14.771 Development Economics: Microeconomic issues and Policy Models

Fall 2008

The Demand for Health and Calories

Esther Duflo

14.771

Some striking facts

- Achieving a minimum nutrition standard is fairly cheap (even with today's prices)
- Yet, there is plenty of malnutrition, even outside countries that face particularly acute food crises: ▸ Udaipur, ▸ Children malnutrition; ▸ Comparison with world ▸ calories consumed in India today.
- Household spend considerable share of their budget on health care, and visit doctors frequently: ▸ Visits to Doctors in Udaipur; ▸ health in the world ▸ Share of Budget spent on Health
- Yet, take up of cheap, highly effective preventive care remain really low:
  - Less than 5% of children and 3% of pregnant mothers in Kenya sleep under a bednet (Cohen and Dupas (2007)).
  - 25% of mother breastfeed within an hour of birth in India
  - NFHS report 44% of children fully immunized, and this is probably an exageration.

Understanding Health Demand

- Traditional model of demand for health input (e.g. Strauss and Thomas) (calories, an action, a shot)

$$H = f(y, p, r, X)$$

- For H, an health input. Health depends on price p , income y, characteristics and anticipated impact of these inputs on health r, X characteristics which may influence the demand for health itself (social norms, education, etc.)
- Underlying this model, view of health (and possibly health inputs as well) as both consumption and investment. Two sources for the income effect (health –or even health inputs–is a normal good; resource constraints).
- Health is difficult to understand: Education, environment, also play a role in determining r (perceived impact of action on health), and hence, in reduced form, demand for health inputs.
- This ignores intra-family decisions: whose health? who decides about it? who cares about it, to which we will return later.

Does Income affect Nutrition: The Engel-Curve approach?

- Deaton-Subramanian: Non-parametric estimates of the relationship between total expenditures per capita in the household and calories consumed.
- Points to keep in mind:
  - Food expenditure is not equal to nutrition: price per calory.
  - Need to go from food items consumed to nutrients consumed through conversion tables (need detailed items).
  - Some other adjustments needed: meals taken out or given away, waste.
  - This is not a structural relationship: it could be an income effect on the demand for food OR that the household needs more food to produce more income.
  - It is also cross-sectional: it may not be a good indication of how a person would react if their income increased (unobserved heterogeneity; adaptation to nutrition level)

- Methods to estimate $y = g(x)$
  - Kernel regression: for each point x along a grid,weighted mean of y in a neighborood of x (weights are Kernel weights)
  - Local Linear (Fan) regression: for each point x along a grid, predicted value from a weighted linear regression in a neighborhood of x (kernel weights). Better (not biased at the edges) (what Deaton and Subramanian use).
  - Further advantage: with y=log(calories per capita) and x=log(expenditure per capita), elasticity at any point is slope of the curve: directly estimated at each point in the grid

Results

- Clear relationship between total expenditures per capita and calorie consumption: ▸ figure
- The relationship does not appear to be non-linear, at least in this range, and the elasticity is never above 1 (despite the fact that it is probably an over estimate due to the reverse causality): ▸ Elasticity
- There is also a strong relationship between price of calories and expenditures (see ▸ figure, indicating a lot of substitution towards more expensive calories: not clear that households' back is against the wall, even very poor households.
- Since the relationship is more or less log-linear, they proceed to estimate a log-linear relationship, which allows them to add control variables: ▸ Table.

Deaton-Dreze Nutrition Over Time in India

- Surprisingly, calory consumption is falling down in India, at the same time as income and overall expenditure increase...
- Has the Engel-Curve gone away?
- No... instead it is shifting downwards over time: ▸ figure.
- How can we reconcile an upward-slopping Cross-Sectional Engel-Curve with a downward drifts as income increase?
  - Relative price of food?
  - Demand for variety
  - D-D explanation: Calory requirements are going down over time (better health infrastructure/more sedentary work); people do need to get enough calories to do their work, and try to get the tastier one possible within this constraint
  - Problem with that explanation: nutritional status is still really poor in India, and not going up really fast (in NFHS some measures show a worsening of children's nutritional status). This explanation assumes that people are content with a nutritional status that most of us would consider quite poor.

Income shock and nutritional status: Natural Experiments

- Indian time-series experience suggest that movements along the cross-sectional Engel curve may not identify the effect of income on demand for nutrition
- Time series does not identify this impact either, since many things change over time.
- Ideal (thought) experiment?
- Natural experiments:
  - Duflo: Grandmother and Granddaughters: exogenous pension increase in South Africa on child health (we will discuss it later when we talk about intra-household).
  - Banerjee, Duflo, Postel-Vinay, Watts: 40% drop in wine production (due to phyloxera). Income shock with probably not too many other things happening. Look at heights of cohorts born at that time: ▸ table.

The demand for Calories: Price effect

- Large increase in food prices since 2005. From March 2007 to March 2008, the average world price for corn increased 30%; for rice, it increased 74%; for soybeans, 87%; and for wheat, 130%
- Very concerning for the welfare of the poor.
- Will it result in stark decline in nutritional standards?
- Note that an increase in prices will have a both an income and a substitution effect (since food is an important part of the budget).
- Income effect should lead to a substitution towards cheaper food items (even if they all increase proportionally)

The demand for Calories: Jensen-Miller

- Reverse Experiment in China: subsidize staple food in two region for randomly selected household. Survey food consumption after a few month.
- In both regions, substitution towards more expensive calories: ▸ Hunan ▸ Guansu.
- In one region, calories consumption actually worsens. No perceptible improvement on the other items except fat. In the other region, no change in calories consumption ▸ Table.
- What can explain these results?
- Caveats: short term decrease in food prices: people may be using the windfall to have good food rather than to improve their nutritional status. Long term increase/decrease may have very different impacts.

