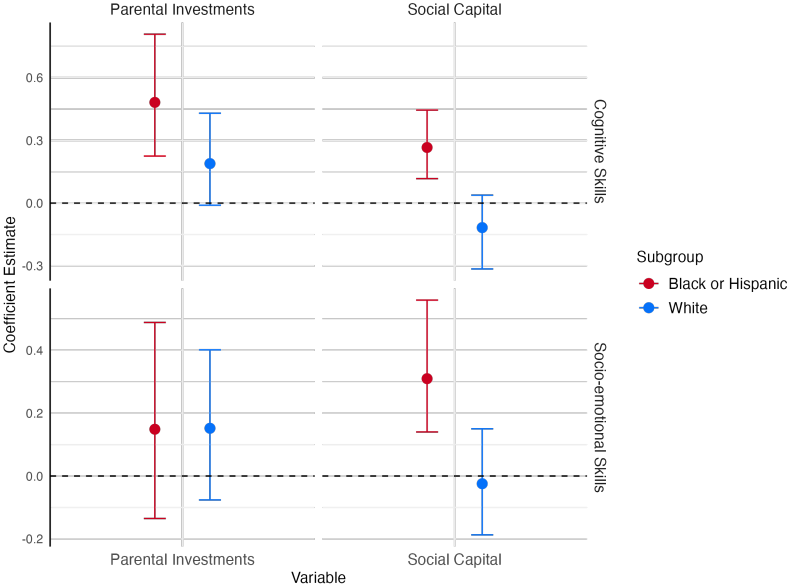


Results by gender

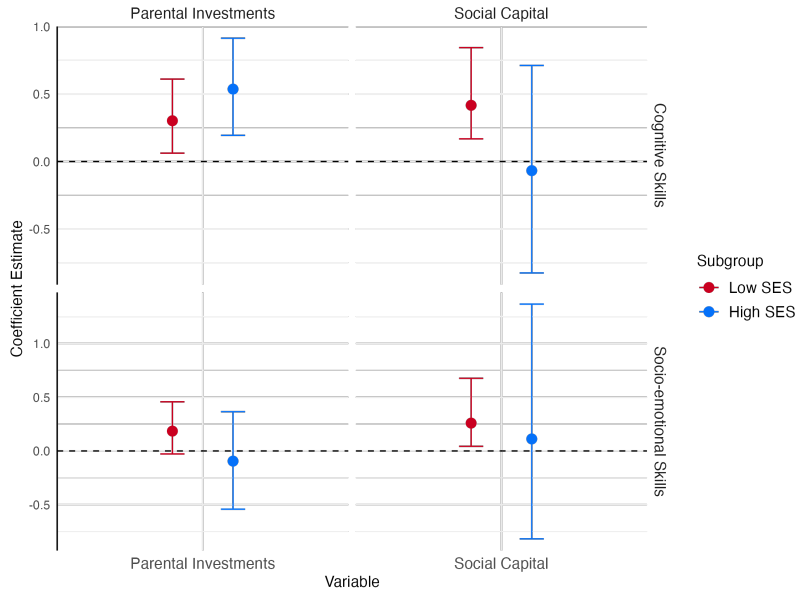


► More

Results by race



Results by neighborhood SES



Robustness check

- Restrict the sample to neighborhoods with demolitions only
- Restrict the sample to non-moving residents
- Investigate if demolition changed the school environment or peer quality
- Examine if estimates are robust to controlling for post-treatment peer loss
- Examine if estimates are robust to controlling for post-treatment criminal activities

► More

Robustness check (1): restrict the sample to neighborhoods with demolitions only

	Cognitive skills w2		Socio-emotional skills w2	
	OLS	IV	OLS	IV
Social capital	0.061 [0.007, 0.118]	0.154 [0.002, 0.333]	0.148 [0.05, 0.264]	0.294 [0.136, 0.552]
Parental investments	0.025 [-0.009, 0.059]	0.288 [0.103, 0.521]	0.047 [0.001, 0.091]	-0.127 [-0.32, 0.057]
Cognitive, w1	0.547 [0.355, 0.817]	0.577 [0.443, 0.7]	0.12 [0.031, 0.223]	0.13 [0.042, 0.234]
Socio-emo., w1	0.204 [0.11, 0.306]	0.202 [0.112, 0.301]	0.794 [0.6, 1.03]	0.861 [0.68, 1.075]
Observations	362	337	356	332

Notes: Ninety percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All four models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, and the unemployment rate.

