20th IPDC Conference 2014:

09-10 July 2014, Tokyo

Impact of income and non-income shocks on child labor: evidence from a panel survey of Tanzania

Amarakoon Bandara, Rajeev Dehejia, and Shaheen Lavie Rouse

The objectives

- The objectives of the paper are:
  - to examine the relationship between household income and non-income shocks and child labor, and

  - if the availability of other coping strategies such as social protection mechanisms, access to credit or asset holdings reduce child labor.

The Model

The household derives utility:

$$U(c_{it}, h_{it})_{i,t} = \frac{c_{it}^{\sigma}}{\sigma} + \alpha h_{it} \qquad (1)$$

$0 < \sigma < 1$ and $\alpha > 0$.

Parents participate in the labor market and derive income $f(l_{pit}, \theta_{it})$,

$$f(l_{pit}, \theta_{it}) = w_{pit} l_{pit} + \lambda \theta_{it} + \tau \emptyset_{pit} \qquad (2)$$

The Model cont.

The household problem is thus given by:

$$\max_{c_{it}, e_{cit}} \left\{ \frac{c_{it}^{\sigma}}{\sigma} + \alpha\beta e_{cit}^{\sigma} \right\} \tag{3}$$

Subject to the budget constraint,

$$c_{it} = w_{cit}(1 - e_{cit}) + w_{pit}l_{pit} + \lambda\theta_{it} + \tau\emptyset_{pit} \tag{4}$$

The solution to the first order conditions from the above household problem can be given by:

$$l_{cit} = \delta + \varphi\chi_{pit} + \lambda\theta_{it} + \tau\emptyset_{pit} + \eta e_{cit} + \varepsilon_{it} \tag{5}$$

The Model cont.

Households with asset holdings, the budget constraint,

$$c_{it} = w_{cit}(1 - e_{cit}) + w_{pit}l_{pit} + \lambda\theta_{it} + \tau\emptyset_{pit} +$$

$$(1 + r)a_{it} - a_{it+1} \qquad (6)$$

First order conditions given by:

$$l_{cit} = \rho + \varphi\chi_{pit} + \lambda\theta_{it} + \tau\emptyset_{pit} + \eta e_{cit} + \mu a_{it} + u_{it}$$

$$(7)$$

The Model cont.

Households with asset holdings and access to credit

$$c_{it} = w_{cit}(1 - e_{cit}) + w_{pit}l_{pit} + \lambda\theta_{it} + \tau\emptyset_{pit} +$$

$$(1 + r)a_{it} - a_{it+1} + b_{it} - (1 + r)b_{it+1} \qquad (8)$$

The solution to the household problem can be given by:

$$l_{cit} = \phi + \varphi\chi_{pit} + \lambda\theta_{it} + \tau\emptyset_{pit} + \eta e_{cit} + \mu a_{it} +$$

$$\vartheta b_{it} + \omega_{it} \qquad (9)$$

Data and empirical strategy

- Data set:
  - Two rounds of The Tanzania National Panel Survey (TZNPS), with sample sizes of 16,709 individuals (3,280 HH) in 2009 and 20,559 individuals (3,924 HH) in 2011.
  - Over 97% of Round 1 HH were re-interviewed. Only 7% of HH members present in Round 1 were missing in Round 2. Attrition is thus low.

- *Outcome Measures:*
  - children's round 2 work patterns
  - human capital development
  - a measure of food security

- *Controls and Buffering Mechanisms:*
  - At child level, limited to age and gender
  - At HH level, parental education and household size
  - buffering mechanism: access to credit (access to a bank account , durable goods as a proxy for collateralizable assets and hence the ability to borrow)

- *Measuring Shocks*
  - primary measure of HH income shocks is crop shocks (measured by an indicator variable for if a HH lost any of its crops after the harvest)
  - impact of deaths in the HH on child labor and related outcomes

Data and empirical strategy

- *Empirical Strategy*
  - interested in the relationship between child labor intensity and measures of parental income, crop shocks, and credit constraints.