The demand for Health: Price effects

- Households seem to be willing to pay for what they perceive to be quality: e.g. expenditure on private health care in India.
- However, surprisingly large price elasticities for preventive health–Examples:
- Small positive price: Cohen-Dupas: Take up of insecticide treated bednets by pregnant women
  - Experimental Approach: Different maternity clinics randomly assign to give away nets or to sell them at different prices.
  - Huge elasticity of take up: ▸ figure
  - No elasticity of use conditional on take up (contrary to what is often hypothesized): ▸ Conditional usage ▸ Effective coverage.
  -

Price Effects

- Small negative price: Banerjee-Duflo etc.. Immunization in India
  - 130 villages
  - 60 get randomly assigned to receive regular immunization camp
  - 30 of those get small incentives to get immunized (1 kg of lentils/1 set of plates)
  - Pretty large impact of the camp..But larger impact of the lentils ▸ complete immunization ▸ number of shots

Why these high price elasticities?

- These are just two examples, but Kremer and Holla (2008) review several
- High price elasticities, particularly for preventive health.
- Basis for the "Conditional Cash transfer approach" (e.g. Progresa, Mexico), which has become very popular in many countries: cash transfer is conditional on health.
- Puzzling in light of health demand model we started with:
  - Large benefits
  - Prices (or opportunity cost) are not that high to begin with
- High discount rates or hyperbolic discounting?
- Problem with this explanation is that it would imply a pretty high degree of naivete to keep postponing (given the large benefits)

High elasticity: possible Explanation

- We observe large sensitivity to relevant information
  - e.g. Dupas (2007): Pregnancies with older partners decline significantly when teenager are informed that older men are less likely to have HIV than younger men. ▸ table
- However, learning about health is very difficult (Das and Sanchez, 2002): many diseases are "self-limiting", in the sense that symptoms will go away by themselves (at least temporarily) : learning about doctor quality is really hard.
- Particularly difficult to link cause and effects with preventive case, especially when the behavior has externalities.

High elasticity: possible Explanation

- Mistrust of government (message changes; in India: forced sterilization).
- Very little impact of less well defined "behavioral change" message
  - e.g. Kremer and Miguel: No impact of a campaign to convince kids to wear shoes and stop fishing in the lake to avoid catching worms.
- As a result, there could be a large zone of indifference, where people simply do not know what the benefits are, so are willing to do things if this does not cost them anything, but will be discouraged by any cost.
- May not be the right model... However, what this does suggest is that the basic "health as human capital" model is problematic.

Conclusions

- At a literal level, the Das Gupta - Ray model is not doing very well so far... the income elasticities of calory consumption are probably not zero, but clearly not huge either.
- However, this may need to be re-interpreted less literally.
- May be health rather than income.
- Think of the very high price elasticity for the very poor. If those were much lower for the rich, small differences in the political environment could generate huge difference in health outcomes for rich and poor.

Banerjee, Deaton, and Duflo (Health, Wealth, Health Services), Table 1

Selected Health Indicators, by Position in the per Capita Monthly Expenditure Distribution

Indicator	*Group*		
	Bottom third	*Middle third*	*Top third*
Reported health status	5.87	5.98	6.03
No. symptoms self-reported in last 30 days	3.89	3.73	3.96
BMI	17.85	17.83	18.31
Hemoglobin below 12 g/dl	0.57	0.59	0.51
Peak flow meter reading	314.76	317.67	316.39
High blood pressure	0.17	0.15	0.20
Low blood pressure	0.06	0.08	0.09

Notes: Means reported are based on data collected by the authors from 1,024 households. See text for survey and variable description.

Deaton and Dreze, Table 9

Child Nutrition Indicators, 1975-9 to 2004-5

	Proportion (%) of undernourished children					Percentage decline
	1975-79	1988-90	1996-97	2000-1	2004-5	(1975-9 to 2004-5)
Weight-for-age						
Below 2 SD	77	69	62	60	55	29
Below 3 SD	37	27	23	21	18	51
Height-for-age						
Below 2 SD	79	65	58	49	52	34
Below 3 SD	53	37	29	26	25	53
Weight-for-height						
Below 2 SD	18	20	19	23	15	17
Below 3 SD	2.9	2.4	2.5	3.1	2.4	17
Prevalence of nutritional deficiency signs (%)						
Oedema						
Marasmus	0.4	0.1	0.1	0.0	0.0	100
Bitot spots	1.3	0.6	0.1	0.2	0.0	100
Angular stomatitis	1.8	0.7	0.7	0.8	0.6	67
	5.7	5.7	2.1	1.4	0.8	86

Source: *National Nutrition Monitoring Bureau (1991, 1999, 2002, 2006). All figures pertain to children aged 1-5 years.*

Deaton and Dreze, Table 10

Countries with the Highest Levels of Child Undernutrition, 1996-2005

Country	Proportion (%) of children with low "weight for age"
Nepal	48.3
Bangladesh	47.5
India	46.7
Timor-Leste	45.8
Yemen	45.6
Burundi	45.1
Madagascar	41.9
Sudan	40.7
Lao (People's Dem Rep)	40.4
Niger	40.1
Eritrea	39.6
Afghanistan	39.3

Source: *World Development Indicators, 2007. Figures apply to the most recent year for which data are available within the reference period. There is a significant margin of error for individual countries.*

Figure by MIT OpenCourseWare.

Deaton and Dreze, Table 5

Fractions of the Population Living in Households with per Capita Calorie Consumption below 2,100 Urban and 2,400 Rural

Year	Round	Rural	Urban	All India
1983	38	66.1	60.5	64.8
1987-8	43	65.9	57.1	63.9
1993-4	50	71.1	58.1	67.8
1999-0	55	74.2	58.2	70.1
2004-5	61	79.8	63.9	75.8

Source: *Authors' calculations based on NSS data.*

Figure by MIT OpenCourseWare.

