

# FROM PARENT TO CHILD

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Association Between Parental Resources and  
Child Development in Peru

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# Overarching Research Question

*How and to what extent are parental resources associated with child development in Peru?*

# Why do research on this topic?

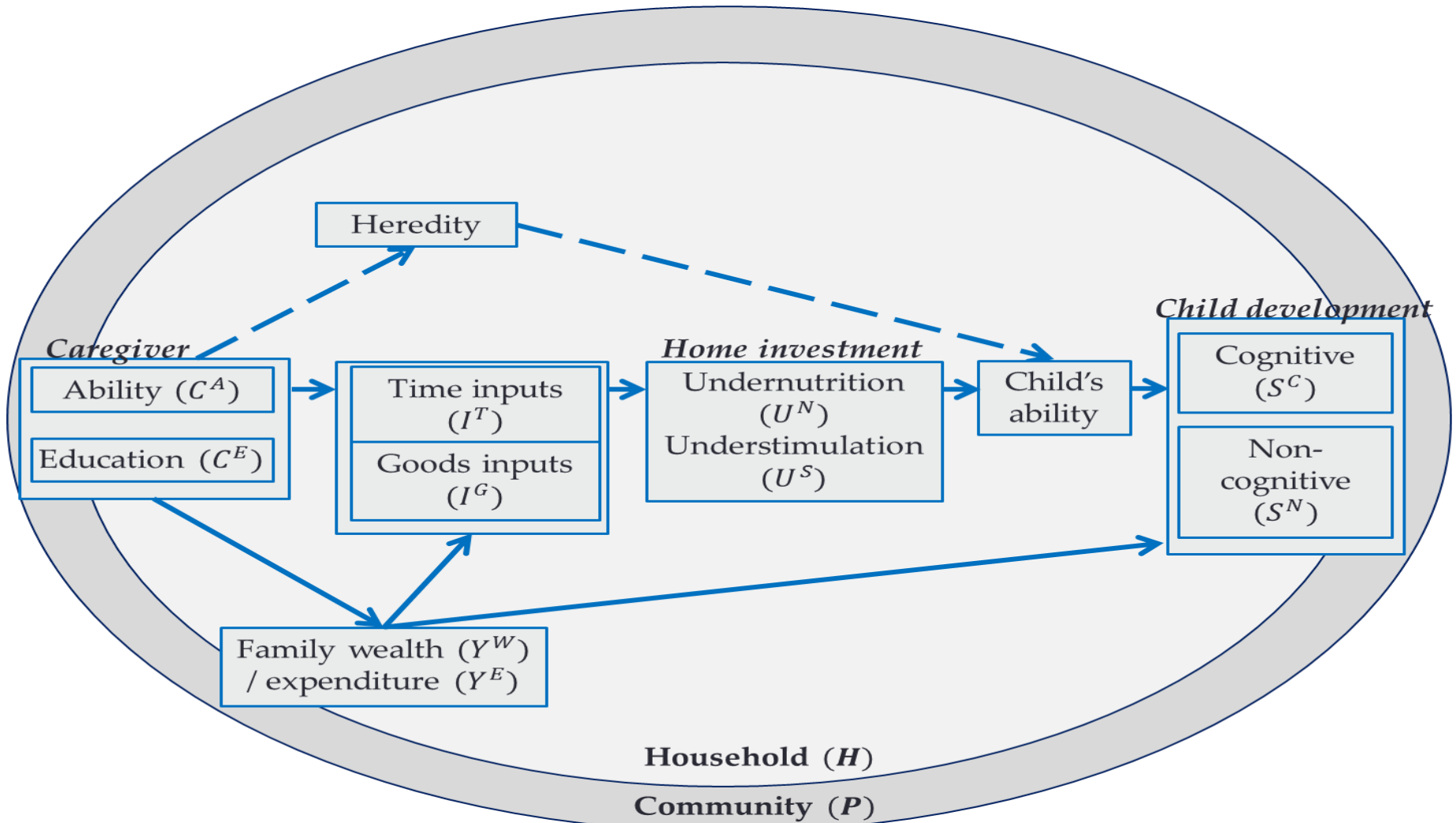
- A “conservative estimate that more than 200 million children under 5 years fail to reach their potential in cognitive development because of poverty...” and its attendant problems.<sup>1</sup>
- Long term consequences<sup>2</sup>
- Poor children are more likely to remain poor
- Limited research on the topic