  - Main challenges:
    - potential simultaneity of child labor and parental income,
    - omitted variable bias with respect to crop shocks and child labor

  - Four-fold strategy for addressing these concerns
    - use parents' level of education as a proxy for parental income
    - include a broad range of controls, including household controls such as the size of the household and the size of the household's accessible land holdings
    - empirically investigate whether household agricultural shocks are correlated with household, child, or parental characteristics
    - present specifications that include region fixed effects

  - as a robustness check, we exploit the panel structure of the data and present household fixed effects results

Results

- *Are shocks exogenous with respect to child labor and transitory?*

  - we use a linear probability model to regress crop shocks against our individual, parental, and household control variables

  - results lend credence to a causal interpretation of the effect of crop shocks in round 1 on subsequent outcomes, but leaves open the interpretation of these results.

Results: *Child labor and agricultural Shocks: direct effects*

VARIABLES	OLS Full Sample	Region FE Full Sample	Region FE Male	Region FE Female
Table 1: Outcome: Total Child Labor Hours (Round 2)				
Crop shock (Round 1)	7.686** (3.078)	5.389 (3.586)	8.657 (5.501)	1.992 (4.638)
Table 2: Outcome: Child Agricultural Labor Hours (Round 2)				
Crop shock (Round 1)	7.050** (3.277)	5.911* (3.278)	8.415 (5.316)	3.236 (4.618)
Table 3: Outcome: Child Wage Labor Hours (Round 2)				
Crop shock (Round 1)	-2.728** (1.201)	-3.576** (1.463)	-3.789** (1.659)	-3.343* (1.751)

Table 4: Outcome: Child Chore Labor Hours (Round 2)				
VARIABLES	OLS Full Sample	Region FE Full Sample	Region FE Male	Region FE Female
Crop shock (Round 1)	3.266 (1.924)	3.550* (2.041)	4.462* (2.441)	2.202 (2.456)
Table 5: Outcome: Child Left School Between Rounds				
Crop shock (Round 1)	0.0398** (0.0143)	0.0394*** (0.0141)	0.0112 (0.0202)	0.0624*** (0.0238)
Table 6: Outcome: Insufficient Food Situation in Past 12 Months (Round 2)				
Crop shock (Round 1)	0.0723*** (0.0258)	0.0714** (0.0312)	0.0923** (0.0411)	0.0657 (0.0387)

Results reveal that HH are not fully able to cope with the agricultural shocks they face by adjusting children's level of labor hours, i.e., that despite working additional hours children's food security continues to be an issue.

Overall results suggest that crop shocks lead not only to an increase in child labor hours but a change in the composition of child time use: children are spending less time engaged in wage work and more time in agricultural work, and girls are less likely to be in school.

Buffering of Child Labor Effects

VARIABLES	OLS Full Sample	Region FE Full Sample	Region FE Male	Region FE Female
Table 1: Outcome: Total Child Labor Hours (Round 2)				
Bank Account (Round 1)	-8.888* (4.338)	-10.29* (5.007)	-12.12 (8.181)	-8.412* (4.850)
Crop shock (Round 1)	7.717** (3.304)	4.839 (3.650)	8.192 (5.134)	1.527 (4.980)
Table 4: Outcome: Child Chore Labor Hours (Round 2)				
Bank Account (Round 1)	-3.618*** (1.198)	-4.080*** (1.260)	-2.028 (1.940)	-5.894*** (1.525)
Crop shock (Round 1)	2.938 (2.189)	3.308 (2.302)	3.920 (2.893)	2.412 (2.971)
Table 6: Outcome: Insufficient Food Situation in Past 12 Months (Round 2)				
Bank Account (Round 1)	-0.0707** (0.0275)	0.0863*** (0.0287)	-0.0657 (0.0401)	0.0988** (0.0411)
Crop shock (Round 1)	0.0920*** (0.028)	0.0895** (0.0336)	0.112** (0.0434)	0.0842* (0.0418)