Banerjee, Deaton, and Duflo (Health Care Delivery), Table 2

Frequency of Health Care Visits

Per capita monthly expenditure		*Total number of visits in the last 30 days*			
		All	*Public*	*Private*	*Bhopa*
Panel A: Means					
All	470	0.51	0.12	0.28	0.11
Poor	219	0.43	0.09	0.22	0.12
Middle	361	0.54	0.11	0.29	0.13
Rich	770	0.55	0.15	0.33	0.07
Panel B: OLS regressions: dependent variable: number of visits					
Middle		0.11 (.052)	0.02 (.023)	0.07 (.034)	0.01 (.027)
Rich		0.12 (.05)	0.06 (.024)	0.11 (.034)	-0.05 (.022)
Panel C: OLS regressions, with village fixed effects					
Middle		0.14 (.047)	0.02 (.024)	0.09 (.033)	0.02 (.023)
Rich		0.13 (.05)	0.04 (.026)	0.11 (.036)	-0.03 (.025)
Villages fixed effects		yes	yes	yes	yes

Note: Omitted dummies in panel B and C: poor
Standard errors in parentheses below the coefficients

Health in the Household

		In Last Month				
		Percent of HH Members Sick	A Household's Average # of Consultations	Percent of Households that met At Least Once with a Consultant		Infant Mortality
				Public	Private	
Rural						
	Cote d'Ivoire	21.4%	1.28	49.7%	3.2%	6.2%
	Guatemala					6.2%
	India - Hyderabad					
	India - Udaipur	46.1%	0.11	20.1%	58.1%	10.0%
	India - UP/Bihar	12.5%	0.81	13.9%	47.3%	7.7%
	Indonesia	24.2%	0.77	20.7%	27.3%	3.4%
	Mexico	46.3%	1.11	47.7%	0.0%	6.9%
	Nicaragua	34.9%	0.15	46.0%	5.0%	
	Pakistan	28.0%	0.45	24.0%	48.8%	16.7%
	Panama	15.2%	0.10	23.8%	0.0%	
	Papua New Guinea					
	Peru	11.1%	0.10	20.9%	8.5%	
	South Africa	12.5%	0.12	16.4%	6.9%	8.6%
	Tanzania	13.2%	0.07	23.2%	14.0%	8.7%
	Timor Leste	11.7%	0.21	30.2%	0.5%	

How the poor spend their money

As a Share of Total Consumption

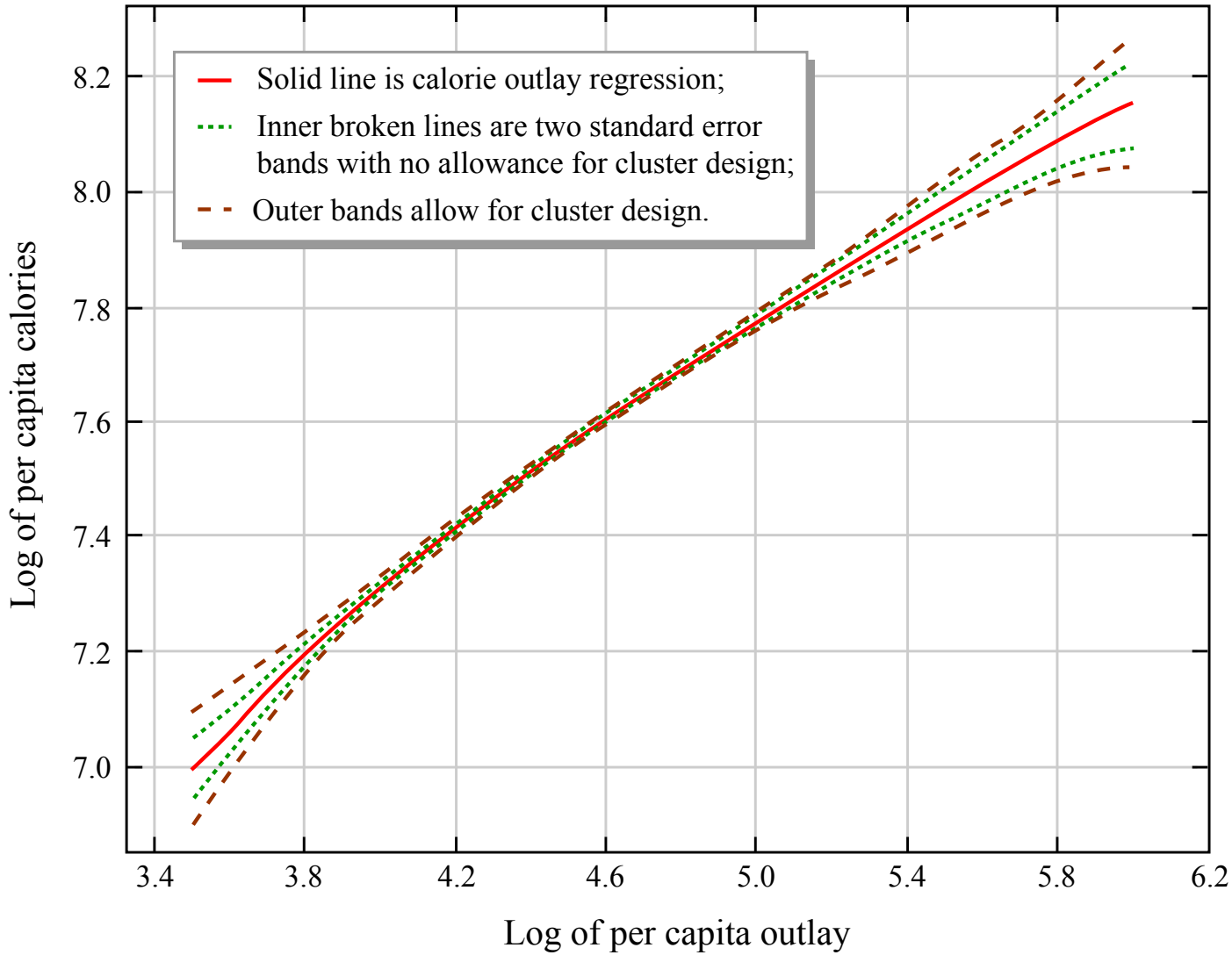
		Food	Alcohol/ Tobacco	Education	Health
Rural					
	Cote d'Ivoire	64.4%	2.7%	5.8%	2.2%
	Guatemala	65.9%	0.4%	0.1%	0.3%
	India - Udaipur	56.0%	5.0%	1.6%	5.1%
	India - UP/Bihar	80.1%	3.1%	0.3%	5.2%
	Indonesia	66.1%	6.0%	6.3%	1.3%
	Mexico	49.6%	8.1%	6.9%	0.0%
	Nicaragua	57.3%	0.1%	2.3%	4.1%
	Pakistan	67.3%	3.1%	3.4%	3.4%
	Panama	67.8%		2.5%	4.0%
	Papua New Guinea	78.2%	4.1%	1.8%	0.3%
	Peru	71.8%	1.0%	1.9%	0.4%
	South Africa	71.5%	2.5%	0.8%	0.0%
	Timor Leste	76.5%	0.0%	0.8%	0.9%

