APPLIED ECONOMICS WORKSHOP

Business 33610
Spring Quarter 2011

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University of California, Los Angeles

(Nolan Miller and NBER)

"Keepin' 'em Down on the Farm: Old Age Security and Strategic Underinvestment in Children"

Wednesday, May 11, 2011
1:20 to 2:50pm
Location: HC 3B

For any other information regarding the Applied Economics Workshop, please contact Tamara Lingo (AEW Administrator) at 773-702-2474, tammy.lingo@ChicagoBooth.edu, or stop by HC448.
Keepin’ ‘em Down on the Farm: Old Age Security and Strategic Underinvestment in Children

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Old Age and Children

- Children play important role in well-being of elderly in poor countries
  - Financial support, labor
  - Insurance for illness or disability
  - Physical care & assistance around the home
  - Protection & security
  - Attention and affection

- Old age security motive for fertility (Leibenstein 1957)
  - especially when no other means of old age support
Intergeneration coresidence and the elderly

- Often carried out via kids living with or near their parents

- Intergenerational coresidence widespread in poor countries
  - e.g., India 70+% of people 60+ live with children
  - China 60-70%, with 80+% living in same village (Giles-Mu 2007)
  - All developing countries, mean ~ 70% (UN 2005), as high as 80-90% in Bangladesh, Pakistan, India, Senegal
  - U.S., <15%...but, 70% in the 1850s (Ruggles 1996)
    - Costa 1999—role of social security
Migration and the rural elderly

- Increasing urban economic opportunities $\rightarrow$ migration of young out of rural areas

  - For many households, key strategy to increase wealth. Large remittance flows.

  - But…

    - Parent can’t always count on remits
    - Amt. might be less than parent wants or what would get if stayed on farm
    - No market substitutes for other benefits—care & assistance around home

    - Plus, if kids migrate, lose traditional ties. And, “corrupting influence” of cities
Importance of keepin’ ‘em down on the farm

☐ Coresidence very important determinant of well-being of elderly

☐ Most parents hope at least some of their kids will live with or near them when they get older.

☐ However, parents can’t control whether their children migrate
  ■ Best interests of parent and child may diverge around this point

☐ Do parents attempt to influence child’s decision by limiting potential future benefits of migration?

☐ Do parents strategically underinvest in children’s education so that they will voluntarily choose to stay “down on the farm”? 
This paper...

- Examine how rural parents respond to changes in urban returns to test whether parents try to keep some kids down on the farm

- **Experiment**: Assign variation in returns/opportunities in rural India via 3 years of IT/BPO recruiting services
  - Related paper on gender differences in human capital investment

- Household-level panel data
Related studies

- **Chakrabarti, Lord and Rangazas (1993)**
  --Since parents can’t contract with kids, uncertainty about support can lead to ineffic low educ

- **Baland and Robinson (2000)**
  --Even if P & C altruistic, child labor will be inefficient if P so poor that can’t leave bequests or w/ K-mrkts imperfections—prevent P internalize reduced future earnings due to C labor

- **Bommier and Dubois (2004)**
  --Still inefficient w/ bequests and K-mrkts, if kids have disutility of labor

- **Logan (2007)**
  --In U.S. in late 1800s, don’t see discrim against girls, even though should, due to different L-mrkts returns. Says it’s maybe b/c uncertainty sons will support in old age
Related literatures

1. Parents using strategic behavior to influence kids
   - Bernheim, Shleifer and Summers (1985)—strategically condition bequests to maximize attention provided by kids.
   - Hoddinott (1991) same for W. Kenya, contributions of money and time

2. Effects of migration on education
   - Gains, due to $\Delta$ income or $\Delta$ returns to schooling
     - Kochar (2004) for India
   - Losses
     - de Brauw and Giles (2008)—China. Increases in opp. costs school due to higher local wages, plus higher wage, low-skilled opportunities available lowers returns
     - McKenzie-Rapoport (2010)—adult migration $\rightarrow$ loss of parent’s time input into child’s human K, plus child might have to take over HH production activities.
     - Antman (2011)—Mexico-U.S. migration, kids spend more time working, less schooling
Related studies (specifically, tech-IT-white collar)

- **Jensen (2010)**
  - Girls’ school enrolment and economic opportunities

- **Oster-Millet (2010)**
  - School enrolment and addition of a call-center, around Bangalore. 7-8%-age point gains for boys+girls

- **Shastry (2010)**
  - Areas with more English speakers (based on linguistic distance from Hindi) experienced more IT growth, and in turn had greater increases in English language school enrolment.

- **Munshi-Rosenzweig (2006)**
  - Boys’ and girls’ English language school enrolment, finance/services Mumbai.
MODEL SET UP (partial equilib...)
Household consists of a parent $p$ and a child $c$. 2 sectors.

Rural Sector

P endowed with a unit of land.  
$\text{No land markets for now.}$

C supplies unit labor, parents do not.  
$\text{No labor markets for now.}$

\[ f(e) \text{ farm output, where } f' > 0, \ f'' < 0. \]

\[ f(0) > w(0) \]

$w'(e) > f'(e)$

$w(e) > f(e)$

Urban Sector

\[ w(e) \text{ wage earned by child, } w' > 0 \text{ and } w'' < 0. \]

Assume higher productivity in farm work at low levels of $e$, but urban productivity inc more rapidly in $e$, so urban productivity higher for some suffic. large $e$.

$w(0) > f(0)$

$w'(e) > f'(e)$

$w(e) > f(e)$
C can either stay at home ($H$) or migrate ($M$) to the urban area

Cost of educ is $c(e)$, increasing and convex.

If C migrates, send home fraction $r$ of earnings (exog for now)

Cost of migration $t$, heterogeneous across households
(similar results if driven by endowments, ability, etc.)

P and C risk neutral, maximize wealth.

Choose $e$ and $H$ vs. $M$
Efficient outcome \((\text{max total HH wealth})\)

If C stays home, total household wealth is
\[
f(e) - c(e)
\]
Let \(e_{HE}\) denote optimal educ level in this case, i.e., where \(f'(e_{HE}) = c'(e_{HE})\)

If C migrates, total household wealth is
\[
w(e) - c(e) - t
\]
Let \(e_{ME}\) denote optimal educ level in this case, i.e., where \(w'(e_{ME}) = c'(e_{ME})\)
Under assumption $w'(e) > f'(e)$, i.e., marginal product educ greater in city, $e_{ME} > e_{HE}$

Efficient solutions

--If parent keeps child home, child gets $e_{ME}$

--If parent has child migrate, child gets $e_{HE}$

--Prefer former to latter when

$$f(e_{HE}) - c(e_{HE}) \geq w(e_{ME}) - c(e_{ME}) - t$$

or

$$w(e_{ME}) - c(e_{ME}) - (f(e_{HE}) - c(e_{HE})) \leq t$$

i.e., parent sends child to city whenever maxd surplus in city exceeds maxd surplus at home by at least cost of transport
2\textsuperscript{nd} best

Get efficient solution if P can choose e and H vs. M.