Robustness check (2): restrict the sample to non-moving residents

	Cognitive skills w2		Socio-emotional skills w2	
	OLS	IV	OLS	IV
Social capital	0.025 [-0.019, 0.068]	0.123 [0.009, 0.269]	0.038 [0.001, 0.074]	0.182 [0.092, 0.349]
Parental investments	-0.029 [-0.076, 0.011]	0.343 [0.128, 0.595]	0.031 [-0.002, 0.064]	0.083 [-0.168, 0.382]
Cognitive, w1	0.874 [0.524, 1.337]	0.612 [0.468, 0.757]	0.138 [0.031, 0.285]	0.099 [0.009, 0.209]
Socio-emo., w1	0.145 [0.055, 0.232]	0.136 [0.05, 0.221]	0.845 [0.707, 0.991]	0.861 [0.716, 1.007]
Observations	1061	978	956	873

Notes: Ninety percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All four models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, and the unemployment rate.

Robustness check (3): did demolition change the school environment?

- In waves 1 and 2 of the household survey
 - Primary caregivers rated the education their children received
 - Provided information on the types of schools their children attended

Robustness check (3): did demolition change the school environment?

- In waves 1 and 2 of the household survey
 - Primary caregivers rated the education their children received
 - Provided information on the types of schools their children attended
- Collect school information from the National Center for Education Statistics for 1993-1997
 - Pupil-teacher ratio as a proxy for school resources
 - Low-income student share as a measure of student quality

► More

FE specification

$$Y_{k,t} = \gamma_0 + \gamma_1 \textit{Treated}_k \cdot \textit{Post}_t + \lambda_k + \psi_t + \epsilon_{k,t} \quad (1)$$

- where k is schools/individuals and t is time
- $\textit{Treated}_k = 1$ if unit k is in the treatment group, 0 otherwise
- $\textit{Post}_t = 1$ for time periods since treatment begins, 0 otherwise
- λ_k is school/individual fixed effects, and ψ_t is time fixed effects
- $\epsilon_{k,t}$ is an error term

Robustness check (3): did demolition change the school environment?

	(1)	(2)	(3)	(4)
Dependent variables:	Education rating	Public school	Pupil-teacher ratio	Low-income share
$\text{Treated}_k \cdot \text{Post}_t$	-0.075 (0.242)	-0.038 (0.028)	-0.015 (0.017)	-0.062 (0.066)
Observations	3,114	3,238	1,753	1,567

Notes: This table presents the fixed effect estimates of demolition on four outcomes: education rating, school type, pupil-teacher ratio, and share of low-income students. Observations are at the school/individual * year level. All dependent variables, except "public school", are standardized to have a mean of zero and a standard deviation of one. Public school is a dummy variable. Asymptotic standard errors, reported in brackets, are robust to clustering at the neighborhood level. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Robustness check (4): friend loss effects

- Peer quality proxied by (low-income share) remained unchanged
- Non-displaced children may lose friends

Robustness check (4): friend loss effects

- Peer quality proxied by (low-income share) remained unchanged
- Non-displaced children may lose friends
- No direct friendship/school data
 - Neighborhood school racial composition (NCES data)
 - Assigned same-race friend share based on homophily principle

Robustness check (4): friend loss effects

- Peer quality proxied by (low-income share) remained unchanged
- Non-displaced children may lose friends
- No direct friendship/school data
 - Neighborhood school racial composition (NCES data)
 - Assigned same-race friend share based on homophily principle
- Controlling for pre- and post-demolition friend shares show robust estimates

Robustness check (4): friend loss effects

Table: Production Functions Estimates (controlling for peer loss)

	Cognitive skills w2	Socio-emotional skills w2
Social capital	0.16 [0.057, 0.318]	0.304 [0.158, 0.555]
Parental investments	0.219 [0.051, 0.411]	0.018 [-0.2, 0.266]
Cognitive, w1	0.632 [0.508, 0.752]	0.128 [0.048, 0.224]
Socio-emo., w1	0.16 [0.087, 0.236]	0.782 [0.655, 0.917]
Observations	1031	947

Notes: Ninety-five percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All four models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, the homicide rate, racial composition, unemployment rate, and the neighborhood's same-race peer composition before and after demolition.