Deaton and Subramanian, Table 1

Expenditure Patterns, Calorie Consumption, and Prices per Calorie, Rural Maharashtra, 1983

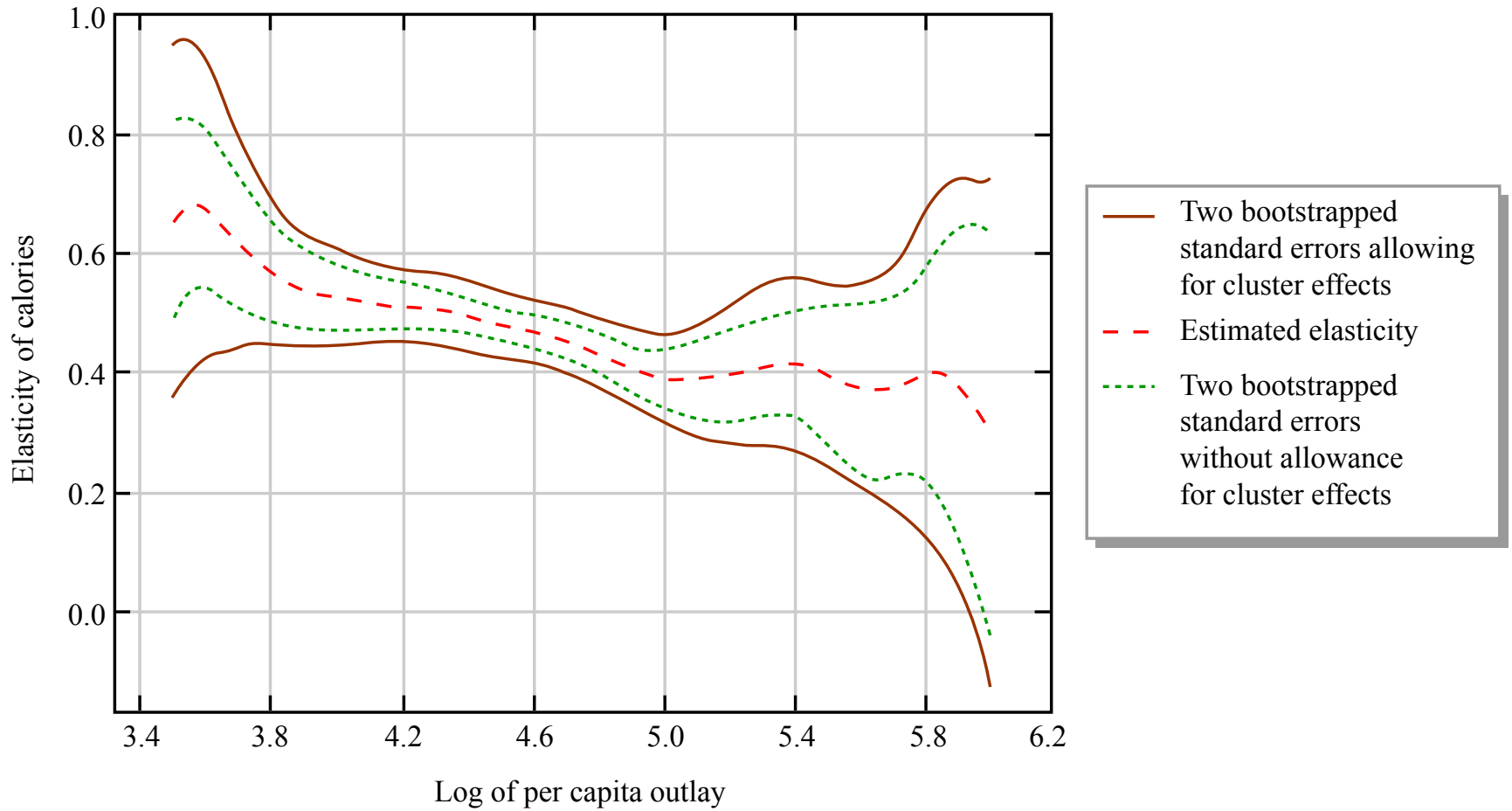
	Expenditure shares (%)			*Calorie shares (%)*			*Price per calorie (Rupees per 1,000 calories)*		
	Mean (1)	*Bottom 10% (2)*	*Top 10% (3)*	*Mean (4)*	*Bottom 10% (5)*	*Top 10% (6)*	*Mean (7)*	*Bottom 10% (8)*	*Top 10% (9)*
A. Food groups									
Cereals	40.7	46.0	31.0	70.8	77.3	57.3	.64	.51	.79
Pulses	8.9	10.2	7.8	6.6	6.2	7.2	1.51	1.44	1.60
Dairy	8.1	4.9	11.8	2.8	1.3	4.9	3.69	3.59	3.92
Oils and fats	9.0	9.2	9.2	5.9	4.8	7.6	1.74	1.67	1.81
Meat	5.1	3.4	6.4	.7	.4	1.0	11.7	11.0	12.2
Fruits and vegetables	10.5	8.5	12.0	3.5	2.3	5.4	3.90	3.83	3.85
Sugar	6.5	7.4	5.9	7.2	7.0	8.0	1.01	.94	1.09
Other food	11.3	10.4	16.1	2.5	0.8	8.6	17.4	16.8	15.9
B. Cereals									
Rice	11.6	9.0	10.9	15.2	10.1	16.5	.95	.89	1.02
Wheat	5.6	3.8	7.9	8.5	4.7	14.4	.79	.73	.82
Jowar	18.2	27.4	9.3	37.8	52.9	21.6	.50	.43	.55
Bajra	3.0	2.7	1.3	6.6	4.9	3.2	.48	.48	.50
Other coarse cereal	1.2	2.8	.3	2.2	4.5	.6	.66	.58	.99
Cereal substitutes	1.1	.5	1.3	.6	.2	.8	2.23	2.22	2.22
Total food (or total calories)	67.4	73.4	54.1	2,120	1,385	3,382	1.14	.88	1.50
				2,098	1,429	3,167			

Figure by MIT OpenCourseWare.

