

A Free Day Care Policy: Effects Through Less Time at Home and More Time in Day Care

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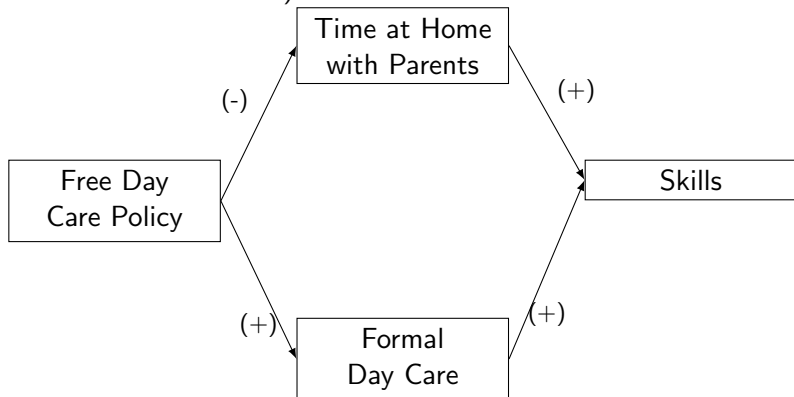
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Outline

- 1 Research Question and Importance
- 2 Data
- 3 Estimation
- 4 Results
- 5 Conclusion

Research Question

- Importance of female labor market participation and of child skills
- Explore how the impact of a free day care program on skills is *causally mediated* by a decrease in time at home with parents (only observe hours data on mothers)



Optimal Policy Design

If maternal time is more important:

- Design policies to involve parents
- Target to parents that will likely switch from informal care to formal care, like single mothers

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Data

Infant Health and Development Program (IHDP)

- A randomized controlled trial
- Designed to study the development of premature, low birth-weight children
- Treatment group received home visits from ages 0–3, and center-based childcare from ages 1–3

Variables of Interest

- **Dependent variables**

- SB and PPVT scores at age 3: standardized to have a mean of 100 and standard deviation of 15

- **Independent variables**

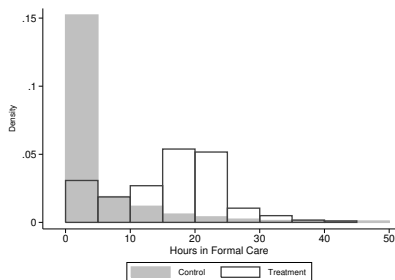
- *Center-Based Day Care*: average hours per week in formal care, accumulated across first 3 years of life
- *Parental Time at Home*: additive inverse of accumulated hours of maternal **Work** per week

- **Policy**

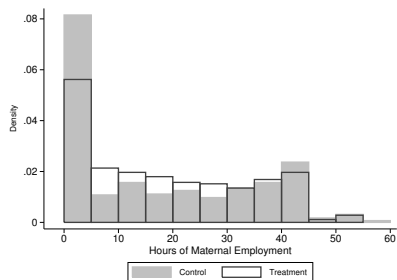
- Randomization of the IHDP program

Distribution of Inputs

Figure 1: Distribution of Inputs



(a) Average Hours in Formal Care



(b) Average Hours of Maternal Employment

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Production Function Model

Following Bernal and Keane (2011), we assume the following model for the skills at age 3:

$$S_i = \alpha_D D_i + \alpha_H H_i + X_i' \gamma + \epsilon_i$$

- X_i : a vector of control variables
- ϵ_i : unobserved components

Instrumental Variable Method

- The unobserved ϵ_i may include unobservables as “concern” of parents about child
- Could link less developed children with more inputs
- OLS estimates would not be consistent
- Use Instrumental Variable estimation: exogenous variation in inputs

We use the following three variables as our instruments:

- 1 Randomization into treatment
- 2 Average number of childcare centers at the zip-code level
- 3 Local unemployment rate of the neighborhood around every household

Decomposing the Effects of Each Input

- We intend to measure:
 - The effect of the policy on each input
 - The (total) effect of the policy on skills
 - The effect of the policy through each input
- We use the following decomposition (causal mediation).

$$\underbrace{\Delta S_i}_{\text{Total Treatment Effect}} = \underbrace{\alpha_D \Delta D_i}_{\text{Effect through } D_i} + \underbrace{\alpha_H \Delta H_i}_{\text{Effect through } H_i} + \text{Residual}_i \quad (1)$$

where Δ is an operator taking the mean difference between the treatment and the control group, conditional on controls X_i .