Recast as a two-stage game

Stage 1. Parent chooses e

Stage 2. Child chooses whether to migrate

Each maximizes own well-being.

Keep assuming child remits fraction $r$. 
If C migrates to city, his net wealth is: \((1-r)w(e) - t\)

to induce C to stay, P must offer at least this much

So, if C stays, P’s net surplus: \(f(e) - c(e) - [(1-r)w(e) - t]\)

\([(1-r)w(e) - t]\) is like additional cost of educating C & keeping home when P can’t control H vs. M.

The more educ they give, the more attractive child will find M, so P must give even more to keep him from leaving.

If P wants C to stay, chooses \(e_H\) to max this function, which occurs at:
\[f'(e_H) - (1-r)w'(e_H) = c'(e_H)\]

If C migrates, P’s net surplus is: \(r w(e) - c(e)\)

Which is max’d at: \(r w'(e_M) = c'(e_M)\)
If stay: \( f'(e_H) - (1-r)w'(e_H) = c'(e_H) \) \quad \text{If migrate: } r w'(e_M) = c'(e_M) 

**Proposition 1:** If \( r < 1 \), both children who stay home and those who migrate receive less than the efficient amount of education.

**Proposition 2:** If \( r = 1 \), then both levels of schooling are efficient.

**Proposition 3:** \( e_M > e_H \).

**Proof:** It is sufficient to show that \( rw'(e) > f'(e) - (1-r)w'(e) \). But, note that

\[
\begin{align*}
    w'(e) &> f'(e) \\
    rw'(e) + (1-r)w'(e) &> f'(e) \\
    rw'(e) &> f'(e) - (1-r)w'(e).
\end{align*}
\]

Props 1 to 3 establish basic inefficiency of investments in \( C \) when \( P \) unable to control migration.
Proposition 4: Migration is less attractive in the second-best regime than in first-best.

Proof: The first-order conditions in the first-best are given by:

\[
\begin{align*}
\text{Home} & : f'(e_H) - c'(e_H) = 0 \\
\text{Migrate} & : w'(e_M) - c'(e_M) = 0
\end{align*}
\]

In 1st best, a HH with transp. cost \( t \) lets child migrate if \( t < \hat{t}^* \), where \( \hat{t}^* \) satisfies:

\[
\left\{ w(e_M) - c(e_M) \right\} - \left\{ f(e_H) - c(e_H) \right\} = t^*
\]

The corresponding first-order conditions in the second-best problem are given by:

\[
\begin{align*}
\text{Home} & : f'(\hat{e}_H) - c'(\hat{e}_H) = (1-r)w'(\hat{e}_H) \\
\text{Migrate} & : w'(\hat{e}_M) - c'(\hat{e}_M) = (1-r)w'(\hat{e}_M)
\end{align*}
\]

A HH with transp. cost \( t \) lets child migrate if \( t < \hat{t}^* \), where \( \hat{t}^* \) satisfies:

\[
\left\{ w(\hat{e}_M) - c(\hat{e}_M) \right\} - \left\{ f(\hat{e}_H) - c(\hat{e}_H) \right\} = \hat{t}^* - (1-r)\left( w(\hat{e}_H) - w(\hat{e}_M) \right)
\]
Thus, the solution \((e_H, e_M, t^*)\) to the 1st-best and 2nd-best probs are parameterized by the following three equations.

\[
f'(\tilde{e}_H) - c'(\tilde{e}_H) = \alpha(1-r)w'(\tilde{e}_H)
\]

\[
w'(\tilde{e}_M) - c'(\tilde{e}_M) = \alpha(1-r)w'(\tilde{e}_M)
\]

\[
\{w(\tilde{e}_M) - c(\tilde{e}_M)\} - \{f(\tilde{e}_H) - c(\tilde{e}_H)\} = \hat{t}^* - \alpha(1-r)(w(\tilde{e}_H) - w(\tilde{e}_M))
\]

where for \(\alpha=0\), we have the 1st-best problem and \(\alpha=1\) we have the 2nd-best.

Implicitly differentiating wrt \(\alpha\) and solving for \(e'_H(\alpha)\), \(e'_M(\alpha)\) and \(t^*(\alpha)\), we have:

\[
e'_H(\alpha) = \frac{(1-r)w'(e_H)}{f''(e_H) - c''(x_H) - (1-r)w''(e_H)} < 0
\]

\[
e'_M(\alpha) = \frac{(1-r)w'(e_M)}{f''(e_M) - c''(x_M) - (1-r)w''(e_M)} < 0
\]

\[
t^*(\alpha) = (1-r)\{w(e_H) - w(e_M)\} < 0
\]

Hence, in moving from the first-best to second-best, education levels for those who stay home and those who migrate decrease, and the set of households for which migration is optimal decreases.
Inefficiency in the 2^{nd} best. All C’s get too little e

- C’s who migrate: P gets < full marginal product of investment, so underinvest.

- C’s who stay home: P knows that the more they invest, the greater the C’s opportunity as a migrant. So, have to give them more to get them to stay home. So again, not get full marginal product of investment, so underinvest.

- When P’s don’t control migration and fully appropriate gains, migration less attractive to P’s. Would rather have entire inc. of less productive C who stays home than just part of the inc. of a more productive C in the city.

- But since can’t control migration decision, only way to prevent them from leaving is by giving low education (though BSS—but fails if low assets or high urban w)
To see impact of an increase in urban returns to education, replace wage function $w(e)$ with $\theta w(e)$.

An increase in $\theta$ represents an inc. in urban returns (similar result will hold if we consider an upward shift in $w'(e)$).

Solution to the second-best problem, $(e_H, e_M, t^*)$, solves:

\[
f(e_H) - c(e_H) - [(1-r)\theta w(e_H) - t^*] = r\theta w(e_M) - c(e_M),
\]
\[
f'(e_H) - (1-r)\theta w'(e_H) = c'(e_H), \quad \text{and}
\]
\[r\theta w'(e_M) = c'(e_M).
\]
Proposition 5: An increase in the urban returns to educ (\(\theta\)) increases educ for children who migrate (\(e'_M(\theta) > 0\)), decreases education for children who stay home (\(e'_H(\theta) < 0\)), and increases the set of households whose children migrate (\(t'(\theta)>0\)).

