Big Sisters

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Motivation

Investments in early childhood are critical to adult outcomes

Almost half of all children in LMICs may not reach their developmental potential because of inadequate nutrition, stimulation (Black et al. 2017)

- **Inadequate stimulation in early childhood** impacts cognitive development, human capital, and income throughout adult life

Parenting interventions have substantial impacts on child development

- Promoting responsive care has larger impact on cognitive, language, and motor development than improving nutrition (Prado et al. 2019)

Policies typically evaluated in terms of costs and benefits **for children**, but they also have ramifications for parents, other household members

- Interventions encourage parents to invest more in young children

Little Evidence of Gender Gap in Early Investments
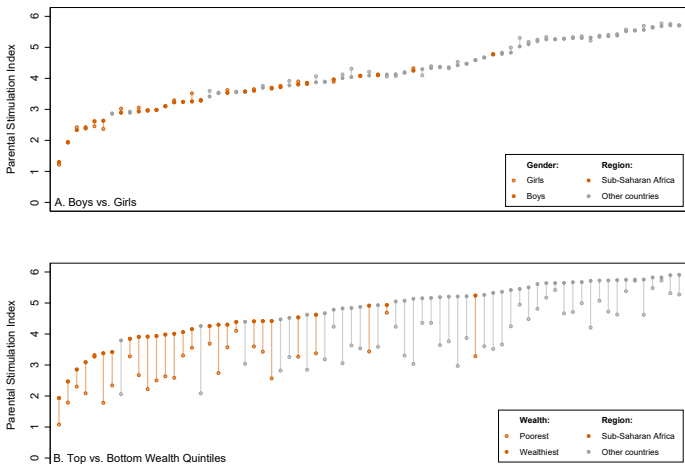
Source: Multiple Indicator Cluster Surveys

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Gender Gaps Emerge as Children Age

Women are still less educated than men in most countries

- In Sub-Saharan Africa in 2010, girls less likely to be enrolled in primary school in 27 of 37 countries for which data available

- Girls less likely to be enrolled in secondary in 19 of 25 countries

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Households treat boys and girls differently

- Gender gaps emerge as children age

- Returns to schooling may differ by gender

- Boys and girls do different tasks within the household
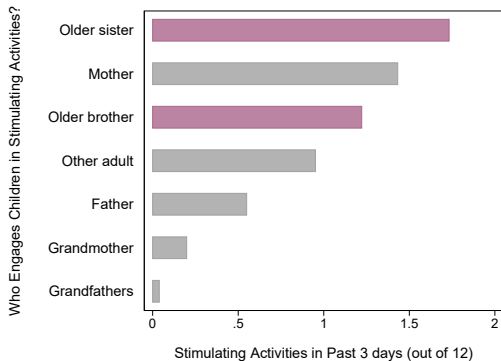
The Role of Big Sisters

Photo credit: Levine et al. (1994), Ozier (2015), Schmidt (2019)

Sisters play a major role in childrearing in many societies (Lancy 2015), but contributions to child development often ignored in research, policy

- Models of "parental" investments (e.g. Cunha and Heckman 2007)

- Measures of early childhood stimulation often only consider activities by parents, adults (Bradley and Corwyn 2005, Kariger et al. 2012)
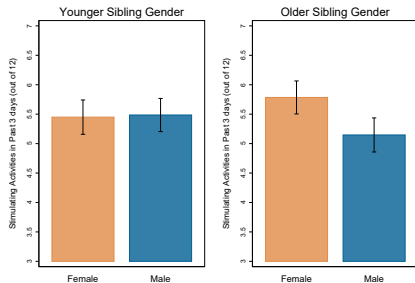
The Role of Big Sisters

Data from 2,500 children aged 3–6 in Luo-speaking area of rural Kenya

- Older sisters do more stimulating activities with young children than anyone else in the household (and older brothers do a lot, too)

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The Role of Big Sisters

Young children with older sisters engaged in more stimulating activities:

- Young children with (exactly) one older sister experience significantly more early childhood stimulation than those with one older brother

- As in the MICS data, young girls and young boys experience the same amount of early childhood stimulation (by all family members)

Estimating the Impacts of Big Sisters

We treat gender of older siblings as plausibly exogenous

- Parents cannot control sex of each child (once conceived) creating a "natural experiment" (Washington 2008, Dahl and Moretti 2008)

- Households with an older sister (vs. an older brother) look similar on a range of observables (e.g. household composition, durable assets)

- Households with one older child differ from other households; we estimate impact of having an older girl in our specific sub-sample

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We make two contributions:

- Estimate impact of having an older sister on child development

- Theoretical model of older siblings' contributions to young children's human capital, implications for familial investments (in both kids)

