The Role of Maternal Cognitive Skills in Children's Health in Madagascar

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Research Objective

What is the effect of young mothers' cognitive skills, measured by Math, French and Life Skills test scores, on children's height for age (HAZ), a long term indicator, in Madagascar

Motivation

▪In Madagascar, 50% of the children under age of 5 are stunted and 35% are severely stunted (DHS, 2009). High poverty (70%) and fertility context (Total fertility 4.5 children per woman).

▪Madagascar: 6th highest rate of stunting in the world. Higher than its income country peers in Sub-Saharan Africa (World Bank, 2010)

▪Empirical evidence has shown that the effectiveness of the largest nutritional program depends on maternal education (Umapathi, 2008)

▪Intergenerational transmission of poverty: Early life nutritional outcomes are critical for later economic adult outcomes.

Literature Review

▪Maternal education is positively associated with children's health in developing countries (Strauss & Thomas, 1995; Behrman, et al. 2009).

▪Channels of impact on children's health: income, health knowledge and intra-household bargaining power.

▪Few studies have analyzed the effect of cognitive skills (i.e., literacy and numeracy) on children's health in developing countries (Glewwe, 1999; Rubacalva et a.l, 2004; Smith-Greenway, 2013)

Empirical Methodology

Reduced form estimation of the demand for child health H_i (Height for Age–HAZ):

$$H_i = g(X_i, X_h, X_c, \varepsilon_i)$$

Where X_i is child characteristics, X_h household characteristics and , X_c community characteristics and ε_i child random error.

▪ X_h includes mother's cognitive skills measured by the standardized total score: sum of the Math, French and Life Skills test scores.

▪OLS models controlling for: i) child's age and gender; ii) mother's years of education, height, spouse education, 2004 socioeconomic status and iii) community characteristics.

▪Estimation using community fixed effects. Probit estimations when the dependent variable is stunting.

▪Endogeneity of Mothers' Cognitive Skills and Child Health is explored using a 2004 School Facility Index as an IV.

Data and Descriptives

▪The Madagascar Life Course Transition of Young Adults Survey 2004/12.

▪1749 young adults (859 women), 21-24 years old in 2012, re-interviewed from 2004 when they were 13-16 years old.

▪Socioeconomic information on young adults, including 2012 Math, French and Life Skills test scores even if they were not in school.

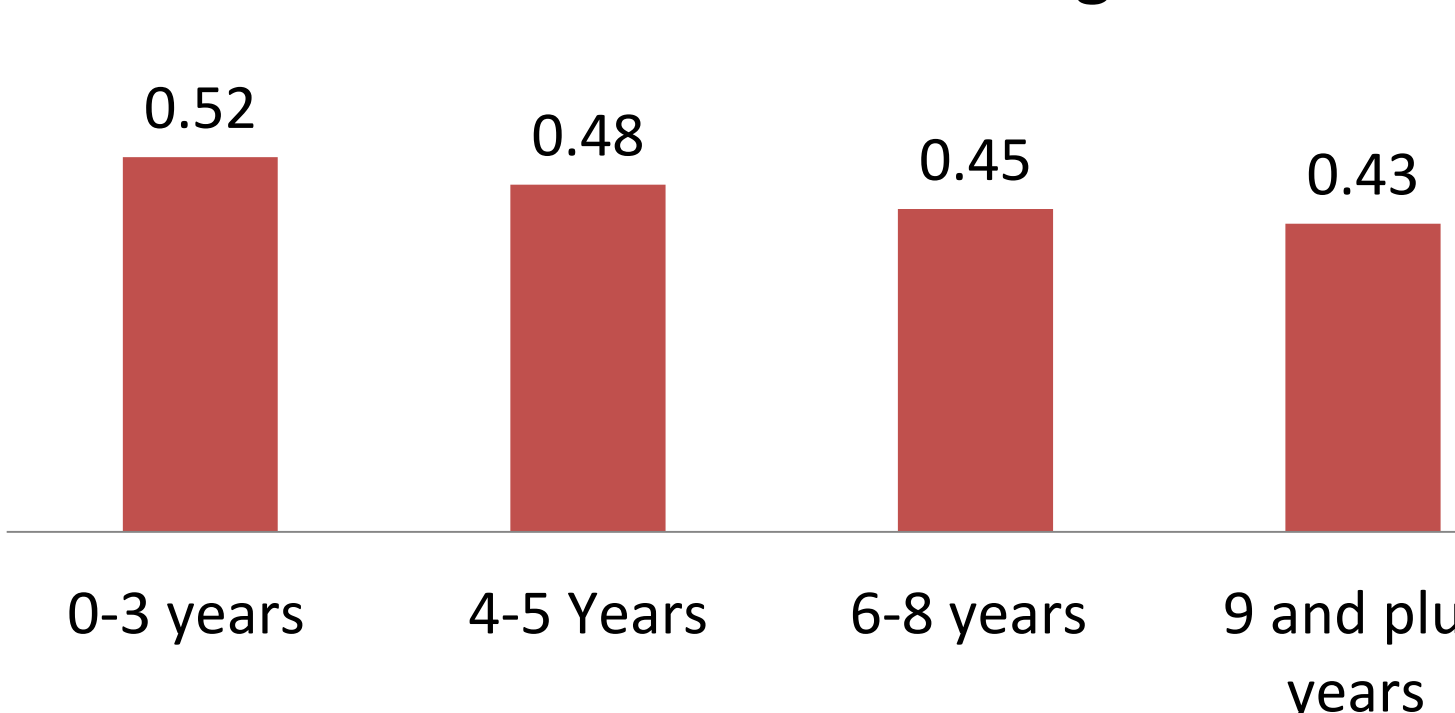▪Sample of young mothers' children including anthropometrics.

