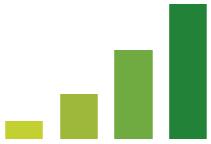

Centre for the Evaluation of Development Policies

at The Institute for Fiscal Studies

Household Responses to Information on Child Nutrition: Experimental Evidence from Malawi

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Introduction

- Malnutrition severe and prevalent problem in developing countries (Onis et al 2008)
- Decreases welfare and associated with poor long run outcomes (Strauss and Thomas 1998, Schultz 2005, Maluccio et al 2009, Barham 2012)
- Could be driven by constraints such as lack of information, credit and liquidity constraints, etc
- Social experiments shedding light on whether relaxing these improves child nutritional status (Alderman 2007; Linnemayr and Alderman 2011; Galasso and Umapathi 2009)
- Yet, very little attention paid to how other margins of household behaviour react to relaxation of constraints
- Important to understand how health interventions affect broader household behaviour and wellbeing

In this paper, we…

- Investigate how households respond to provision of information on child nutrition
- Focus on outcomes beyond child health – consumption and labour supply
- Simple theoretical model shows that in response to the information, households will:
  - Increase household and child consumption
  - Increase adult labour supply
- Test these predictions, exploiting an RCT in rural Malawi
- Intervention: Mothers in randomly chosen groups of villages ("zones") provided with information on child nutrition

Preview of Results

- Household and child consumption increase in response to information, consistent with the model
  - Evidence of increases in diet diversity
- Increased consumption funded by increases in fathers' labour supply, on both the extensive and intensive margins
- Leads to significant improvements in child health as measured by height
- Maternal knowledge improved, and mothers more likely to talk with friends about child nutrition issues, increasing salience
- Evidence of spillovers in food consumption for older children indirectly exposed to intervention

Intervention

- Infant feeding counselling intervention set up by an NGO, Mai Mwana, in Mchinji District, Malawi.
- Test its effectiveness via a cluster randomised control trial
- The Intervention:
  - Delivered through trained volunteer counsellors nominated by the local community
  - Counsellors cover a population of around 1,000 individuals → 60% eligible women visited in practice
  - Identify pregnant women in the community, and visit them once before birth and 4 times after birth of the infant. Information provided on a one-to-one basis
    - Visit 1: Birth preparedness and HIV testing and counselling services
    - Visit 2 - 5: Importance of exclusive breastfeeding, any breastfeeding related issues
    - Visit 5: Suggestions on nutritious, locally available complementary foods and how to prepare them
- Intervention began in 2005.

Experimental Design

- Mchinji District was divided into 48 parts, each with a population of 8,000 people.
- Within each part, a population of about 3000 people living close to the centre chosen to be in study area (zone), leaving a buffer area between zones
- 12 zones randomly allocated to receive the infant feeding counselling intervention, and 12 left as controls
- 24 zones received a women's group intervention, whose main focus was to improve maternal health

Data

- Main source: 2-wave survey collected 3.5 and 4.5 years after start of intervention (in 2008-09 and 2009-10); intervention still on-going at the time
- Sample drawn from census of all women of child bearing age living in study areas in 2004 (baseline census)
- Surveyed 1660 women and their households (66% of sample drawn)
- Sample balance on observables assessed with data from baseline census
- Rich information on health (maternal-reported), child anthropometrics, household and child consumption, labour supply, health knowledge, information networks