Estimating the Impacts of Big Sisters

| Variable	Older Sisters		Older Brothers		Diff.	S.E.
	Mean	S.D.	Mean	S.D.		
Child is male	0.48	0.50	0.53	0.50	-0.05	0.04
Child age (in months)	59.70	13.72	60.46	14.14	-0.76	0.90
Child in school	0.90	0.30	0.87	0.33	0.03	0.02
Older sibling age	9.53	2.16	9.51	2.19	0.02	0.20
Mother's age	30.50	7.03	30.44	6.90	0.06	0.60
Mother is Luo	0.95	0.21	0.95	0.22	0.01	0.02
Mother's education	7.88	2.39	8.02	2.42	-0.15	0.21
Parents married	0.82	0.38	0.82	0.39	0.01	0.04
Father's age	39.41	9.43	38.37	9.22	1.04	0.87
Father's education	8.67	2.76	8.89	2.59	-0.23	0.25
Cement floor	0.15	0.36	0.16	0.37	-0.01	0.03
Iron roof	0.98	0.13	0.99	0.12	-0.00	0.01
Latrine	0.81	0.40	0.78	0.42	0.03	0.04
Solar power	0.39	0.49	0.44	0.50	-0.04	0.04
Observations	352		347			

Estimating the Impacts of Big Sisters

Child development outcomes:

- Vocabulary index

  - ▶ **Receptive**: English, Luo sub-scales adapted from BPVS

  - ▶ **Expressive**: Newly developed, locally appropriate assessment measures skills in all relevant languages (Knauer et al. 2019)

- Fine motor skills

  - ▶ Subset of items from MDAT (Gladstone et al. 2010)

Early childhood stimulation:

- Adaptation of Family Care Indicators (Kariger et al. 2012)

  - ▶ All stimulating activities, including those done by older children

The Impacts of Big Sisters on Child Development
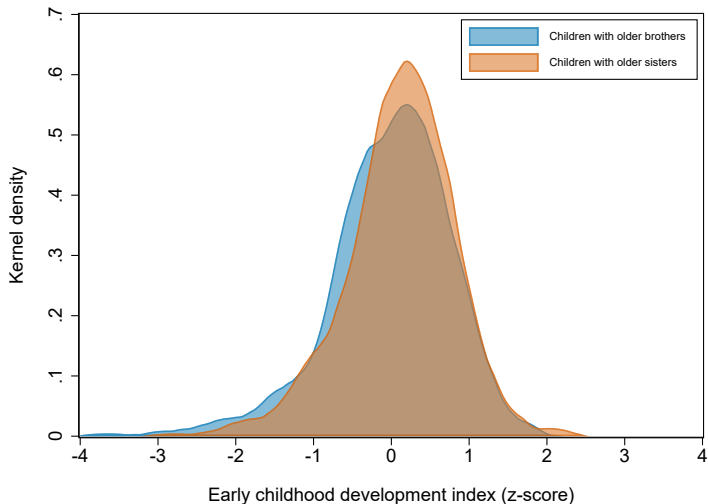
The Impacts of Big Sisters on Child Development

	Mean	No Controls		w/ Controls	
		Coef.	S.E.	Coef.	S.E.
Panel A. Summary Measure of Younger Siblings' Development					
Child development index (z-score)	-0.022	0.129**	0.061	0.141**	0.062
Panel B. Components of Child Development Index					
Child vocabulary (z-score)	-0.015	0.108*	0.064	0.130**	0.064
Fine motor skills (z-score)	-0.028	0.149*	0.078	0.151*	0.081

OLS coefficients reported. Robust standard errors clustered at the household level. The mean indicates the average variable of each outcome variable among households with a single male child between the ages of 7 and 14; the OLS coefficient estimates denote the treatment effect of having a older sister rather than an older brother (in the eligible age range). The specification with controls includes child age (fixed effects for age in months), child gender, mother's education, household size, and an index of household assets. Statistical significance: ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Impact of having an older sister on child development is similar in magnitude to 1 SD increase in mother's education, household assets

The Impacts of Big Sisters on Child Development

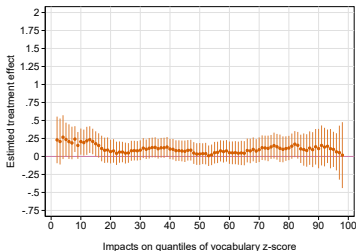Impacts on quantiles of child development index

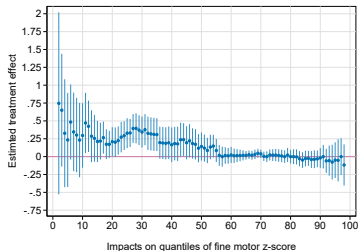# The Impacts of Big Sisters on Child Development

Impacts on **vocabulary** spread across distribution

The Impacts of Big Sisters on Child Development

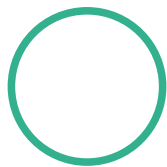Impacts on **vocabulary** spread across distribution

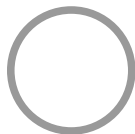Impacts on **motor skills** are mainly below median

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A Model of Familial Investments in Children
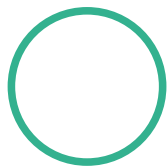