# Filling the Gaps: My Research Questions

How and to what extent are parental resources associated with child development? Particularly focusing on:

- i. Parental resources at birth and each subsequent stage of life
- ii. Changes in parental resources
- iii. Differential effect of wealth versus expenditure
- iv. Whether the effect of parental resources differs across the wealth distribution

# Analytical Framework



Source: Adapted from Haveman and Wolfe (1995), Grantham-McGregor et al. (2007)

# Data: Young Lives

- Four countries: Ethiopia, Andhra Pradesh (India), **Peru** and Vietnam
- Total sample of 12,000 children followed over a period of 15 years
- Sample size used here, younger cohort in Peru ~2000 children born in 2001/02
- Three survey rounds (birth, 5/6 yrs and 7/8 yrs)
- Extremely low attrition rates (<3%)
- Limitations

# Analytic Approach

- Challenge: Omitted variable bias and endogeneity leads to biased estimates
- Several approaches available to address this
- Latent Trait Modeling to recalculate the wealth index

## Models

- 1) OLS with Community Fixed Effects
- 2) First-Differences
- 3) Spline with Community Fixed Effects

# Controls

- Child specific:
  - gender
  - race/ethnicity
  - birth weight
  - chronic health problems
  - stunting
  - age
- Household level:
  - siblings
  - maternal depression
  - proxy for household non-cognitive environment
  - proxy for household cognitive environment
  - proxy for parenting ability
  - network/social capital



# Model 1: OLS with Community Fixed Effects

Drawing on Dercon and Sanchez's (2011) approach, a prototypical model is represented as follows:

$$S_{ij,t}^C = \sum_{t=2}^4 \beta_t Y_{ij,t-1} + \sum_{k=1}^K \lambda_k x_{ij,t}^k + \alpha_j + \sum_{l=1}^L \gamma_l y_i^l + \mu_{ij,t}^1$$

- $S_{ij,t}^C$  is the cognitive outcome observed in Round  $t$  for child  $i$  in community  $j$
- $Y_{ij,t-1}$  ( $t = 2, \dots, 4$ ) are the lagged parental resources for Round  $t$  ;
- $x_{ij,t}^k$  ( $k = 1, \dots, K$ ) captures the observed factors
- $\alpha_j$  represents the community fixed effects
- $y_i^l$  ( $l = 1, \dots, L$ ) represents the unobserved exogenous factors affecting child development
- $\mu_{ij,t}^1$  is the error term

# Model 2: First-difference model

- Controls for differences between households and communities
- Allows me to examine the effect of changes parental resources on child development

$$S_{it}^C - S_{i,t-1}^C = \beta_1(Y_{it} - Y_{i,t-1}) + \beta_2(Y_{it-1} - Y_{i,t-2}) + T_i + (\varepsilon_{it} - \varepsilon_{i,t-1})$$

- $S_{it}^C - S_{i,t-1}^C$ : changes in the developmental outcome between age 5/6 yrs and 7/8 yrs
- $Y_{it} - Y_{i,t-1}$ : changes in parental resources between 5/6 yrs and 7/8 yrs (% change)
- $Y_{it-1} - Y_{i,t-2}$ : changes in parental resources between birth and 5/6 yrs (% change)
- $T_i$ : time elapsed between age 5/6 yrs and 7/8 yrs
- $\varepsilon_{it} - \varepsilon_{i,t-1}$ : change in the error term

# Model 3: Spline with Community FE

- Are there non-linear effects?
- A prototypical model is represented as follows:

$$S_{ij,t}^C = \sum_{t=2}^3 s(Y_{ij,t-1}) + \sum_{k=1}^K \lambda_k x_{ij,t}^k + \alpha_j + \sum_{l=1}^L \gamma_l y_i^l + \mu_{ij,t}^1$$

- The only difference between Model 1 and this one is the spline function around the parental resources variable  $s(Y_{ij,t-1})$ .