Proof: Implicitly differentiate above conditions and simplify:

\[
i^*(\theta) = (1-r)w(e_H') + rw(e_M') > 0
\]

\[
e_H'(\theta) = \frac{(1-r)w'(e_H)}{f''(e_H) - (1-r)\theta w''(e_H) - c''(e_H)} < 0
\]

\[
e_M'(\theta) = \frac{rw'(e_M)}{c''(e_M) - r\theta w''(e_M)} > 0
\]

Thus, inc in urban returns decreases schooling of children who remain in the rural area, and increases it among children who migrate.

If enough children will remain in the rural area, the net education of rural children could decrease. Additionally, these effects will lead to greater inequality in educational attainment among rural children.
If we instead consider an upward shift in $w'(e)$.

Note $e_H$ is defined by $f'(e_H) - (1-r)w'(e_H) = c'(e_H)$, which only depends on $e_H$.

Upward shift in $w'(e)$ decreases the left-hand-side, which decreases the optimal choice of $e_H$ and lowers the parent’s maximal surplus from keeping the child at home.

Similarly, $e_M$ is defined by $r w'(e_M) = c'(e_M)$

an upward shift in $w'(e)$ increases the left-hand side, which increases the optimal choice of $e_M$ and increases the parent’s optimal surplus from letting the child migrate.

Since the cut-off level of $t$ is where

$$t^* = \left\{ r\theta w(e_M) - c(e_M) \right\} - \left\{ f(e_H) - c(e_H) - (1-r)\theta w(e_H) \right\}$$

$t^*$ necessarily increases.
Proof of Proposition 4: In the second-best case, the parent chooses to keep the child at home if and only if:

\[
\begin{align*}
& f(e_H) - c(e_H) - [(1-r)w(e_H) - t] \geq r w(e_L) - c(e_L) \\
& f(e_H) - c(e_H) - (1-r)w(e_H) \geq w(e_L) - c(e_L) - (1-r)w(e_H) - t \\
& f(e_H) - \tilde{c}(e_H) \geq w(e_L) - \tilde{c}(e_L) - t
\end{align*}
\]

where \(\tilde{c}(e) = c(e) + (1-r)w(e)\). Note that \(\tilde{c}(e) > c(e)\) and \(\tilde{c}'(e) > c'(e)\). Thus, the second-best problem can be thought of as identical to the first-best problem, except with higher absolute and marginal cost. Suppose that, under the second best, it is better to Leave:

\[
\left[ w(0) + \int_0^{e_L} w'(e) - \tilde{c}(e) de \right] - \left[ f(0) + \int_0^{e_H} w'(e) - \tilde{c}(e) de \right] \geq 0
\]

\[
\int_0^{e_H} w'(e) - f'(e) de + \int_{e_H}^{e_L} w'(e) - \tilde{c}(e) de \geq f(0) - w(0)
\]

Consider the first best. It is better to Leave if:

\[
\int_0^{e_{LE}} w'(e) - c'(e) de - \int_0^{e_{HE}} f'(e) - c'(e) de \geq f(0) - w(0).
\]

Simplifying the left-hand side:

\[
\int_0^{e_H} w'(e) - f'(e) de + \int_{e_H}^{e_{HE}} w'(e) - f'(e) de + \int_{e_H}^{e_L} w'(e) - c'(e) de + \int_{e_L}^{e_{LE}} w'(e) - c'(e) de >
\]

\[
f(0) - w(0) + \int_{e_L}^{e_{LE}} w'(e) - c'(e) de >
\]

\[
f(0) - w(0).
\]

The first inequality follows from:

\[
\int_{e_H}^{e_{HE}} w'(e) - f'(e) de + \int_{e_{HE}}^{e_L} w'(e) - c'(e) de \geq \int_{e_H}^{e_L} w'(e) - \tilde{c}(e) de.
\]
Predictions:

In response to an increase in the urban returns to schooling, rural parents will:

- **Prediction 1**: Increase schooling for children they want to migrate;
- **Prediction 2**: Want more children to migrate;
- **Prediction 3**: Decrease schooling for children they still do not want to migrate.

- Note, if enough not want migrate, could end up with net negative effect.
- Schooling responds sluggishly to increases in non-farm returns
- **Widening of distribution of rural education**

- (GE, diff returns sustained by land markets, K constraints, time to react & info constraints (frictions), parental control of investment…)
Refinements

- Other reasons why P’s may not want C’s to migrate
  - Physical care, assistance around home. Limited market substitutes.
  - Corrupting influence of city, ties to home/land/culture
  - Protect child from making bad decision, for child’s own best interests

- We can’t distinguish motive w/ our data.

- Basic idea, do parents do something to reduce likelihood child migrates?
Assumptions—No Land Markets

- If can sell or lease out land, why need kids to stay at home?
  - Still want kids nearby for non-financial benefits of living nearby, or corrupting influences/ties
  - Not such an awful approx? Land transactions not very common
    - Rentals
      - Agency probs
      - Monitoring & enforcement of contract
      - Differing incentives on long vs. short run productivity of land
    - Sales
      - Imperfect titling and tenure security
      - How do you store the wealth?
      - Psychic value to land
      - Usufructury rights—only way get value from land is if kid stays home

Of course, land transaction take place. But, an additional wedge that higher wages of migrating kids must overcome.
Assumptions—No Labor Markets

- If can hire in labor, why need kids to stay at home?
  - Still want kids nearby for non-financial benefits of living nearby, or corrupting influences/ties
  - Hired land not yield as high a return to parent
    - Agency probs
    - Monitoring & enforcement
    - Specific knowledge
    - purdah

- Rosenzweig-Wolpin (1985) use specific knowledge to jointly explain predominance of extended families, overwhelming use of family labor on farms and relative scarcity of land transactions in rural India.

- Strongly favor use of own family labor on farm
Predictions:

In response to an increase in the urban returns to schooling, rural parents will:

- **Prediction 1**: Increase schooling for children they want to migrate;
- **Prediction 2**: Want more children to migrate;
- **Prediction 3**: Decrease schooling for children they still do not want to migrate.

To test these predictions, we need:

1. Way to classify children based on parent’s migration preferences
2. Source of exogenous variation in urban returns
Classifying Kids by Parent’s Migration Preferences

- As noted, many factors may influence whether a parent wants a particular child to migrate
  - Land owned
  - Access to means of saving for old age, pensions
  - Quality of local land and labor markets
  - Beliefs about child’s ability (in both urban & rural occs)
  - Birth order, norms
  - Expectations child’s altruism
  - Beliefs about own longevity
  - Preferences over land staying in family, corruption of the city, etc.