Sample Balance and Attrition

	Full Sample			Interviewed Sample		
	Control Group	Difference: Treatment - Control	p-value	Control Group	Difference: Treatment - Control	p-value
Woman's Characteristics						
Married (dv = 1)	0.616	-0.021	0.368	0.661	-0.034	0.176
Some Primary Schooling or Higher	0.706	0.033	0.356	0.682	0.04	0.352
Some Secondary Schooling or Higher	0.066	0.01	0.503	0.06	-0.007	0.563
Age (years)	24.577	-0.186	0.636	25.492	-0.429	0.368
Chewa	0.948	-0.044	0.274	0.957	-0.05	0.256
Christian	0.977	0.006	0.499	0.979	0.008	0.304
Farmer	0.661	-0.075	0.093+	0.688	-0.06	0.124
Student	0.236	0.015	0.413	0.204	0.022	0.206
Small Business/Rural Artisan	0.036	0.03	0.094+	0.037	0.024	0.242
Household Characteristics						
Agricultural household	0.995	-0.005	0.39	0.995	0.002	0.593
Main Flooring Material: Dirt, sand or dung	0.914	-0.041	0.211	0.916	-0.027	0.525
Main roofing Material: Natural Material	0.853	-0.018	0.689	0.857	-0.004	0.971
HH Members Work on Own Agricultural Land	0.942	-0.057	0.111	0.95	-0.056	0.94
Piped water	0.011	0.04	0.229	0.009	0.032	0.394
Traditional pit toilet (dv = 1)	0.772	0.054	0.225	0.791	0.054	0.248
# of hh members	5.772	0.065	0.812	5.848	0.132	0.863
# of sleeping rooms	2.116	0.199	0.027*	2.152	0.166	0.096+
HH has electricity	0.002	0.007	0.125	0.002	0.004	0.384
HH has radio	0.629	0.03	0.36	0.641	0.015	0.741
HH has bicycle	0.508	0.016	0.659	0.512	0.008	0.895
HH has motorcycle	0.008	0.001	0.872	0.007	0.002	0.767
HH has car	0.006	-0.002	0.54	0.007	-0.003	0.336
HH has paraffin lamp	0.926	0.032	0.196	0.926	0.036	0.14
HH has oxcart	0.058	-0.015	0.169	0.059	-0.022	0.066+
N	1249	1248		846	814	

Model

Simple model with 1 adult and 1 child

$$Max\ U(A,L) + G(H) \qquad (1)$$
$$st: H = h(\theta C) \qquad (2)$$
$$pA + C \leq w(T - L) \qquad (3)$$

Model Predictions:

Providing information on child nutrition to parent ($\uparrow\theta$) will:

1) increase child consumption : $\uparrow$C
   - Under the assumption that child health and consumption are low to start with
2) Increase adult labour supply : $\uparrow$T-L (or $\downarrow$L)
   - Under the assumption that $U''_{LA} > 0$
3) Increase total household consumption : $\uparrow$pA+C

Empirical Model

$$Y_{izt} = \alpha + \beta_1 T_z + \gamma X_{izt} + \mu_t + u_{izt}$$

- Y_{izt} includes:
  - Household consumption
  - Child consumption (liquid and food intakes for kids aged <2 and <6 yrs)
  - Adult labour supply (works, has 2 jobs, hours worked)
  - Child Health – anthropometrics, maternal-reported
- T_z = 1 if zone of residence of main respondent in 2004 received intervention → Identify an ITT Effect
- Selection due to reductions in infant mortality → underestimate effects
- Inference:
  - Clustered standard errors invalid with small number of clusters (<30)
  - Use the wild-bootstrap-t procedure recommended by Cameron, Gelbach, Miller (2008)

Results – Household Consumption

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	Per Capita Monthly Food Consumption for:						
	Total Non-durable	Food	Health	Cereals	Proteins	Fruit and Vegetables	Other Foods
T_z	502.889**	408.037*	6.053+	2.78	113.671*	224.985+	64.440*
Standard Error	[165.785]	[144.746]	[2.949]	[46.617]	[40.631]	[97.743]	[24.633]
Wild Cluster Bootstrap p-value	{0.004}	{0.03}	{0.06}	{0.935}	{0.011}	{0.052}	{0.018}
Observations	3190	3200	3199	3205	3202	3204	3204
R-squared	0.05	0.06	0.01	0.11	0.02	0.17	0.02
IntraCluster Correlation	0.0951	0.111	0.0225	0.0741	0.0415	0.172	0.0526
Mean Control Areas	2146	1784	17.11	606	349.8	679.7	149.7