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Base Results and Sensitivity of our estimates

- Following tables show base results along with our exploration of the sensitivity of our estimates.
- **Column 1** Base specification controlling for individual, maternal, household, and local-economic variables.
- **Column 2** Account for quality of the time children spend with their mothers using the Home Observation for Measurement of the Environment (HOME).
- **Column 3** Low-IQ mothers (below sample median IQ)
- **Column 4** High-IQ mothers (above sample median IQ)
- **Column 5** Single mothers

First Stage Results

Table 1: Childcare First Stage

	(1) Base	(2) Quality Adjusted	(3) Low IQ	(4) High IQ	(5) Single Mothers
Treatment group	12.6397*** (0.0000)	12.7161*** (0.0000)	12.8236*** (0.0000)	12.2492*** (0.0000)	13.0261*** (0.0000)
Childcare establishments in zip code	0.0876 (0.2100)	0.0833 (0.2260)	0.0078 (0.9460)	0.1772* (0.0890)	0.0653 (0.3830)
% Population unemployed in tract	-0.2594* (0.0760)	-0.2254 (0.1240)	-0.2439 (0.2140)	-0.2487 (0.3180)	0.0418 (0.8570)

Table 2: Maternal Employment First Stage

	(1) Base	(2) Quality Adjusted	(3) Low IQ	(4) High IQ	(5) Single Mothers
Treatment group	2.2736** (0.0330)	1.8696** (0.0210)	3.2858** (0.0180)	1.0303 (0.5230)	2.056 (0.1260)
Childcare establishments in zip code	0.3939*** (0.0020)	0.2721*** (0.0010)	0.4382*** (0.0100)	0.3641** (0.0460)	0.3276** (0.0240)
% Population unemployed in tract	-0.5537** (0.0320)	-0.4017** (0.0410)	-0.7117* (0.0550)	-0.2157 (0.5770)	-0.4304 (0.2030)

Second Stage

Table 3: Second Stage

	(1) Base	(2) Quality Adjusted	(3) Low IQ	(4) High IQ	(5) Single Mothers
Childcare	0.7841*** (0.0020)	0.8037*** (0.0010)	0.7379*** (0.0000)	0.7211** (0.0340)	0.7926*** (0.0050)
Hours/week worked by mother	-0.8294** (0.0310)	-1.1668** (0.0310)	-0.2339 (0.3520)	-1.0875 (0.2060)	-0.493 (0.1970)

Main Result: Treatment Effect

Table 4: Decomposition of Total Treatment Effect

	(1) Base	(2) Quality Adjusted	(3) Low IQ	(4) High IQ	(5) Single Mothers
Childcare	9.9704*** (0.0010)	10.2829*** (0.0010)	9.4701*** (0.0000)	8.9942** (0.0350)	10.332*** (0.0040)
Hours/Week Worked by Mother	-2.1218* (0.0770)	-2.4322* (0.0690)	-0.7904 (0.3430)	-1.5968 (0.3880)	-1.0403 (0.2590)
Residual	0.0858 (0.9610)	0.0591 (0.9670)	0.0549 (0.9750)	0.159 (0.9310)	-0.0514 (0.9760)
Total	7.9344*** (0.0000)	7.9098*** (0.0000)	8.7346*** (0.0000)	7.5564*** (0.0000)	9.2402*** (0.0000)

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Conclusion

- A free day care policy has a positive impact in Formal Day Care use and a smaller negative impact in Maternal Time at Home
- Large, positive effects of both formal childcare and maternal care at home on skills, similar magnitudes
- Negative effect of IHDP mediated through reduced hours of maternal care is outweighed by positive effect mediated through additional hours in childcare
- The impact on child skills of an hour of parental time varies greatly with the skill level of the mother
- Apparent differences in findings on the impact of formal care on skills can be explained through relative impacts.