- Since can’t measure, account for or model all of these, instead use direct elicitation…
Classifying Kids by Parent’s Migration Preferences

Imagine when you are older, at least 60, and your children are adults. At this time, do you want or hope [child] will live:

1. in this dwelling or in another dwelling on this land or compound
2. in a separate household or dwelling in this village
3. in a different village, nearby
4. in a different village, far away
5. in a city in India
6. outside of India

Asked for each child. Will take as a summary, reduced-form msr
Classifying Kids by Parent’s Migration Preferences

**Stay near home:**
1. in this dwelling or in another dwelling on this land or compound
2. in a separate household or dwelling in this village

**Migrate:**
5. in a city in India

**Drop:** (not matter much, v. few of these anyway)
3. in a different village, nearby
4. in a different village, far away
6. outside of India

--Much of what kids do, don’t need to live home, just nearby
--And for some stuff, just not want live city (corrupting influences)

--Key: When new city opps, some will want their kids to take advantage, some will definitely want them not to, and will need to act to ensure they do not.
Classifying Kids by Parent’s Migration Preferences

- Would be better to have objective measure
  - Yet, many studies finding such measures predict actual, and can be used to test theories (e.g., Finkelstein-McGarry 2006, Jayachandran-Kuziemko 2010).

- Prefer vs. expect

- Does predict actual migration for older children…

- But does this measure simple proxy for something else?
  - Maybe, but hard to think of a factor that would cause to reduce education in response to increase in returns. Maybe not increase (i.e., zero), but decrease?

- Do they report what is fait accompli?
  - Perhaps. But again, why would parents then reduce schooling?

- Use baseline values. Weakens test, but not stratify by endog var
<table>
<thead>
<tr>
<th>Location</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same dwelling</td>
<td>0.31</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>[0.44]</td>
<td>[0.036]</td>
</tr>
<tr>
<td>Same village</td>
<td>0.26</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>[0.40]</td>
<td>[0.19]</td>
</tr>
<tr>
<td>Nearby rural area</td>
<td>0.054</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>[0.18]</td>
<td>[0.34]</td>
</tr>
<tr>
<td>More distant rural area</td>
<td>0.030</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>[0.23]</td>
<td>[0.48]</td>
</tr>
<tr>
<td>City in India</td>
<td>0.32</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>[0.48]</td>
<td>[0.37]</td>
</tr>
<tr>
<td>Outside India</td>
<td>0.029</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td>[0.22]</td>
<td>[0.18]</td>
</tr>
</tbody>
</table>

**TABLE II.** BASELINE PREFERENCES OF CHILD'S FUTURE RESIDENTIAL LOCATION
Predictions:

In response to an increase in the urban returns to schooling, rural parents will:

- **Prediction 1**: Increase schooling for children they want to migrate;

- **Prediction 2**: Want more children to migrate;

- **Prediction 3**: Decrease schooling for children they still do not want to migrate.

To test these predictions, we need:

1. **Way to classify children based on parent’s migration preferences**

2. **Source of exogenous variation in urban returns**
IT/Business Process Outsourcing (BPO) Industry

- Activities/services including call centers, data entry & management, claims processing, transcription, online tech support, etc.

- A fairly new industry. Technological change (fiber optic cables) and policy shift (1990s, allowed FDI in telecoms).

- 30-40% annual growth in India in the 2000’s. 95% of jobs in 7 cities.

- Large, sudden increase in demand for educated labor. Well-paid (5-10kRs).

- Lots of recruiting activities, businesses
The Intervention

- Awareness of and access to these jobs limited b/c so new (esp. rural)

- We hired 8 call center/BPO recruiting subcontractors
  - All with at least 2 years experience

- Drew up list of villages near Delhi would normally not visit
  - Size of village/distance make them higher cost (per potential recruit) than nearer areas (50+km). Info and access likely to be lower there
  - Haryana-Punjab-UP-Rajasthan

- Randomly assigned 240 villages to treatment and control groups
  - 80 controls
  - 80 girls treatment + boys treatment.
  - 80 treatment (girls-only)
The Intervention

- Recruiters first visited local schools, villages
- Recruiters spent 1-2 days in treatment villages (weekends) providing range of information and services
  - No fixed script.
  - Provided overview of opportunities, information on how to apply, information about specific employers, interview tips and skills lesson and practice interviews, assessment of language skills.
  - Told no guarantee of employment, jobs were competitive.
    - But actually ended up placing quite a (>1200 over 3 years).
  - English language, secondary school, computers (rules out many/most older people).
  - High attendance, lots of interest
The Intervention

- “Booster shot” 1 & 2 years later.
- Left contact details for additional information and (free) follow-up, thus ~3 years continuous recruiting support
Data and Project Timing

- Treatment, December 2003
- Booster shot, November 2004, November 2005
BPO industry ideal for testing our theory

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1. BPO jobs require e&gt;10, &amp; pay well. (wages ~2X comparable educ jobs)</td>
<td>An increase in returns</td>
</tr>
<tr>
<td>2. BPO largely urban (95% in 7 cities)</td>
<td>An increase in urban returns</td>
</tr>
<tr>
<td>3. Jobs primarily for younger people (older not qualified &amp; hiring pref)</td>
<td>Inc. in urban returns for currently young kids, leaving adult (their parents) returns unchanged</td>
</tr>
<tr>
<td>4. At time, rural awareness &amp; access low</td>
<td>Can in effect randomly assign higher urban returns from perspective of parents</td>
</tr>
</tbody>
</table>
Study Setting: Rural districts around Delhi (Haryana, Punjab, Up, Rajasthan)
Data

- In 240 villages (50-150km from Delhi: HY, PJ, RJ, UP)
  - Short form—20 households
  - Long form—80 households, nearest neighbors
- Management Development Institute (MDI)
- Data on education, earnings, family background, expectations, etc.
- Weighed and measured height of all 5+ years old (got 98%). School records. Valuable b/c objective
- Info on members/kids of members not living at home

Round 2 Household Survey, August 2006.
- Same households.
- ~2% attrition, roughly balanced T vs. C (a little more T, but not stat sig). Tracked those we could (most attritors nearby, or Delhi).
- Replacement households
- Discuss attrition & sensitivity below
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Empirical Strategy

- Randomized, so simply regress

\[ Y_i = \beta_0 + \beta_1 \text{Treatment}_i + \varepsilon_i, \]

\[ Y_i = \beta_0 + \beta_1 \text{Treatment}_i + \sum \gamma_i Z_i + \varepsilon_i \]

\[ \Delta Y_i = \beta_0 + \beta_1 \text{Treatment}_i + \varepsilon_i \]

