Big Sisters

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Birdsall House Conference on Women 2019
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

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Little Evidence of Gender Gap in Early Investments

A. Boys vs. Girls

B. Top vs. Bottom Wealth Quintiles

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
Gender Gaps Emerge as Children Age

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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

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

Who Engages Children in Stimulating Activities?

Older sister  Mother  Older brother  Other adult  Father  Grandmother  Grandfathers

Stimulating Activities in Past 3 days (out of 12)

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)
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).
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

<table>
<thead>
<tr>
<th>Variable</th>
<th>Older Sisters</th>
<th></th>
<th>Older Brothers</th>
<th></th>
<th>Diff.</th>
<th>S.E.</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
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<td>Child is male</td>
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<td>Child age (in months)</td>
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<td>Child in school</td>
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<td>0.30</td>
<td>0.87</td>
<td>0.33</td>
<td>0.03</td>
<td>0.02</td>
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<td>Older sibling age</td>
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<td>2.16</td>
<td>9.51</td>
<td>2.19</td>
<td>0.02</td>
<td>0.20</td>
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<tr>
<td>Mother’s age</td>
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<td>7.03</td>
<td>30.44</td>
<td>6.90</td>
<td>0.06</td>
<td>0.60</td>
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<td>Mother is Luo</td>
<td>0.95</td>
<td>0.21</td>
<td>0.95</td>
<td>0.22</td>
<td>0.01</td>
<td>0.02</td>
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<td>Mother’s education</td>
<td>7.88</td>
<td>2.39</td>
<td>8.02</td>
<td>2.42</td>
<td>-0.15</td>
<td>0.21</td>
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<td>Parents married</td>
<td>0.82</td>
<td>0.38</td>
<td>0.82</td>
<td>0.39</td>
<td>0.01</td>
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<tr>
<td>Father’s age</td>
<td>39.41</td>
<td>9.43</td>
<td>38.37</td>
<td>9.22</td>
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<tr>
<td>Father’s education</td>
<td>8.67</td>
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<td>Cement floor</td>
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<td>0.16</td>
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<td>Iron roof</td>
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<td>0.13</td>
<td>0.99</td>
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<td>Latrine</td>
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<td>Observations</td>
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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

Jakiela, Ozier, Fernald, and Knauer (2019) Big Sisters
<table>
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<td>Mean Coef.</td>
<td>S.E.</td>
<td>Coef.</td>
<td>S.E.</td>
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<tr>
<td><strong>Panel A. Summary Measure of Younger Siblings’ Development</strong></td>
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<tr>
<td>Child development index (z-score)</td>
<td>-0.022</td>
<td>0.129**</td>
<td>0.141**</td>
<td>0.061</td>
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<tr>
<td><strong>Panel B. Components of Child Development Index</strong></td>
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<td></td>
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<tr>
<td>Child vocabulary (z-score)</td>
<td>-0.015</td>
<td>0.108*</td>
<td>0.130**</td>
<td>0.064</td>
</tr>
<tr>
<td>Fine motor skills (z-score)</td>
<td>-0.028</td>
<td>0.149*</td>
<td>0.151*</td>
<td>0.081</td>
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</table>

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 an 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.
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The Impacts of Big Sisters on Child Development

Impacts on **vocabulary** spread across distribution

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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

Jakiela, Ozier, Fernald, and Knauer (2019) 
Big Sisters
A Model of Familial Investments in Children

Parent divides time between work, children; investing in child $i$ increases $i$’s human capital

Older child

Younger child
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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?
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When parents favor boys, they invest more in younger brothers

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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

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

⇒ But we do
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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

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Testing the Predictions of the Model

Impact of having a sister on stimulation...

Estimated impact on child stimulation index (out of 12)

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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
- Both parents and older siblings know this

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

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Older siblings play an important role in 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
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

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!