Parent

Older child

Younger child

A Model of Familial Investments in Children

Parent divides time between work, children; investing in child i increases i's human capital
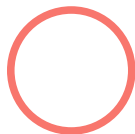
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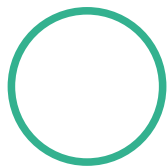
Older siblings divide their time between, their own human capital, their siblings'

Younger child

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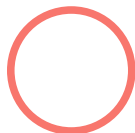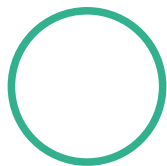Older siblings divide their time between, their own human capital, their siblings'

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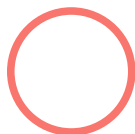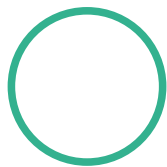Older siblings divide their time between, their own human capital, their siblings'

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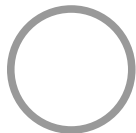Younger siblings benefit

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A Model of Familial Investments in Children

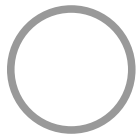Are results explained by gender-biased parents?

A Model of Familial Investments in Children
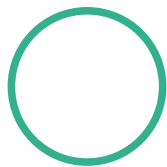
Are results explained by gender-biased parents?

When parents favor boys, they invest more in younger brothers

A Model of Familial Investments in Children

If parents systematically favor boys over girls (at all ages), they will spend more time engaging in stimulating activities with young boys

⇒ They do not

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$\Rightarrow$ They do not

Older brothers and sisters may differ along two dimensions:

- Return to investments in older children's human capital

- Productivity of older siblings' investments in young children

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Older brothers and sisters may differ along two dimensions:

- Return to investments in older children's human capital
- Productivity of older siblings' investments in young children

If older boys and girls did not differ along either dimension, we would not observe an impact of older sisters on young children's development
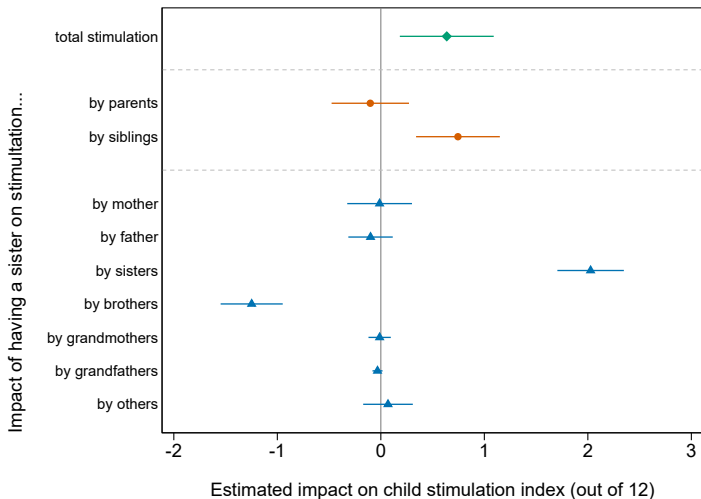
$\Rightarrow$ But we do

Testing the Predictions of the Model

Explanations for the impact of big sisters:

- If return to human capital investments is relatively low for older girls but older sibs do not contribute to younger siblings' human capital, parents w/ an older daughter will invest **more** in their young children

- If older girls are better at improving younger siblings' human capital but returns to investments in older siblings do not differ by gender, parents w/ an older daughter will invest **less** in their young children

- If both mechanisms at play, parental investments need not vary

  ▶ Older girls invest less in themselves, more in their younger siblings

  ▶ Older sisters are investing (relatively) more in their younger siblings, reducing parents' incentive to invest more time in young children

  ▶ Parents may increase their labor supply (or leisure) instead

Testing the Predictions of the Model

Estimated impact on child stimulation index (out of 12)

Impact of having a sister on stimultation...

total stimulation
by parents
by siblings
by mother
by father
by sisters
by brothers
by grandmothers
by grandfathers
by others

Discussion

Seen through lens of the model, results suggest:

- Low(er) perceived returns to investing in older girls' human capital

- Older siblings contribute to their younger siblings' human capital

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Implications for research and policy:

- Many models of human capital formation ignore role of older children

  ▶ Parents' choices depend on their beliefs about older children's inputs

  ▶ Echoes recent work on girls' education (Qureshi 2018)

- Interventions seeking to leverage family members as mediators may be more effective if informed by realities of childcare practices

Conclusions

Older siblings play an important role early childhood development

- Impacts of ECD interventions on siblings are rarely measured

- Ignoring their contribution — imposing western, rich-country views of childrearing — limits our ability to design effective ECD policy

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Older sisters do a disproportionate share of childcare in many contexts

- This may or may not be optimal for them or for their younger siblings

- We can't understand the costs and benefits of sibling childcare unless we measure these behaviors and include them in our models

- Highlights tradeoffs inherent in encouraging more active "parenting"

Thank you!