- Separately by baseline parental preferences towards migration
- Cluster standard errors village level
- OLS here, but robust to limited dependent variable models
### TABLE III. EFFECT OF THE INTERVENTION ON ENROLMENT

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<th>GIRLS FULL SAMPLE</th>
<th>BOYS FULL SAMPLE</th>
<th>BOYS EXPECTED TO STAY HOME</th>
<th>BOYS EXPECTED TO MIGRATE</th>
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<td>log (expend per cap)</td>
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<td>2,335</td>
<td>2,720</td>
<td>1,402</td>
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Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. The dependent variable is enrolment for children aged 7-18 in Round 2. All control variables are measured in Round 1. All regressions also include family size, child's age and indicators for whether expenditure or mother's or father's education data was unavailable (these household are assigned median values for these variables). *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
Comparison to Oster-Millett (2010)

They find call centers lead to education net gains for girls and boys

Possible explanations:

1. **O-M look at primary school only, we’re looking primary and secondary**
   - Don’t want to pull kids out too early b/c local returns, only need do it before finish HS.

2. **O-M look at effect of having a call center in same area as a school. So, not need migrate for job & thus no need to underinvest.**
   - Equivalent would be areas that 1) did not get a call center, 2) live far enough away from a call center to where need to migrate for a job, but 3) they still were influenced, updated beliefs about returns based on call center.
   - However, they find localized effects. People a few km away don’t update returns.

3. **Standard errors, we really can’t rule out same**
Attrition

- Concern that treatment affected attrition
  - Whether leave home for work, school, marriage.
  - We were able to track a bunch of these guys

- “Full” attrition (no info on child) for 7-15 yr olds at baseline ~2%
  - About 63% was entire HH attrited
  - Rate of children no longer in HH higher (~8%), driven mostly by 12-15, boys leaving for work, girls for marriage
  - But for child-only attrition, less of an issue b/c HH reported on kids away from home, and we verified with schools
  - Biggest concern is entire HH attrition

- 2.1% control, 1.9% treatment
APPENDIX TABLE II. ATTRITION: ANY INFORMATION ON CHILD AT ROUND 2

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<td>(0.0019)</td>
<td></td>
<td></td>
<td>(0.0023)</td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.006</td>
<td></td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td></td>
<td>(0.013)</td>
<td></td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.001</td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td></td>
<td>(0.000)</td>
<td></td>
</tr>
<tr>
<td>R^2</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Observations</td>
<td>2,417</td>
<td>2,417</td>
<td>2,870</td>
<td>2,870</td>
</tr>
</tbody>
</table>
### TABLE III. EFFECT OF THE INTERVENTION ON ENROLLMENT: SENSITIVITY TO ATTRITION

<table>
<thead>
<tr>
<th></th>
<th>GIRLS FULL SAMPLE</th>
<th>BOYS FULL SAMPLE</th>
<th>BOYS EXPECTED TO STAY HOME</th>
<th>BOYS EXPECTED TO MIGRATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.047**</td>
<td>0.045**</td>
<td>-0.007</td>
<td>-0.012</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.022)</td>
<td>(0.013)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>log (expend per cap)</td>
<td>0.035**</td>
<td>0.063**</td>
<td>0.086***</td>
<td>0.048*</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.029)</td>
<td>(0.023)</td>
<td>(0.026)</td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.003</td>
<td>0.004</td>
<td>0.004</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.005</td>
<td>0.008**</td>
<td>0.005</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.005)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.001</td>
<td>0.046</td>
<td>0.002</td>
<td>0.10</td>
</tr>
<tr>
<td>Observations</td>
<td>2,348</td>
<td>2,348</td>
<td>2,784</td>
<td>2,784</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,441</td>
<td>1,441</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,018</td>
<td>1,018</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. The dependent variable is enrolment for children aged 7-18 in Round 2. All control variables are measured in Round 1. All regressions also include family size, child's age and indicators for whether expenditure or mother's or father's education data was unavailable (these household are assigned median values for these variables). *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
## Table IV. Effect of the Intervention on Migration Preferences

<table>
<thead>
<tr>
<th></th>
<th>GIRLS (1)</th>
<th>GIRLS (2)</th>
<th>GIRLS (4)</th>
<th>BOYS (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.054***</td>
<td>0.057***</td>
<td>0.040***</td>
<td>0.042***</td>
</tr>
<tr>
<td>log (expend per cap)</td>
<td>0.036</td>
<td>0.039</td>
<td></td>
<td>0.025</td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.001</td>
<td></td>
<td>0.005*</td>
<td>0.008**</td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.010*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.043</td>
<td>0.002</td>
<td>0.037</td>
</tr>
<tr>
<td>Observations</td>
<td>2,335</td>
<td>2,031</td>
<td>2,720</td>
<td>2,720</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. The dependent variable is a 0,1 indicator for whether the child's parent reports in Round 2 that they want the child to migrate. All control variables are measured in Round 1. All regressions also include family size, child's age and indicators for whether expenditure or mother's or father's education data was unavailable (these household are assigned median values for these variables). *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
Interpretation

- Supports predictions of model. Predictions 1 and 2 are consistent with standard model.

- Prediction 3 strongly consistent with, P’s realize a new opportunity makes kid more likely to migrate, so cut back so that they will not migrate.

3 Important Challenges:
1. Did the experiment affect child’s educ for any reason other than change urban returns?
2. Can any other model predict inc urban returns cause gains+losses?
3. Is self-interest the reason parents do this?
Are These Effects Due to a Change in Returns?

- We argued that this experiment was purely a shock to future urban returns for current kids.

- But, could have influenced adult/parents employment

- If parent gets BPO job, child schooling could change b/c:
  - Income effect (though can’t explain reduction for one group)
  - HH allocation of time (kid stays home to do parent’s or older sibs’ work)
  - Change in HH member bargaining power
  - Fertility changes, fewer/more kids (income effect, plus opportunity cost time)
Are These Effects Due to a Change in Returns?

- We chose BPO sector specifically b/c targeted younger people (or current children in the future) while leaving opportunities for adults (current parents) unchanged.

- Older adults too little educ, English, computers to get one of these jobs.

- No employment change for those 25+. And, among those matched, none had kids.

\[
\text{work_for_pay} = \beta_0 + 0.0013 \ (0.018) \ast \text{Treatment for 25+}
\]

- However, anticipated future work of adults (thus higher income) or the fact that they could work if they wanted, might change educ (ex., mom’s threat could get a BPO job could change her bargaining position).