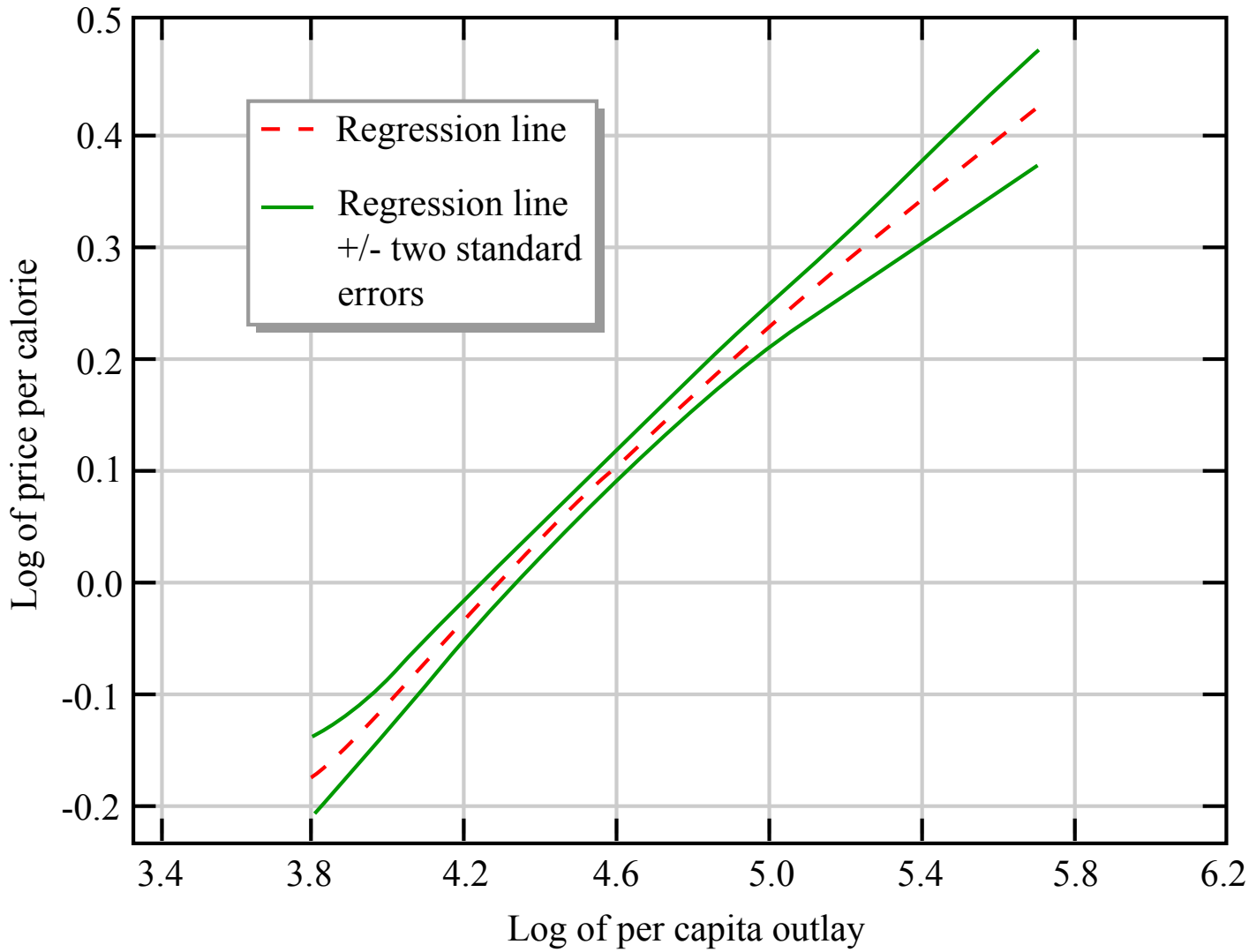


Regression function for log calories and log per capita expenditure, Maharashtra, India, 1983.

Deaton and Subramanian, Figure 3



Elasticity of per capita calories to per capita expenditure, Maharashtra, India, 1983.



Log of price per calorie and log of per capita expenditure, Maharashtra, India, 1983.

OLS Estimates of Double Log Calorie and Calorie Price Regressions with Other Covariates

	Log calorie availability				Log price per calorie			
	All data (1)		Within village (2)		All data (3)		Within village (4)	
	β	$\|t\|$	β	$\|t\|$	β	$\|t\|$	β	$\|t\|$
Constant	6.028	(78)			- 1.5934	(18)		
ln PCE	.3655	(29)	.3407	(27)	.3799	(25)	.3217	(23)
ln household size	- .1572	(14)	- .1630	(21)	.0839	(6.8)	.0661	(8.4)
rm04	- .0967	(2.2)	- .1461	(4.1)	.1024	(2.3)	.1008	(3.3)
rm59	.0488	(1.2)	.0321	(1.0)	- .0467	(1.2)	- .0331	(1.2)
rm1014	.0891	(1.9)	.0612	(1.9)	- .1120	(2.3)	- .0842	(2.9)
rm1555	.1636	(5.1)	.1634	(5.9)	- .1700	(4.3)	- .1347	(5.0)
rm55+	.1406	(3.0)	.1213	(2.8)	- .1565	(3.6)	- .1074	(2.9)
rf 04	- .1359	(3.1)	- .1869	(4.9)	.0460	(1.1)	.0742	(2.2)
rf 59	.0176	(.4)	- .0040	(.1)	- .0643	(1.4)	- .0476	(1.4)
rf 1014	.1140	(2.8)	.0679	(2.0)	- .1108	(2.7)	- .0873	(3.0)
rf 1555	.0420	(1.6)	.0514	(2.1)	.0085	(.3)	- .0021	(.1)
Scheduled caste	- .0083	(.8)	- .0179	(2.0)	.0020	(.2)	- .0071	(.8)
Hindu	.0114	(.7)	.0302	(2.1)	- .0562	(2.6)	- .0605	(4.4)
Buddhist	.0237	(1.1)	.0400	(2.0)	- .1080	(4.0)	- .0760	(4.0)
Self-employed nonagriculture	.0187	(1.0)	.0064	(.4)	- .0270	(1.1)	.0079	(.5)
Agricultural labor	.0433	(2.2)	.0222	(1.4)	- .0837	(3.4)	- .0418	(2.7)
Nonagricultural labor	.0275	(1.1)	.0293	(1.5)	- .0210	(.8)	- .0315	(1.7)
Self-employed agriculture	.0618	(3.5)	.0389	(2.7)	- .0610	(2.8)	- .0118	(.8)
R^2	.5532		.6706		.4254		.6414	