Robustness check (5): did demolition affect criminal activities?

- Due to data limitation, existing studies focus on the impacts of demolition on crime after 1999

Robustness check (5): did demolition affect criminal activities?

- Due to data limitation, existing studies focus on the impacts of demolition on crime after 1999
- Negative effects of demolition on criminal activities, with the largest changes in violent crime (Aliprantis and Hartley, 2015; Sandler, 2017)

Robustness check (5): did demolition affect criminal activities?

- Due to data limitation, existing studies focus on the impacts of demolition on crime after 1999
- Negative effects of demolition on criminal activities, with the largest changes in violent crime (Aliprantis and Hartley, 2015; Sandler, 2017)
- The demolition post-1999 (about 16,000 units) is of a much larger scale than demolition studied in this project (about 700 units)

Robustness check (5): did demolition affect criminal activities?

- Due to data limitation, existing studies focus on the impacts of demolition on crime after 1999
- Negative effects of demolition on criminal activities, with the largest changes in violent crime (Aliprantis and Hartley, 2015; Sandler, 2017)
- The demolition post-1999 (about 16,000 units) is of a much larger scale than demolition studied in this project (about 700 units)
- Controlling for homicide in 1996 does not change our conclusions

[▶ back](#)

Robustness check (5): crime effects

Table: Production Functions Estimates (control for post-treatment crime)

	Cognitive skills w2	Socio-emotional skills w2
Social capital	0.123 [0.032, 0.25]	0.219 [0.116, 0.376]
Parental investments	0.306 [0.137, 0.487]	-0.021 [-0.217, 0.172]
Cognitive, w1	0.61 [0.479, 0.737]	0.114 [0.047, 0.194]
Socio-emo., w1	0.122 [0.054, 0.189]	0.854 [0.727, 0.985]
Observations	1308	1191

Notes: Ninety-five percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All four models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, racial composition, unemployment rate, and the homicide rate before and after demolition.

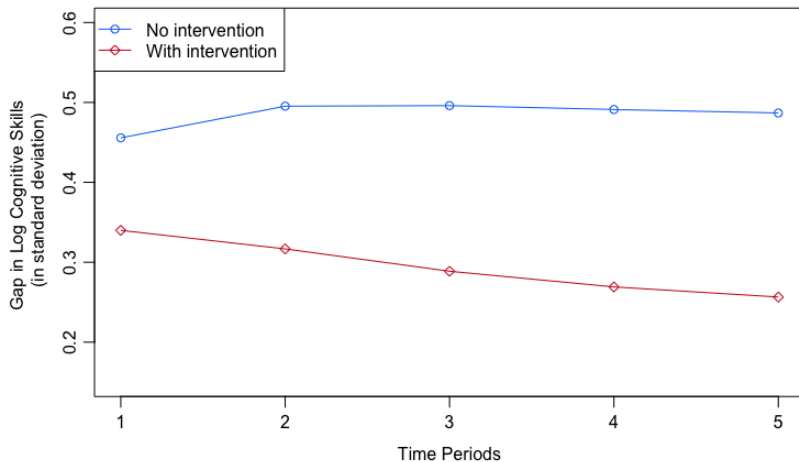
Robustness check (6): excluding those interviewed after 1998

Table: Production Functions Estimates

	Cognitive skills w2	Socio-emotional skills w2
Social capital	0.102 [0.043,0.177]	0.155 [0.074,0.257]
Parental investments	0.294 [0.135,0.462]	-0.048 [-0.227,0.131]
Cognitive, w1	0.596 [0.471,0.707]	0.115 [0.05,0.19]
Socio-emo., w1	0.108 [0.043,0.169]	0.827 [0.707,0.955]
Observations	979	864