# Results: OLS with Community FE

*Data on parental wealth are a better predictor of children's cognitive development than consumption data.*

	PPVT		Maths	
	5/6 yrs	7/8 yrs	5/6 yrs	7/8 yrs
<u>Birth</u>				
Wealth	5.38*** (8.37)	0.75 (1.38)	0.36*** (3.85)	0.51* (2.23)
Log consumption	-0.24 (-0.70)	-0.13 (-0.51)	0.00 (0.02)	-0.05 (-0.41)
<u>5/6 yrs</u>				
Wealth		2.34*** (4.42)		1.14*** (5.15)
Log consumption		-0.46 (-0.92)		0.29 (1.38)
Constant	17.32*** (3.70)	27.44*** (6.62)	6.41*** (9.33)	2.25 (1.26)
n	1643	1538	1672	1593

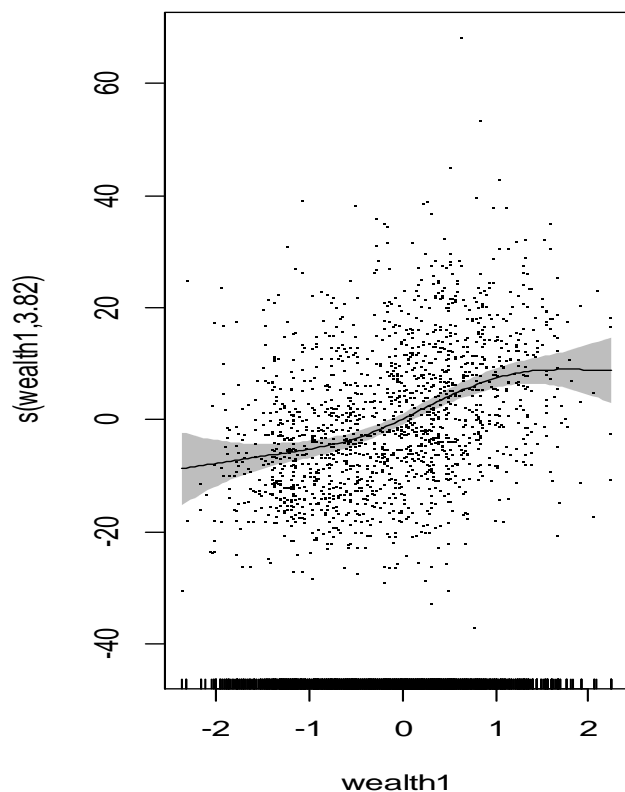
\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$

t-statistic in parentheses; control variables included

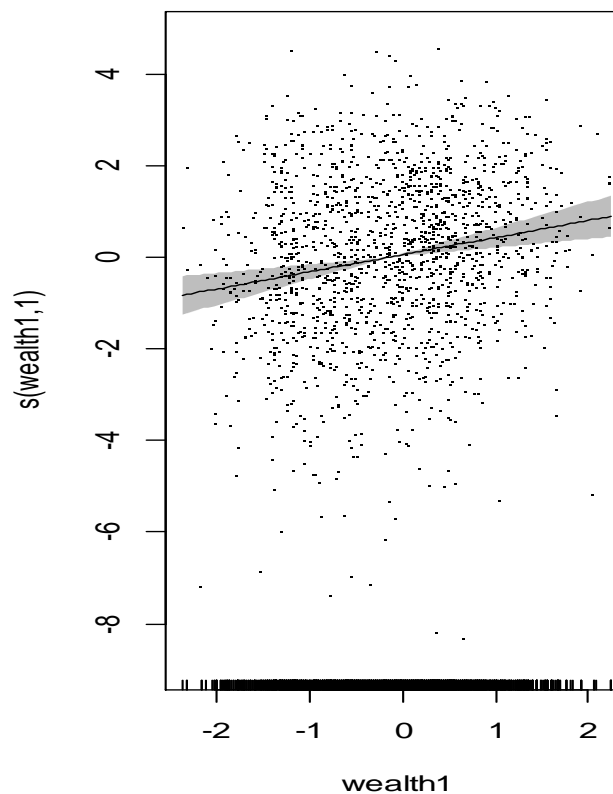
# Results: Spline with Community FE (1)