Deaton and Dreze, Figure 1

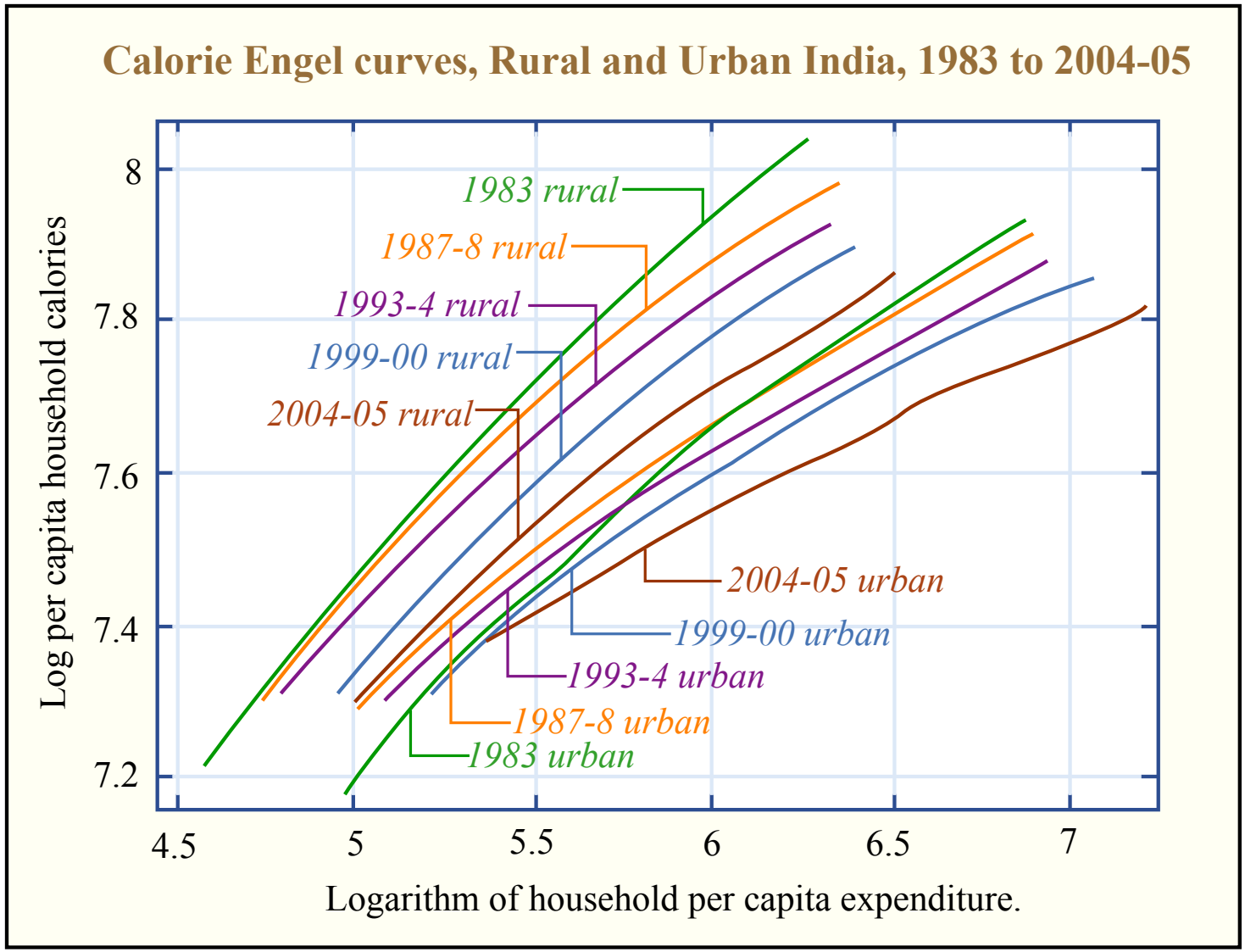


Figure by MIT OpenCourseWare.

Table 3: Impact of phylloxera on height at 20
(year of birth 1852-1892: cohorts 1872-1912)

	Dependent Variables	
	Mean height	Fraction shorted than 1.56 meter
	(1)	(2)
A. Year Dummies, Departement dummies		
Born in phylloxera year	-0.00150	0.00358
	(.00093)	(.00204)
Observations	3485	3485
Department trend	No	No
B.Year dummies, departement dummies, departement trend		
Born in phylloxera year	-0.00188	0.00381
	(.00095)	(.00173)
Observations	3485	3485
Department trend	Yes	Yes
C. Hectare of vine per habitant		
born in phylloxa year *hectare	-0.00753	0.01928
vine per habitant	(.00389)	(.01142)
Observations	3485	3485
Department trend	Yes	Yes