Notes: Ninety-five percent confidence intervals are presented in brackets. Confidence intervals are computed by 1,000 bootstrap replications of the entire estimation process, taking into account clustering at the neighborhood level. All four models include the same set of control variables: the child's age, parental educational attainments, the number of siblings, the neighborhood's average household income, the share of high school graduates, racial composition, unemployment rate, and the indicators for demolition in 1996 and 1997. Households interviewed after 1998 are excluded. [▶ back](#)

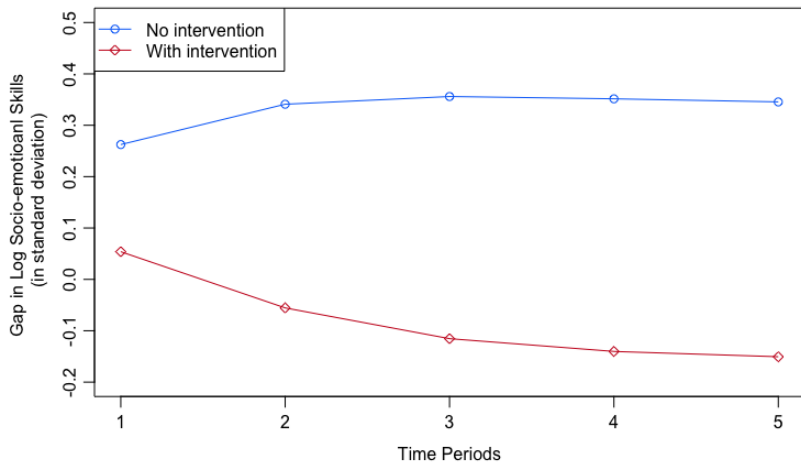
Counterfactual experiment (1): foster social capital



Note: This graph illustrates the gap in log cognitive skills between children from low-SES neighborhoods and those from high-SES neighborhoods. The intervention assigns the social capital level of high-SES neighborhoods to children in low-SES neighborhoods. The production function is assumed to have the same parameters over time.

[▶ go back](#)

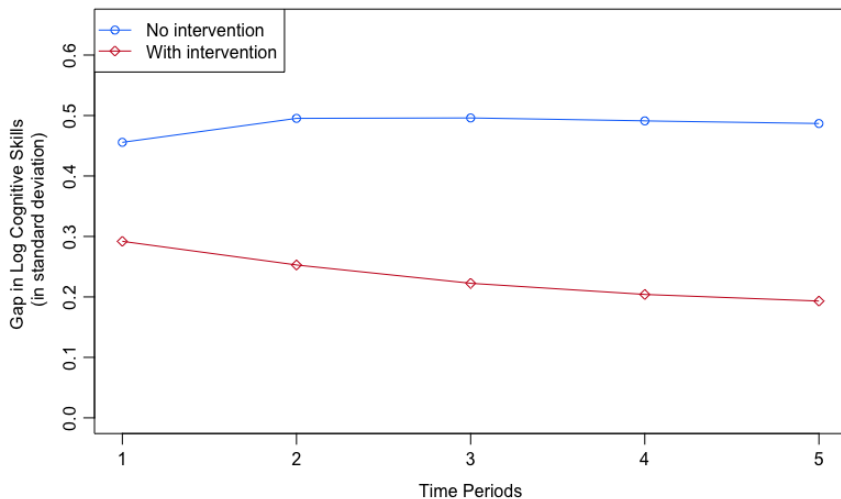
Counterfactual experiment (1): foster social capital



Note: This graph illustrates the gap in log socio-emotional skills between children from low-SES neighborhoods and those from high-SES neighborhoods. The intervention assigns the social capital level of high-SES neighborhoods to children in low-SES neighborhoods. The production function is assumed to have the same parameters over time.

[▶ go back](#)

Counterfactual experiment (2): improve parental investments



Note: This graph illustrates the gap in log cognitive skills between children from low-SES neighborhoods and those from high-SES neighborhoods. The intervention assigns the parental investment level of children from high-SES neighborhoods to children in low-SES neighborhoods. The production function is assumed to have the same parameters over time.

[▶ go back](#)