- Look at HHs where no adult member (home or away) has enough education to qualify for one of the jobs—so future employment or prob(empl) could not possibly \( \Delta \).
### TABLE V. EFFECT OF THE INTERVENTION ON ENROLLMENT – NO MEMBERS WITH A HIGH SCHOOL DEGREE

<table>
<thead>
<tr>
<th></th>
<th>Girls Full Sample</th>
<th>Boys Full Sample</th>
<th>Boys Expected to Stay Home</th>
<th>Boys Expected to Migrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.053***</td>
<td>0.051***</td>
<td>-0.009</td>
<td>-0.012</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.013)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>log (expend per cap)</td>
<td>0.029*</td>
<td>0.061**</td>
<td>0.072***</td>
<td>0.049**</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.023)</td>
<td>(0.031)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.001</td>
<td>0.005</td>
<td>0.002</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.001</td>
<td>0.009**</td>
<td>0.008</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.04)</td>
<td>(0.006)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.021</td>
<td>0.005</td>
<td>0.045</td>
</tr>
<tr>
<td>Observations</td>
<td>2,021</td>
<td>2,021</td>
<td>2,411</td>
<td>2,411</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,253</td>
<td>1,253</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>844</td>
<td>844</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. The dependent variable is enrolment for children aged 7-18 in Round 2. All control variables are measured in Round 1. All regressions also include family size, child's age and indicators for whether expenditure or mother's or father's education data was unavailable (these household are assigned median values for these variables). *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
### TABLE VI. TESTING FOR ALTERNATIVE MECHANISMS

<table>
<thead>
<tr>
<th>Treatment</th>
<th>(1) Receives Transfers</th>
<th>(2) Amount Received</th>
<th>(3) Schooling/Health Decisions? (0-2)</th>
<th>(4) Decision-Making (women&gt;18, 0-10)</th>
<th>(5) Autonomy (women&gt;18, 0-3)</th>
<th>(6) Expenditure per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.009</td>
<td>5.86</td>
<td>-0.010</td>
<td>-0.071</td>
<td>0.112</td>
<td>-21.2</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(9.94)</td>
<td>(0.023)</td>
<td>(0.184)</td>
<td>(0.347)</td>
<td>(32.1)</td>
</tr>
</tbody>
</table>

### Notes
- Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. All variables measured in the Round 2 survey.
- The dependent variable in Column 1 is whether any member of the household received a transfer (in cash, goods or payments made by others) in the past 12 months, and in Column 2 it is the amount of the transfer. Column 3 is whether the woman participates in household decisions on children’s schooling and health care, and Column 4 is the sum of responses to questions on whether the woman participates in household decisions on: children’s schooling and health care; health care for herself; what foods to cook; purchasing major household items; visiting family or friends. The possible responses for these questions ranged from 0 to 2: "2. respondent makes decision alone; 1. respondent makes decision jointly with others in the household; 0. respondent does not participate in the decision (husband or other household members decide)". The dependent variable in Column 5 is the sum of the responses to questions about whether the woman can visit the market without permission from her husband; visit family or friends without permission from her husband; and is allowed to keep money to spend on her own as she chooses. The dependent variable in Columns 2 and 6 are in year 2006 Rupees. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
We argued that our model is unique in predicting a decline in school for some rural kids in response to an increase in urban returns.

Alternatives
- Credit constraints
- Local wage effects
- Loss of adult in HH
Credit Constraints

- Maybe you switch from having 2 kids with medium schooling to one with low and one with high.
  
  - Will depend on shape of prodn, wage and cost functions, f(e) w(e) and c(e)
Credit Constraints

- One piece of evidence against this is gains for girls, usually favor boys when resources are limited.

- Look at boys who are the only/last kid of schooling age left it HH, so they are the only ones who can be influenced by the treatment.

- Maybe credit constraints → can’t increase schooling, but not decrease

- Maybe P meant to give them less education, but should not mean you give them even less when returns increase.

- Look at boys that Ps want to stay home and either
  - All other kids have left school or home as of Round 1
  - All other kids still at home or in school are expected to stay home
<table>
<thead>
<tr>
<th></th>
<th>Last Remaining child: expected to stay home</th>
<th></th>
<th>Effect of treatment on local wages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Treatment</td>
<td>-0.063*</td>
<td>-0.065*</td>
<td>-0.069*</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.031)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>log (expend per cap)</td>
<td>0.033</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Size</td>
<td>0.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child's Age</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Another Alternative for Declines: Wages

- de Brauw and Giles (2008): increased migration → lower local labor supply, so increase in wages. Opportunity cost of schooling increases, local incomes increase.

- Seems less likely here.
  - Small total changes in employment (few qualified)
  - Can look at wages from community survey.

- And, would it change returns? Probably increase.
<table>
<thead>
<tr>
<th></th>
<th>Last Remaining child: expected to stay home</th>
<th></th>
<th></th>
<th>Effect of treatment on local wages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(7)</td>
</tr>
<tr>
<td>Treatment</td>
<td>-0.063*</td>
<td>-0.065*</td>
<td>-0.069*</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.031)</td>
<td>(0.037)</td>
<td>(0.034)</td>
</tr>
<tr>
<td>log (expend per cap)</td>
<td>0.033</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Size</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child's Age</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.005</td>
<td>0.010</td>
<td>0.024</td>
<td>0.000</td>
</tr>
<tr>
<td>Observations</td>
<td>310</td>
<td>310</td>
<td>262</td>
<td>160</td>
</tr>
</tbody>
</table>
Another Alternative for Declines

McKenzie and Rapoport (2008), Antman (2011)

Increased migration hurts kids education because
1. when an adult leaves, lose time input into production human capital
2. children might need to take over adult’s home production

☐ Seems less likely here.
  - We saw that in HHs where no one with enough education, still get same effects
Last issue on interpretation

- Believe enough evidence to say parents are underinvesting in their kids on purpose—little other reason to cut back solely in response to inc. urban return

- Our interpretation was that it is due to parent’s self-interest

- We can’t rule out doing it for kid’s own good.
  Think the kid is myopic, or bad decision maker

- However, migration reversible if they don’t get a job, & it seems any “cost” of migrating is not large (depreciated farm-specific human K? lost earnings?), so little reason to do this.

- And given how important kids are to parents, seems at least likely is playing a role.
Conclusions

- Increasing urban returns leads to education gains for some boys, losses for others. Attempt to limit migration, strategic behavior.

- Net gains small.

- Believe results might apply elsewhere. Large rural areas with limited means old age support, increasing urban returns alongside low rural returns.

- Demand-side constraints to educ. Jensen 2010. Emphasis on credit constraints, cost, access, supply of schools, etc. Here, we changed none of it. Clear evidence of returns leads to gains.

- Rationale for compulsory schooling.