Notes to Table: Standard errors computed using the cluster-correlated Huber-White estimator are reported in brackets, with clustering at the level of the zone; wild cluster bootstrap-t p-values in curly brackets. ** p<0.01, * p<0.05, + p<0.1. Regression includes month-year dummies to control for seasonality. All coefficients in terms of Malawi Kwacha. (The average exchange rate to the US Dollar was approx. 140MK = 1 US$ at the time of the surveys). "Total Non-Durable" is the sum of food consumption and expenditures on items such as transport, education, health, etc, "Food" is food consumption (including food which is not bought), "Health" is the per-capita expenditure (in MK) on health care, "Cereals" includes consumption of rice, maize flour and bread, "Proteins" includes consumption of milk, eggs, meat, fish and pulses "Fruit and Vegetables" includes consumption of green maize, cassava, green leaves, tomatoes, onions, pumpkins, potatoes, bananas, masuku, mango, ground nuts and other fruits and vegetables, "Other Foods" includes cooking oil, sugar, salt, alcohol and other foods.

- Substantial increases in consumption, particularly food
- Concentrated among nutritious, but more expensive foods – proteins and fruit and veg

Child Consumption - I

	[1]	[2]	[3]	[4]	[5]	[6]
	Water		Milk other than maternal		Breastmilk	
	< 6 months	6-24 months	< 6 months	6-24 months	< 6 months	6-24 months
T_z	-0.127+	0.011	-0.066+	-0.04	-0.004	-0.049*
Standard Error	[0.066]	[0.016]	[0.037]	[0.040]	[0.011]	[0.020]
Wild Cluster Bootstrap p-value	{0.06}	{0.553}	{0.086}	{0.38}	{0.789}	{0.02}
Observations	359	950	151	510	361	999
R-squared	0.24	0.04	0.08	0.02	0.02	0.11
IntraCluster Correlation	0.0242	0.0243	0.06	0.0592	0	0.0122
Mean, Control	0.488	0.953	0.101	0.203	0.994	0.925

Notes to Table: All regressions include controls for age, age-squared, gender and dummies for the month of interview. Standard errors computed using the cluster-correlated Huber-White estimator are reported in brackets, with clustering at the level of the zone; wild cluster bootstrap-t p-values in curly brackets. ** p<0.01, * p<0.05, + p<0.1. Samples pooled for both waves. Samples for columns 1, 3 and 5 includes children aged less than 6 months and whose mothers were potentially undergoing the intervention at the time of the survey. Samples in columns 2, 4 and 6 includes children born after July 2005, and aged 6 to 53 months at time of survey. "Water" is an indicator for whether the child had any water in the 3 days prior to the survey, "Milk other than maternal" is an indicator (measured in wave 2 only) for whether the child had milk other than breastmilk in the 3 days prior to the survey; "Breastmilk" is an indicator for whether the child was being breastfed at the time of the survey.

- Evidence of reductions in probability that babies aged < 6 months consume water or milk other than maternal milk

Child Consumption - II

	Number of Foods	Number of Protein-Rich	Number of Staples	Number of Fruit and Veg
	[1]	[2]	[3]	[4]
T_z	0.436+	0.316+	0.106+	0.009
Standard Error	[0.241]	[0.151]	[0.058]	[0.064]
Wild Cluster Bootstrap p-value	{0.086}	{0.052}	{0.062}	{0.895}
Observations	1276	1282	1285	1284
R-squared	0.14	0.07	0.05	0.2
IntraCluster Correlation	0.103	0.0929	0.0743	0.0856
Mean, Control	5.109	1.175	1.729	1.659
Total	8	4	2	2

Notes to Table: All regressions include controls for age, age-squared, gender, wealth at baseline, education of the main respondent and median zone distance to closest trading centre and dummies for the month of interview.Standard errors computed using the cluster-correlated Huber-White estimator are reported in brackets, with clustering at the level of the zone; wild cluster bootstrap-t p-values in curly brackets. ** p<0.01, * p<0.05, + p<0.1. Sample contains all children born after July 2005, and who were aged between 6 and 53 months at time of survey. "Number of Foods" is the number of foods (between 1 and 8) taken by the child during the 3 days prior to the survey, "Number of Protein-Rich" takes integer values between 0 and 4 depending on the intake of meat, fish, eggs and beans, "Number of Staples" takes integer values between 0 and 2 depending on intake of nsima and porridge, "Number of Fruit and Veg" takes integer values between 0 and 2.