Table 4. Consumption Response to the Price Subsidy

	HUNAN							
	Rice	Other Cereal	Fruit & Veg	Meat	Seafood	Pulses	Dairy	Fats
%Subsidy(rice)	-0.235*	0.397	-0.623***	0.377	0.482**	-0.791*	-0.054	-0.567*
	(0.140)	(0.355)	(0.227)	(0.415)	(0.230)	(0.476)	(0.069)	(0.313)
%ΔEarned	0.043***	-0.001	0.058***	0.002	0.036	-0.052	-0.006	0.022
	(0.014)	(0.040)	(0.021)	(0.043)	(0.022)	(0.050)	(0.004)	(0.031)
%ΔUnearned	-0.044*	-0.087	-0.018	0.076	-0.004	-0.037	-0.021	-0.007
	(0.025)	(0.065)	(0.040)	(0.071)	(0.042)	(0.075)	(0.019)	(0.055)
%ΔPeople	0.89***	0.46**	0.63***	0.05	-0.07	0.48**	0.09	0.88***
	(0.08)	(0.19)	(0.11)	(0.24)	(0.10)	(0.23)	(0.05)	(0.16)
Constant	4.1***	7.5***	-0.3	-5.7**	-0.2	8.8***	0.2	-8.3***
	(1.0)	(2.5)	(1.4)	(2.8)	(1.4)	(3.0)	(0.6)	(2.1)
Observations	1258	1258	1258	1258	1258	1258	1258	1258
R^2	0.19	0.06	0.11	0.07	0.02	0.03	0.02	0.09

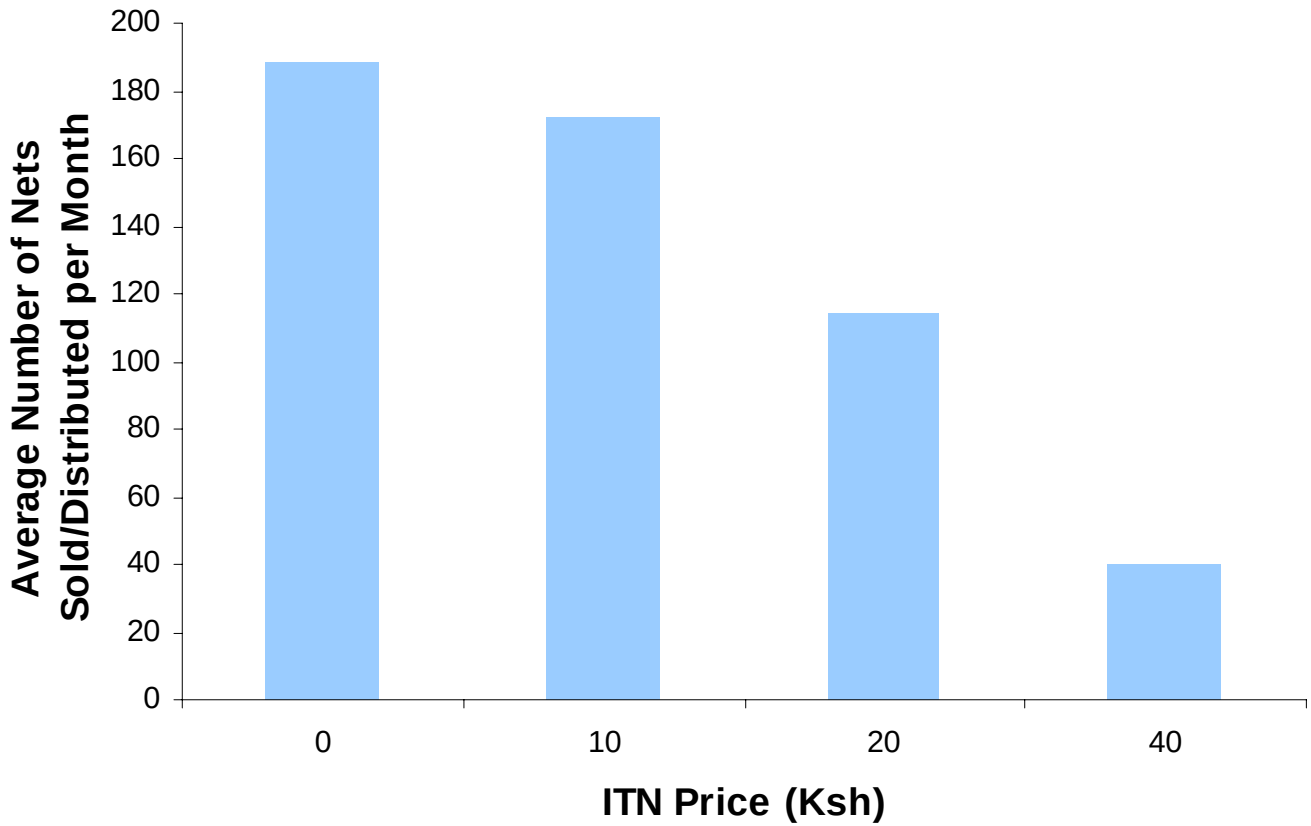
	Wheat	Other Cereal	Fruit & Veg	Meat	GANSU Seafood	Pulses	Dairy	Fats
%Subsidy(wheat)	0.353	-0.283	0.049	0.130	-0.017	0.240	0.282	0.507**
	(0.258)	(0.335)	(0.190)	(0.299)	(0.017)	(0.320)	(0.207)	(0.251)
%ΔEarned	0.079**	-0.067	0.061**	0.085*	0.000	-0.047	-0.025	0.091***
	(0.036)	(0.049)	(0.027)	(0.044)	(0.000)	(0.043)	(0.029)	(0.033)
%ΔUnearned	-0.017	0.130	0.046	0.314***	0.025	0.012	0.108	-0.110
	(0.092)	(0.106)	(0.077)	(0.091)	(0.025)	(0.104)	(0.073)	(0.091)
%ΔPeople	0.58***	0.52*	1.01***	-0.10	-0.01	0.44**	0.10	0.66
	(0.22)	(0.29)	(0.15)	(0.28)	(0.01)	(0.18)	(0.12)	(0.15)
Constant	-26.1***	23.8***	11.0***	2.4	-0.2	6.0**	-3.4*	7.2
	(2.3)	(2.8)	(1.6)	(2.5)	(0.2)	(2.6)	(1.9)	(2.1)
Observations	1269	1269	1269	1269	1269	1269	1269	1269
R^2	0.08	0.06	0.07	0.05	0.03	0.06	0.03	0.07