- Education limits outside of education sector. Reduce need keep kids around. Land markets, pensions/social security, health care provision, savings instruments.
## TABLE III. EFFECT OF THE INTERVENTION ON ENROLLMENT

<table>
<thead>
<tr>
<th></th>
<th>GIRLS FULL SAMPLE</th>
<th>BOYS FULL SAMPLE</th>
<th>BOYS EXPECTED TO STAY HOME</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.058***</td>
<td>0.055***</td>
<td>-0.011</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.015)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>log (expend per cap)</td>
<td>0.031**</td>
<td>0.060***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.004</td>
<td>0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.005</td>
<td>0.007**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.048</td>
<td>0.002</td>
<td>0.11</td>
</tr>
<tr>
<td>Observations</td>
<td>2,335</td>
<td>2,031</td>
<td>2,720</td>
<td>2,720</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. The dependent variable is enrolment for children aged 7-18 in Round 2. All control variables are measured in Round 1. All regressions also include family size, child's age and indicators for whether expenditure or mother's or father's education data was unavailable (these household are assigned median values for these variables). *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
Gender Differences in Human Capital

- In many countries, especially Asia (today), women disadvantaged relative to men in education and health
  - Ex., India, literacy rates 73% for men, 48% for women
  - Mortality rates infancy and childhood 40-50% greater for girls than boys (due to inadequate nutrition, medical care, vaccinations)
  - Masculine Sex Ratios and Missing Women: EFM and SSA

- Huge literature on this
Gender Differences in Human Capital—Role of Returns

- Economic returns to human capital, especially in agriculture
- Where returns are low, investments are low

- Boserup (1970) on technology, production and women’s role/status
- Rosenzweig and Schultz (1982).
- Foster and Rosenzweig (2009)

- Of course, there could be compensation (Becker-Tomes 1979, Griliches 1979, Behrman-Pollak-Taubman 1982) (though not if women don’t work...)
Are social norms a constraint on investment in girls?

- Though human K theory says investments respond to returns, some social norms may weaken or sever the link for girls.

- **Patrilocal Exogamy**: Dyson-Moore 1983, Greenhalgh 1985, Foster-Rosenzweig 2009
  - If girls leave at marriage and don’t support parents in old age, little gain to investing in girls (though may invest for other reasons; altruism (wage+non-wage), transfers, etc.)
  - Depends on whether marriage market compensates for female human K (Behrman et al. 1999, Foster-Rosenzweig 1999)

  - Stigma costs exceed income gains (as an example, purdah)
  - Common until recently in US as well: 1938, 78% disapprove. 1970s, 30+%
  - Even if parents invest for other reasons, human K of girls not respond to returns b/c girls won’t work (unless marriage market compensates: Behrman et al. 1999)
Many studies have examined the link between relative wages or labor force participation and status of women:


Despite theoretical ambiguity, fairly consistent finding:

higher LFP/wages $\rightarrow$ better education & health-mortality for women
But....

- Serious OVB/reverse causality concerns (Sen 1990, Foster-Roszenweig 2009)
  - Areas where women work very different than where don’t
  - Where women have higher human K, more likely to work/earn more.
  - A few studies deal with this
    - Rosenzweig-Schultz 1982 (rainfall)
    - Qian 2008 (policy reform in China changing value of male & female crops)
    - Foster-Rosenweig 2009 (land prices, expected future tech. change, productivity)
And, What is the Underlying Mechanism?

1. Returns to human capital.
2. Bargaining power? (threat point, utility if exit. Women prefer discrim less?)
3. Allocation of time? Women work → daughter’s value in HH prodn. increases
4. Income—investment in girls a luxury?
5. Lower fertility, maybe girls fare better when compete fewer sibs?
6. Women work → others take care of kids, maybe discrim less than mom
7. Women can work → not need boys as death/disability insurance. No need favor boys. Women can work → not need boys for old age support (can save. pension).
And, What is the Underlying Mechanism?

- These mechanisms all have different implications.
- Most studies, unable to test or differentiate among them
- Qian 2008 argues against some of them for the China natural experiment
- But, we really don’t know which mechanisms operate, and whether increases in returns have an impact for girls
- Important for policy, but also, most efforts have focused on “status” or “rights” of women, information, awareness, mobilization (Croll 2001), but little else.
Important distinction

- These are white collar jobs.
- For women, likely an important distinction. Maybe lower stigma
  - These jobs are safer, “cleaner”. Esp. important in India, re: caste.
  - Though in other ways, regarded as less safe. Commuting or migrating.
- Women comparative advantage, jobs not require strength

- Not generalize to other sectors, like ag (Foster-Rosenzweig 2009) or manufacturing (Atkin 2009)

- However, probably still the right experiment
  - India shifting rapidly to services (60% GDP)
  - Throughout world, history women’s paid LFP (esp. married women) is history clerical/white collar/service sector
    - Particularly in U.S. case, information technology (Goldin 1990, 2006).
Effect of Treatment—Employment (work for pay, incl. those away)

TABLE II. EFFECT OF THE INTERVENTION ON PAID EMPLOYMENT

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-24</td>
<td>25-44</td>
<td>45-60</td>
<td>18-24</td>
<td>25-44</td>
<td>45-60</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.024** (0.010)</td>
<td>0.0031 (0.0088)</td>
<td>-0.006 (0.013)</td>
<td>0.002 (0.011)</td>
<td>0.006 (0.023)</td>
<td>-0.004 (0.033)</td>
</tr>
<tr>
<td></td>
<td>0.054</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Focus on paid employment:
- Hard to define exact BPO
- Maybe helped get jobs in other sectors (bank teller), should count?
- Don’t count switching from one job to BPO.
# Effects of Treatment

## TABLE III. EARNINGS BY EDUCATION. ROUND 2 SURVEY

<table>
<thead>
<tr>
<th>Less Than Secondary</th>
<th>Secondary or Above</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>Earnings</td>
<td></td>
</tr>
<tr>
<td>2,372 [1,343]</td>
<td>2,410 [1,336]</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>2,759</td>
<td>2,774</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>Earnings</td>
<td></td>
</tr>
<tr>
<td>4,748 [3,494]</td>
<td>5,969 [4,544]</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>1,942</td>
<td>2,040</td>
</tr>
</tbody>
</table>
### PANEL A. GIRLS

