Early Childhood Human Capital Formation at Scale

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1. Motivation

- **Policy problem:** How can developing countries deliver promising early childhood development (ECD) programs at scale?
- ECD is critical for better long run social and economic outcomes (Almond & Currie 2011, Black et al. 2017)
- Efficacy trials of ECD parenting programs in Jamaica and US show notable improvements in employment, earnings, and health (Heckman et al. 2010, Gertler et al. 2021)
- Less is known about how to **scale** these programs, esp in low-income settings with resource-poor governments
- **Key Question:** Can developing countries leverage existing public service delivery platforms to scale ECD interventions?
- cRCT of an early childhood stimulation program implemented at scale in Bangladesh targeting >18,000 children -- Integrated into the flagship National Nutrition Services (NNS) program

2. The Early Childhood Stimulation Program

Designed by Save the Children, integrated into the existing National Nutrition Services (NNS) program

ECD Materials: Child Development Card, Household & Nature Picture Books, and Key Message Picture Book

Counseling of parents/caregivers on stimulation practices

Delivery mechanism: Home visits by NNS health-workers (no additional incentives)

Figure 1:A page from the Child Development Card

3. The National Nutrition Services Program

Flagship government program to address malnutrition:

- Promotion of positive nutrition practices
- Provision of micro-nutrient supplements + de-worming medication
- Growth monitoring sessions + malnutrition screening
- Referral services for maternal and child malnutrition

4. Experimental Design

- **Location:** 3 districts in Barisal, Chittagong, and Sylhet
  - 30 unions with $\geq$ 2 community clinics $\rightarrow$ 78 community clinics
- **Eligibility:** Children aged 3-18 months
- **Sampling:** 33 eligible households from each of the 78 community clinic catchment areas $\rightarrow$ 2,574 households
- **Randomization:** Community clinic-level clustered randomization (treatment vs. ``business as usual'' control)
- **Data Collection:**
  - Baseline: November 2013--January 2014
  - Endline: September--November 2015 (attrition < 4%)

5. Empirical Strategy

ITT analysis: ANCOVA specification. For child i in community clinic catchment area j:

$$Y_{i,j,t+1} = \beta_0 + \beta_1 T_j + \beta_2 Y_{i,j,t} + \beta_3 \mathbf{X_{i,j,t}} + \varepsilon_{i,j,t+1}$$

- $Y_{i,j,t+1}$ = Outcome variable of interest measured at endline
- T_j = Treatment indicator
- $Y_{i,j,t}$ = Outcome variable of interest measured at baseline
- $\mathbf{X_{i,j,t}}$ = Child-level, parent-level, household-level controls

6. Results

Reallocation of service-provider time spent with households

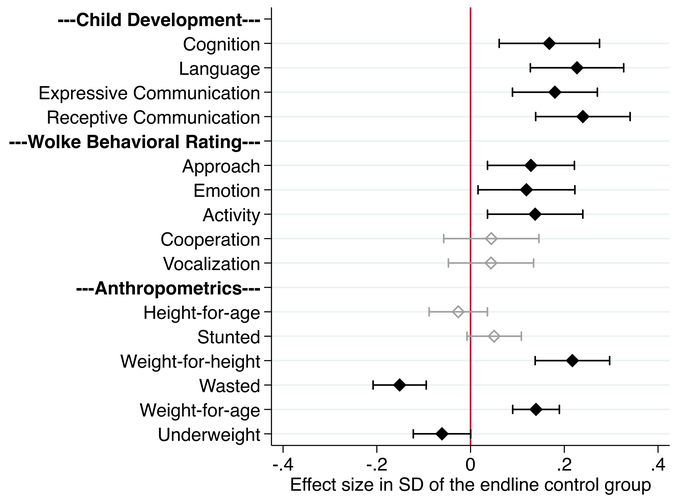
	Number of minutes spent on:							Number of topics:
	(1) ECD	(2) General Nutrition	(3) Child Health	(4) Family Planning	(5) EPI	(6) Pregnant Women	(7) Total	(8) Number of Topics Discussed
Treatment	3.010***	-0.805***	-0.503**	-0.215	-0.506**	-0.268	0.714	0.356**
	(0.271)	(0.209)	(0.215)	(0.369)	(0.212)	(0.335)	(0.544)	(0.138)
Adjusted R^2	0.608	0.156	0.094	-0.090	-0.110	0.309	0.276	0.315
Control Mean	0.038	2.25	1.135	2.827	1.692	3.423	11.365	3.654
Observations	122	122	122	122	122	122	122	122

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses and clustered by community clinic. Units for dependent variables: minutes per household visit in the last working day. Union (strata) fixed effects are included in all regressions.

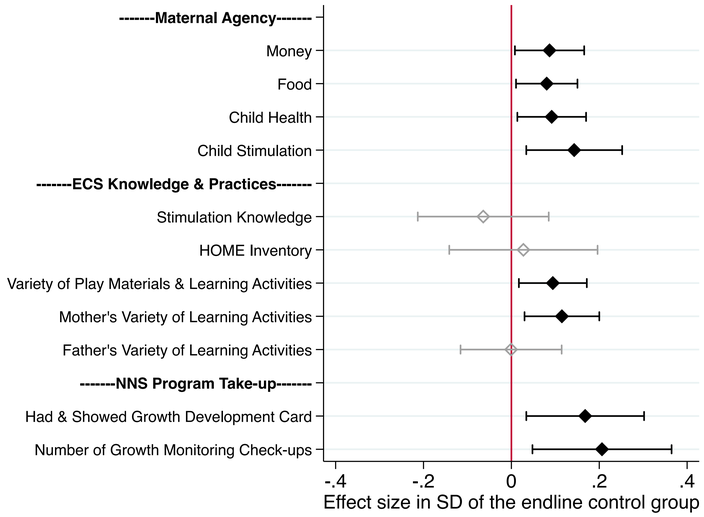
Receipt of Materials by Households

	Mother/Household received				
	(1) Child Development Card	(2) Household Picture Book	(3) Nature Picture Book	(4) Key Message Booklet	(5) Any of the four SC materials
Treatment	0.491***	0.489***	0.484***	0.164***	0.497***
	(0.034)	(0.035)	(0.035)	(0.018)	(0.035)
Adjusted R^2	0.356	0.355	0.349	0.152	0.364
Control Mean	0.024	0.026	0.026	0.011	0.026
Observations	2479	2479	2479	2479	2479

Effects on Child Skills and Anthropometry



7. Mechanisms



8. Cost-benefit Analysis

Cognitive skills:

- Deming (2017): 1 SD $\uparrow$ cognitive skills $\rightarrow$ Wages $\uparrow$ 15.1%
- Program ITT impact: 0.17 SD $\uparrow$ in cognitive composite score

Noncognitive skills:

- Deming (2017): 1 SD $\uparrow$ social skills $\rightarrow$ Wages $\uparrow$ 3.7%
- Program ITT impact: 0.12 SD $\uparrow$ in Wolke index

Assuming additive separability $\rightarrow$ Wages $\uparrow$ 3%

Cost: $6.84 per child targeted

Program IRR: 19.6%

- Head Start: 7.9% (Deming, 2009)
- Perry Preschool Program: 7-10% (Heckman et al. 2010)

9. Policy Implications

- At-scale interventions can be highly cost-effective (IRR: 19.6%)
- Challenges pertaining to compliance and take-up remain

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