- Sample of kids born after 1 July 2005, when intervention started
- Increased diversity in food consumption

How are the increases in consumption funded?

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	Works	Has at least 2 jobs	Weekly Hours Worked	Works	Has at least 2 jobs	Weekly Hours Worked	Works	Has at least 2 jobs	Weekly Hours Worked
		All Males			Fathers			Non-Fathers	
T_z	0.055	0.061+	3.757	0.071	0.080*	5.370+	0.023	0.03	0.836
Standard Error	[0.066]	[0.028]	[2.508]	[0.061]	[0.035]	[3.033]	[0.099]	[0.022]	[2.636]
Wild Cluster Bootstrap p-value	{0.523}	{0.06}	{0.17}	{0.28}	{0.044}	{0.094}	{0.87}	{0.25}	{0.77}
Observations	3956	3953	3637	2380	2378	2160	1602	1601	1501
R-squared	0.15	0.06	0.18	0.05	0.03	0.05	0.1	0.06	0.2
IntraCluster Correlation	0.208	0.0357	0.0998	0.408	0.0464	0.142	0.291	0.0409	0.139
Mean, Control	0.836	0.122	25.74	0.913	0.166	30.26	0.717	0.052	18.86
		All Females			Mothers			Non-Mothers	
T_z	-0.035	0.032	-0.801	-0.064	0.038	-1.024	0.021	0.017	-0.69
Standard Error	[0.071]	[0.023]	[2.684]	[0.071]	[0.029]	[3.013]	[0.090]	[0.015]	[2.557]
Wild Cluster Bootstrap p-value	{0.67}	{0.198}	{0.86}	{0.41}	{0.221}	{0.713}	{0.79}	{0.32}	{0.83}
Observations	4445	4443	4134	3015	3013	2787	1440	1440	1356
R-squared	0.12	0.05	0.14	0.05	0.03	0.05	0.09	0.05	0.18
IntraCluster Correlation	0.214	0.0249	0.144	0.312	0.0309	0.187	0.229	0.0131	0.129
Mean, Control	0.861	0.108	24.54	0.938	0.135	27.64	0.687	0.0482	17.73

Notes to Table: All regressions include controls for age, age-squared, marital status, education and dummies for the month of interview. Standard errors computed using the cluster-correlated Huber-White estimator are reported in brackets, with clustering at the level of the zone; wild cluster bootstrap-t p-values in curly brackets. ** p<0.01, * p<0.05, + p<0.1. The sample in the top-left panel ("All Males") includes all males aged 15-65 years; that in the bottom-left ("All Females") includes all females aged 15-65 years; that in the top-centre panel ("Fathers") includes all males aged 15-65 years with a child aged <15 years; that in the bottom-centre panel ("Mothers") includes all females aged 15-65 years with a child aged < 15 years; that in the top-right ("Non-Fathers") includes all males aged 15-65 years without a child aged < 15 years, while that in the bottom-right panel ("Non-Mothers") includes all females aged 15-65 years without a child aged < 15 years. "Works" in an indicator of whether individual had an income-generating activity at the time of the survey, "Has at least 2 jobs" is an indicator for whether individual has 2 income generating activities, "Weekly Hours worked" give the total hours worked in the week prior to the survey on both income generating activities.