*The effect of wealth on cognitive development is broadly non-linear, but when cognitive development is measured using maths tests the effect of wealth at birth appears to be linear*

Spline Function: Parental Wealth at Birth vs. PPVT Scores Age 5/6 Years



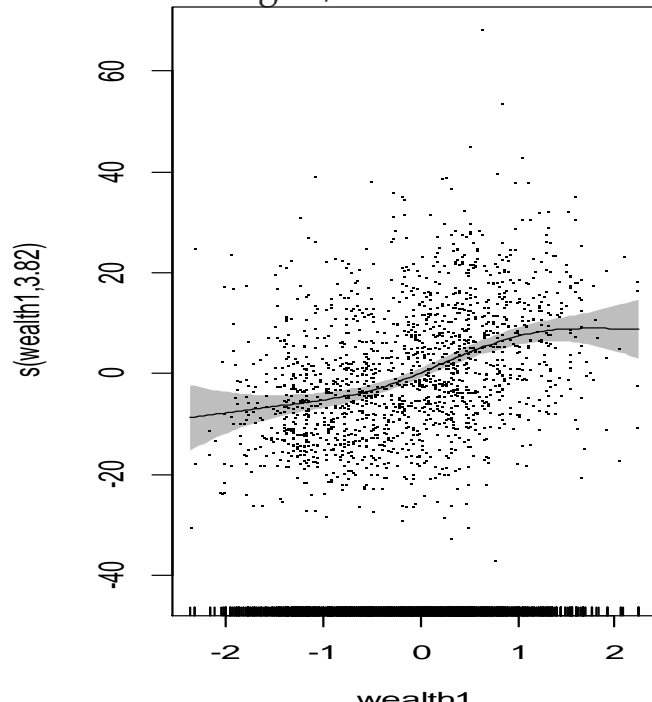
Spline Function: Parental Wealth at Birth vs. Maths Scores at Age 5/6 year



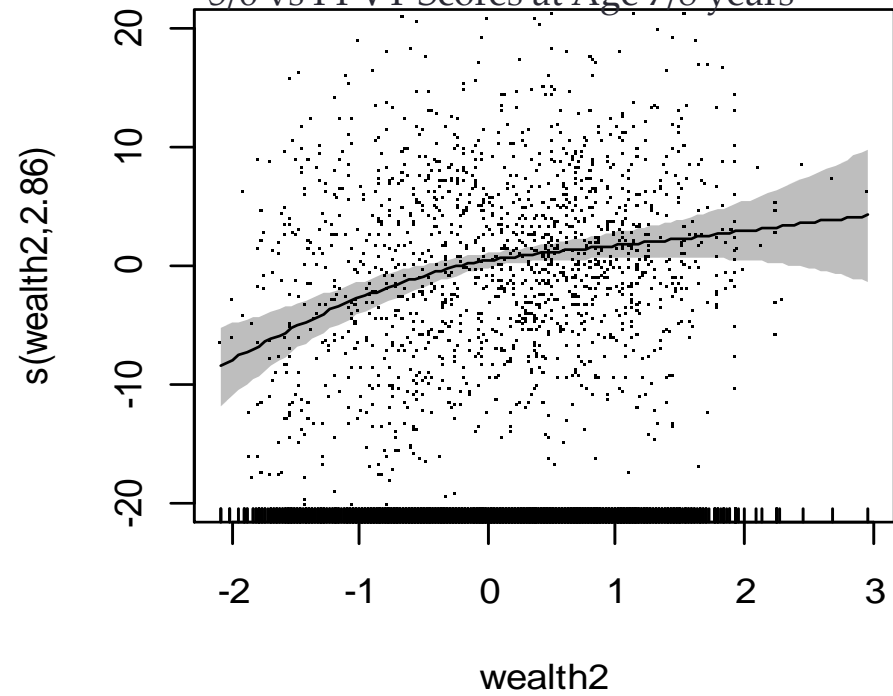
# Results: Spline and Community FE (2)