Summary Statistics

	N	Mean	Std
Child Characterisitics			
Heigh for Age (HAZ)	500	-1.62	2.39
Age in Months	500	27.00	17.04
Gender	500	0.52	0.50
Stunting (%)	500	0.47	0.50
Mothers Characteristics			
Age in 2012	500	22.10	1.22
Years of Schooling	500	6.08	3.22
Height in cms	495	155.02	6.88
French Score	447	7.55	5.74
Math Score	454	11.27	7.28
Life Skills Score	498	14.13	4.21
Mother's Years of Education	498	3.86	3.34
Father's Years of Education	498	4.56	3.80
Live with spouse ?(Y=1)	500	0.71	0.45
Community Characterisitics			
Urban (Y=1)	500	0.19	0.39
Community Health Center ? (Y=1)	500	0.68	0.47
Electricity ? (Y=1)	500	0.38	0.49
Potable Water (Y=1)	500	0.45	0.50
Access to Paved Roads (Y=1)	500	0.40	0.49

Stunting Prevalence by Terciles of the Mother's Total Score

Tercile	Value
1	0.51
2	0.46
3	0.42
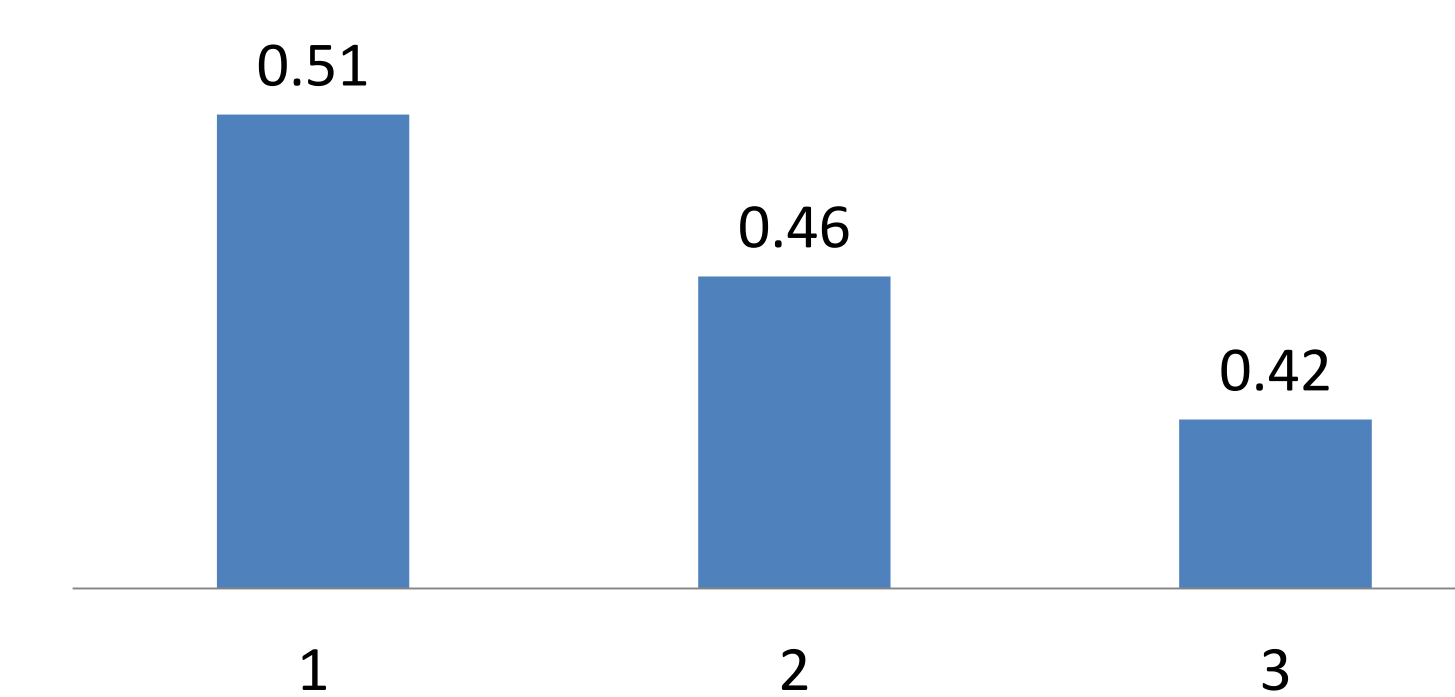
Stunting Prevalence by Mother's Years of Schooling