<table>
<thead>
<tr>
<th></th>
<th>Round 2 Outcomes</th>
<th></th>
<th>Round 2 Outcomes</th>
<th></th>
<th>Δ (Round 2-Round 1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td></td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td>Enrolled</td>
<td>BMI-for-Age</td>
<td>Height-for-Age</td>
<td></td>
<td>Enrolled</td>
<td>BMI-for-Age</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.046***</td>
<td>0.18***</td>
<td>0.031</td>
<td></td>
<td>0.043***</td>
<td>0.19***</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.069)</td>
<td>(0.068)</td>
<td></td>
<td>(0.016)</td>
<td>(0.069)</td>
</tr>
<tr>
<td>Log (inc per capita)</td>
<td></td>
<td></td>
<td></td>
<td>0.063***</td>
<td>0.14**</td>
<td>0.165***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.014)</td>
<td>(0.058)</td>
<td>(0.059)</td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.001</td>
<td>-0.00</td>
<td>0.021</td>
<td></td>
<td>0.003</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td></td>
<td>(0.021)</td>
<td></td>
<td>(0.002)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.006***</td>
<td>0.003</td>
<td>0.031</td>
<td></td>
<td>0.006***</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td></td>
<td>(0.014)</td>
<td></td>
<td>(0.002)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Family Size</td>
<td>-0.001</td>
<td>0.022*</td>
<td>0.031**</td>
<td></td>
<td>-0.001</td>
<td>0.022*</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td></td>
<td>(0.012)</td>
<td></td>
<td>(0.003)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Child's Age</td>
<td>0.004</td>
<td>-0.062***</td>
<td>-0.072***</td>
<td></td>
<td>0.004</td>
<td>-0.062***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td></td>
<td>(0.009)</td>
<td></td>
<td>(0.004)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>R²</td>
<td>0.005</td>
<td>0.008</td>
<td>0.00</td>
<td></td>
<td>0.014</td>
<td>0.028</td>
</tr>
<tr>
<td>Observations</td>
<td>1.873</td>
<td>2.106</td>
<td>2.106</td>
<td></td>
<td>1.873</td>
<td>2.106</td>
</tr>
<tr>
<td>Control Group Mean</td>
<td>0.76</td>
<td>-1.27</td>
<td>-2.05</td>
<td></td>
<td>0.76</td>
<td>-1.27</td>
</tr>
<tr>
<td>Mean Effect</td>
<td>0.11***</td>
<td></td>
<td></td>
<td></td>
<td>0.11***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td></td>
<td></td>
<td></td>
<td>(0.026)</td>
<td></td>
</tr>
<tr>
<td>F-stat (p-value)</td>
<td>8.11</td>
<td></td>
<td></td>
<td></td>
<td>8.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. Columns 1-6 use Round 2 outcomes as the dependent variable, and Columns 7-9 use the change in outcome from Round 1 to Round 2. For the first 6 columns, the sample is children aged 7-15 for schooling and 5-15 for weight and height. For the first columns, the sample is children aged 5-12 at baseline (8-15 at round 2). Weight is measured in kg and height in cm. All control variables in columns 1-6 are measured in Round 2. All regressions also include indicators for whether income or mother's or father's education data was unavailable (these household are assigned median values for these variables). "Mean effect" is the mean effect of the treatment across the three outcomes for a given specification, computed using the methodology described in Kling, Liebman, and Katz (2007). F-stat is from a joint test that the treatment variable is zero in the three specifications. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
## Panel B. Boys

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Round 2 Outcomes</th>
<th>Round 2 Outcomes</th>
<th>Δ (Round 2-Round 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enrolled</td>
<td>BMI-for-Age</td>
<td>Height-for-Age</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.016)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>Log (inc per capita)</td>
<td>-0.009</td>
<td>0.027</td>
<td>0.018</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.072)</td>
<td>(0.052)</td>
</tr>
<tr>
<td>Head's Education</td>
<td>0.005**</td>
<td>-0.026**</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.011)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Spouse's Education</td>
<td>0.000</td>
<td>0.029*</td>
<td>0.032**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.016)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Family Size</td>
<td>-0.003</td>
<td>0.012</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.017)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Child's Age</td>
<td>-0.01***</td>
<td>-0.12***</td>
<td>-0.08***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.011)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>R²</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Observations</td>
<td>2,141</td>
<td>2,442</td>
<td>2,442</td>
</tr>
<tr>
<td>Control Group Mean</td>
<td>0.87</td>
<td>-1.32</td>
<td>-1.96</td>
</tr>
<tr>
<td>Mean Effect</td>
<td></td>
<td></td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.025)</td>
</tr>
<tr>
<td>F-stat</td>
<td>0.17</td>
<td>0.14</td>
<td>0.40</td>
</tr>
<tr>
<td>(p-value)</td>
<td></td>
<td></td>
<td>(0.94)</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity-consistent standard errors accounting for clustering at the village-level in parentheses. Columns 1-6 use Round 2 outcomes as the dependent variable, and Columns 7-9 use the change in outcome from Round 1 to Round 2. For the first 6 columns, the sample is children aged 7-15 for schooling and 5-15 for weight and height. For the first columns, the sample is children aged 5-12 at baseline (8-15 at round 2). Weight is measured in kg and height in cm. All control variables in columns 1-6 are measured in Round 2. All regressions also include indicators for whether income or mother's or father's education data was unavailable (these household are assigned median values for these variables). "Mean effect" is the mean effect of the treatment across the three outcomes for a given specification, computed using the methodology described in Kling, Liebman, and Katz (2007). F-stat is from a joint test that the treatment variable is zero in the three specifications. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.
Conclusions

- Increasing economic opportunities for women increases investment in girls’ human capital—big gains weight and education.

- Can (mostly) rule out is due to Δ bargaining power, wealth, time allocation, fertility, etc. It’s returns (to parents) that cause the change.

- More generally, show demand-side constraints to human capital attainment, along lines of Jensen 2010.
Implications

☐ Most policy focuses on awareness campaigns, media outputs, “promoting status of girls,” act on cultural side.
  ■ Can work (cable TV, Jensen-Oster 2009)

☐ Private sector, employment side important.
  ■ Anti-discrimination laws in the workplace;
  ■ Public sector hiring equality, quotas (?)
  ■ Barriers to women working: laws about part-time, maternity. Single-sex trains.
  ■ Credit, entrepreneurial opportunities

☐ Lots of other things tried, haven’t worked so well
  ■ Holla-Jensen-Oster (cash incentives)
  ■ Ji-Jensen (bans on SSA)
Caveats

- These are only short-run effects

- Only a small area
  - But, place with worst gender disparities

- These are white collar jobs. Maybe lower stigma.
  - We would not necessarily generalize to other economic opps for women
  - But
    - Indian economy shifting towards services (60% GDP)
    - History of women's increased LFP is history of clerical, white collar jobs, IT and office technologies.
    - Reason for optimism (even rapid change: US/UK, LFP 30% in 1960s, today 60-70%)