*The nature of the association between wealth and vocabulary tests differs at birth and at age 5/6 years, as is evident by the different shaped spline functions.*

Spline Function: Parental Wealth at Birth vs. PPVT Scores Age 5/6 Years



Spline Function: Parental Wealth at Age 5/6 vs PPVT Scores at Age 7/8 years



# Results: First-Differences (1)

*Changes in wealth matter most for poorer children.*

	PPVT			Maths		
	Second	Middle	Bottom	Middle	Fourth	Bottom
<u>Birth to 5/6 Years</u>						
Wealth difference	-8.12 (-1.90)	-14.56*** (-3.77)	13.56** (3.25)	13.06* (2.18)	21.66*** (3.32)	3.65 (0.72)
Log consumption difference	-0.78 (-0.48)	-1.12 (-0.63)	3.18 (0.95)	1.35 (0.47)	-2.40 (-0.68)	5.99 (1.55)
<u>5/6 Years to 7/8 Years</u>						
Wealth difference	-12.30* (-2.51)	-5.08 (-1.15)	8.99 (1.80)	6.67 (0.94)	8.57 (1.23)	-1.84 (-0.33)
Log consumption difference	0.38 (0.11)	-2.34 (-0.68)	7.35 (1.74)	4.70 (0.85)	4.84 (0.79)	11.75* (2.39)
Time elapsed between tests	3.63*** (5.12)	3.07*** (4.91)	3.68*** (3.72)	4.20*** (4.22)	4.89*** (3.99)	3.72** (3.28)
Constant	-108.10*** (-5.12)	-80.71*** (-4.16)	-124.10*** (-3.66)	-132.40*** (-4.28)	-167.30*** (-4.05)	-134.70*** (-3.46)
n	318	371	346	387	357	484

\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$

t-statistic in parentheses

# Results: First-Differences (2)

*There is evidence of a lagged effect of changes in wealth, while the effect of changes in consumption appear to have a more immediate effect among the poorest children*

	PPVT			Maths		
	Second	Middle	Bottom	Middle	Fourth	Bottom
<u>Birth to 5/6 Years</u>						
Wealth difference	-8.12 (-1.90)	-14.56*** (-3.77)	13.56** (3.25)	13.06* (2.18)	21.66*** (3.32)	3.65 (0.72)
Log consumption difference	-0.78 (-0.48)	-1.12 (-0.63)	3.18 (0.95)	1.35 (0.47)	-2.40 (-0.68)	5.99 (1.55)
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n	318	371	346	387	357	484

\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$

t-statistic in parentheses



# Summary

- There is evidence that parental wealth is a better predictor of children's cognitive development than consumption data
- The effect of wealth on cognitive development is broadly non-linear for vocabulary, but appears to be linear for maths skills
- The shape of the association between wealth and vocabulary tests differs at each life stage
- Changes in parental resources matter most for poorer children
- Changes in wealth appears to have a lagged effect on children's development, while there is some evidence that changes in consumption have a more immediate effect among the poorest children

Thank you!