	Value
0-3 years	0.52
4-5 Years	0.48
6-8 years	0.45
9 and plus years	0.43

Results

OLS regressions of Height for Age on Mother's Cognitive Skills

	(1)	(2)	(3)	(4)	(5)	(6)	Community Fixed Effects
Standardized Mothers' Total Score	0.283** [0.110]	0.298** [0.147]	0.299** [0.151]	0.297** [0.142]	0.314** [0.149]	0.308* [0.160]	0.456** [0.182]
Mother's years of Schooling		-0.00687 [0.0450]	0.0100 [0.0486]			0.00516 [0.0486]	-0.0248 [0.0612]
Ln Mother's Height			5.744** [2.914]	5.868** [2.943]	4.968* [3.001]	4.953 [3.008]	4.792 [3.133]
Child Age Cohort dummies and gender	Y	Y	Y	Y	Y	Y	Y
Cohort Mother's Age dummies	Y	Y	Y	Y	Y	Y	Y
Grand Parents' Education	N	N	Y	Y	Y	Y	Y
2004 Asset and Spouse Education				Y	Y	Y	Y
Community Variables	N	N	N	N	Y	Y	
N	500	500	491	491	491	491	491
R-sq	0.037	0.037	0.047	0.049	0.061	0.061	0.067

Notes: ***, **, *: significant at 1%, 5%, and 10% levels respectively. Robust Standard errors and clustered at the mother level reported in parentheses.

Summary of Findings

▪An increase in 1 std. dev. in the total score increases the child's HAZ by 0.45 std. dev.

▪Using probit models and specification (6), 1 std. dev. in the total score decreases in 14% the child's probability of being stunted.

▪No differentiated effects by child gender or urban area.

▪Similar results using the factor of the 3 tests scores. No differentiated effect by Math, French or Life Skills tests scores.

▪IV estimations using 2004 School Index show similar magnitude to specifications (6) and (7); however, the standard errors are large and the coefficient is not statistically significant.
   ▪ Empirical Challenge: small sample size.

Future Work

▪Create a Health Knowledge and/or Empowerment Index based on Life Skills questions to disentangle their effect on child health from the rest of the cognitive skills.

▪Improve the identification by estimating other IV models using instruments at the individual level: 2004 brothers/siblings education, and parents education.

Conclusions

▪Results suggest that mothers' cognitive skills is more positively associated with children's long term health than their years of schooling.

▪Limitation in identifying channels through which these cognitive skills affect child health (i.e; increase health knowledge/empowerment)

▪Policies should not only increase women's access to education but also increase their cognitive skills.

▪Increasing young women's human capital is a channel to reduce intergenerational transmission of poverty.