Buffering of Child Labor Effects

Table 1: Outcome: Total Child Labor Hours (Round 2)				
VARIABLES	OLS Full Sample	Region FE Full Sample	Region FE Male	Region FE Female
Asset Index (Round 1)	-3.443*** (0.969)	-3.352*** (0.969)	-3.065 (1.817)	-3.544** (1.468)
Asset Index x Crop Shock	5.031*** (1.725)	5.348*** (1.682)	8.489** (3.456)	1.147 2.811)
Table 2: Outcome: Child Agricultural Labor Hours (Round 2)				
Asset Index (Round 1)	-1.727** (0.744)	-1.695** (0.702)	-1.723 (1.723)	-1.610 (1.087)
Asset Index x Crop Shock	2.550 (2.016)	3.046 (1.992)	6.344* (3.587)	-1.255 (1.657)

VARIABLES	OLS Full Sample	Region FE Full Sample	Region FE Male	Region FE Female
Table 5: Outcome Child Left School Between Rounds				
Asset Index (Round 1)	-0.0126*** (0.00409)	-0.0122*** (0.00398)	-0.0123** (0.00574)	-0.012** (0.00502)
Asset Index x Crop Shock	-0.0107 (0.0132)	-0.00444 (0.0139)	-0.0109 (0.0197)	0.0051 (0.0154)
Table 6: Outcome: Insufficient Food Situation in Past 12 Months (Round 2)				
Asset Index (Round 1)	-0.0265*** (0.00543)	-0.0276*** (0.00581)	-0.0283*** (0.00661)	-0.0258*** (0.00810)
Asset Index x Crop Shock	-0.0370 (0.0230)	-0.0315 (0.0251)	-0.0366 (0.0217)	-0.0321 (0.0342)

Two points: significant buffering effects that go in the direction we expected: access to a bank account seems to buffer children against hunger when household experience agricultural shocks.
However, household asset holdings magnify – rather than attenuate – the effect of agricultural shocks on children's work hours.

The Effect of Deaths in the Household

Panel A: Total work hours				
VARIABLES	OLS Full Sample	Region FE Full Sample	Region FE Male	Region FE Female
Household death round 2	9.845 (9.657)	8.644 (8.847)	23.80** (10.84)	-4.157 (6.785
Index of HH assets owned x Household death round 2	9.749** (3.741)	9.949** (3.758)	16.31*** (4.153)	1.460 (4.557)
Panel B. Farm work hours				
Household death round 2	13.98 (9.751)	13.43 (9.423)	26.50** (11.03)	2.347 (6.767)
Index of HH assets owned x Household death round 2	9.044** (3.405)	8.784** (3.324)	14.98*** (3.928)	0.750 (2.727)

Robustness Check: Household Fixed Effects

VARIABLES	Monthly Labor Hours Full Sample	Monthly HH Farm Work Hrs Full Sample	Monthly Wage Hrs Full Sample	Monthly Unpaid HH Bus Hrs Full Sample	Chore Hours Full Sample	In School Full Sample
Table 8: Household Fixed Effects Specification						
Crop Shock	-26.64* (15.79)	-14.12 (9.918)	1.946 (4.231)	-8.087 (8.264)	-6.870 (5.929)	0.0165 (0.0808)
Age x Crop Shock	2.474* (1.440)	0.903 (0.927)	-0.145 (0.426)	1.368* (0.756)	0.384 (0.478)	0.000380 (0.00807)
Age	7.399*** (0.479)	3.659*** (0.332)	1.033*** (0.207)	1.852*** (0.264)	0.830*** (0.204)	-0.0539*** (0.00321)

The interaction implies that looking within households children aged 10.75 or older experience an increase in labor hours (e.g., 3 hours a month for a 12 year old and 10.5 hours a week for a 15 year old).

The increase in overall child labor hours is driven by an increase in unpaid work in household businesses. For this category, even the youngest children experience some increase in work hours in response to a shock (1.5 hours a month at age 7 increasing to almost 12.5 hours a month at age 15)

Policy implications

- The significant effect of income shocks on child labor and the resulting impact on future human capital development,

- The possible mitigating measures as indicated by some buffering effects,

- Possibilities of using household characteristics such as parental education as a policy instrument in reducing child labor,

- Possible adverse gender biases of some coping strategies: girls suffering heavily in the face of household income shocks.

Thank You