Child Health

	[1]	[2]	[3]	[4]	[5]	[6]
	Height For Age		Weight for Age		Weight for Height	
Age at measurement -->	<6 months	> 6 months	<6 months	> 6 months	<6 months	> 6 months
T_z	0.136	0.204+	-0.133	0.004	-0.369	-0.221+
Standard Error	[0.28]	[0.11]	[0.17]	[0.10]	[0.33]	[0.088]
Wild Cluster Bootstrap p-value	{0.691}	{0.066}	{0.47}	{0.969}	{0.354}	{0.06}
Observations	324	2192	339	2265	319	2217
R-squared	0.05	0.04	0.03	0.02	0.07	0.01
IntraCluster Correlation	0.0482	0.0218	0.048	0.0303	0.197	0.0267
Z-Scores, Control	-0.56	-2.343	0.00828	-0.841	0.633	0.659

Notes to Table: Standard errors computed using the cluster-correlated Huber-White estimator are reported in brackets, with clustering at the level of the zone; wild cluster bootstrap-t p-values in curly brackets. ** p<0.01, * p<0.05, + p<0.1. All regressions include controls for age, age-squared, gender and dummies for the month of interview. Sample in columns 1, 3 and 5 includes children born after June 2005 and who were < 6 months and whose mothers were potentially undergoing the intervention at the time of measurement. Sample in columns 2, 4 and 6 includes children born after July 2005 and who were aged between 6 and 53 months at time of measurement. "Height-for-Age", "Weight-for-Age" and "Weight-for_Height" are standardised z-scores relative to the WHO reference population.

Child Health II

	[1]	[2]	[3]	[4]	[5]
	Suffered Diarrhoea	**Suffered from Vomiting**	**Suffered from Fast Breathing**	**Suffered Fever**	**Suffered from Chills**
			< 6 months		
T_z	-0.049+	-0.055	0.035	0.01	-0.001
Standard Error	[0.027]	[0.040]	[0.052]	[0.073]	[0.050]
Wild Cluster Bootstrap p-value	{0.066}	{0.234}	{0.527}	{0.943}	{0.949}
Observations	376	376	376	376	376
R-squared	0.06	0.06	0.06	0.08	0.03
IntraCluster Correlation	0	0.0259	0.0367	0.0661	0.0746
Mean, Control	0.129	0.169	0.124	0.421	0.101
			> 6 months		
T_z	0.014	-0.012	0.018	0.022	0.016
Standard Error	[0.037]	[0.052]	[0.053]	[0.064]	[0.053]
Wild Cluster Bootstrap p-value	{0.661}	{0.799}	{0.821}	{0.741}	{0.779}
Observations	2362	2366	2363	2371	2370
R-squared	0.11	0.01	0.02	0.01	0.01
IntraCluster Correlation	0.0337	0.081	0.139	0.0804	0.112
Mean, Control	0.251	0.207	0.101	0.507	0.149

Notes to Table: Notes to table: Standard errors computed using the cluster-correlated Huber-White estimator are reported in brackets, with clustering at the level of the zone; wild cluster bootstrap-t p-values in curly brackets. ** p<0.01, * p<0.05, + p<0.1. All regressions include controls for age, quadratic in age, gender and dummies for the month of interview. Sample in columns 1 and 3 includes children born after June 2005 and who were < 6 months and whose mothers were potentially undergoing the intervention at the time of survey. Sample in columns 2 and 4 includes children born after July 2005 and who were aged between 6 and 53 months at time of survey. Each column represents a different dependent variable which takes value 1 if the the child has suffered the condition specified in the column heading in the 15 days previous to the survey as reported by the main respondent, 0 otherwise.

Robustness

- Results not driven by:
  - Improvements in adult health
  - Reductions in fertility
  - Differential attrition:
    - Sample balanced on observables
    - Further see no differences on outcomes for older children (born pre-intervention) or in labour supply of adults who are not parents (reflect different labour market conditions)

Conclusions

- Investigate how households respond to information on child nutrition
- Exploit a randomised experiment in rural Malawi for identification
- Find that households increase household and child consumption
- Funded by increases in fathers' labour supply
- Spillovers in food consumption of older children, but not in terms of health (not shown here)
- Rule out that effects are driven by improvements in adult health and reductions in fertility