Table 2. Calorie Response to the Price Subsidy

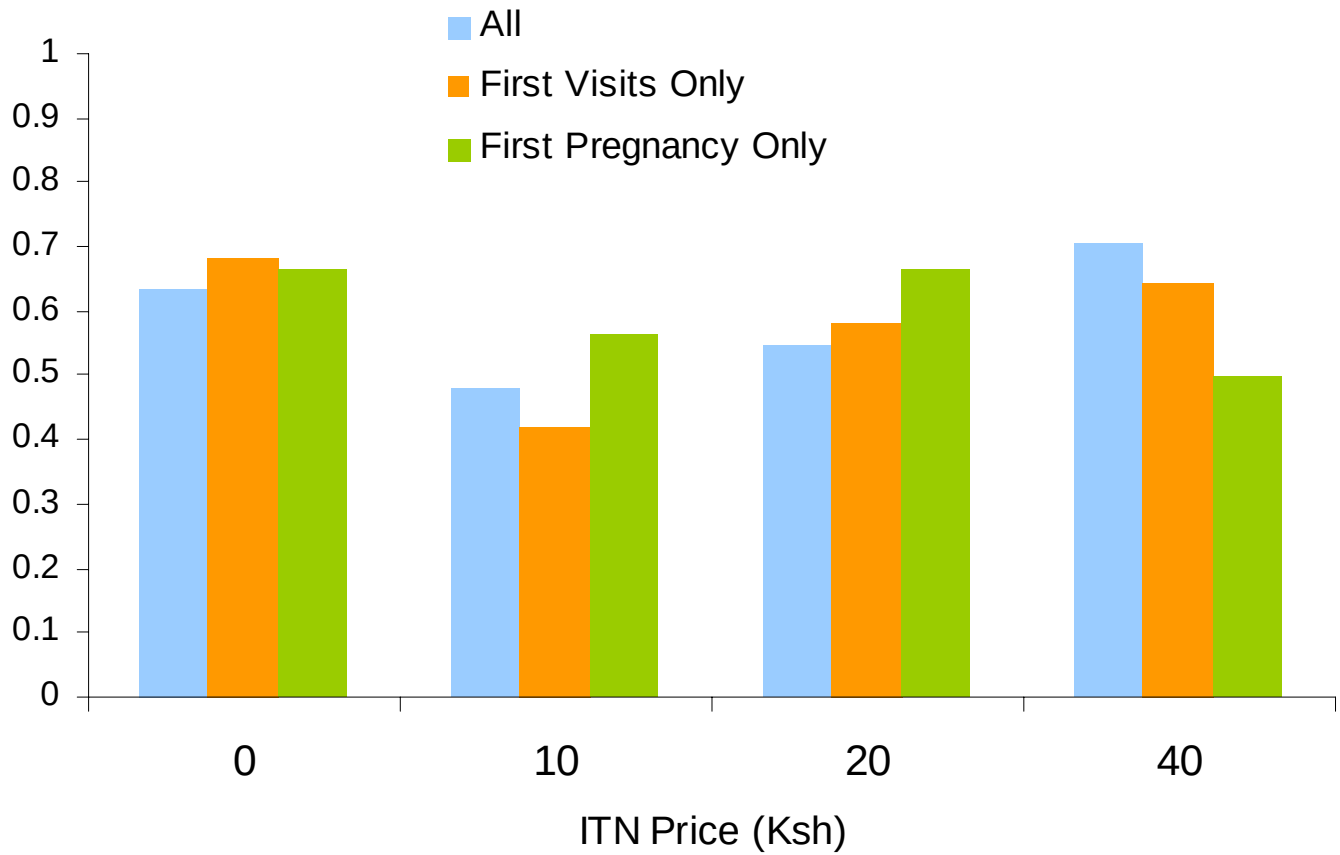
	HUNAN					GANSU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Full Sample (Calories)	Below Median (Calories)	Above Median (Calories)	Bottom Quartile (Calories)	Full Sample (Protein)	Full Sample (Calories)	Below Median (Calories)	Above Median (Calories)	Bottom Quartile (Calories)	Full Sample (Protein)
%Subsidy(rice/wheat)	-0.206*	-0.042	-0.339**	0.004	-0.096	0.154	0.169	0.132	0.070	0.091
	(0.108)	(0.144)	(0.164)	(0.207)	(0.133)	(0.100)	(0.143)	(0.138)	(0.261)	(0.112)
%ΔEarned	0.031***	0.026*	0.036**	0.037*	0.040***	0.028**	0.027	0.029	0.053	0.017
	(0.011)	(0.014)	(0.018)	(0.021)	(0.013)	(0.014)	(0.021)	(0.019)	(0.034)	(0.016)
%ΔUnearned	-0.022	-0.025	-0.023	-0.037	-0.010	0.046	0.020	0.071*	0.101	0.069
	(0.020)	(0.027)	(0.028)	(0.034)	(0.023)	(0.035)	(0.056)	(0.043)	(0.119)	(0.033)
%ΔPeople	0.94***	1.07***	0.80	1.04***	0.93***	0.91***	1.01***	0.81***	1.08***	0.88***
	(0.07)	(0.08)	(0.11)	(0.10)	(0.07)	(0.08)	(0.10)	(0.12)	(0.13)	(0.09)
Constant	0.9	1.6	0.5***	2.8*	0.8	-1.9	0.1	-3.9	0.6	-4.0
	(0.8)	(1.1)	(1.1)	(1.5)	(0.9)	(0.8)	(1.1)	(1.1)	(1.7)	(0.9)
Observations	1258	633	625	317	1258	1269	634	635	320	1269
R^2	0.26	0.34	0.21	0.39	0.20	0.18	0.23	0.15	0.29	0.16

Notes: Regressions include county*time fixed-effects. The dependent variable in columns 1-4 and 6-9 is the arc percent change in household caloric intake and in columns 5 and 10 it is the arc percent change in household protein consumption. Standard errors clustered at the household level. %Subsidy (rice/wheat) is the rice or wheat price subsidy, measured as a percentage of the average price. %ΔEarned is the arc percent change in the household earnings from work; %ΔHH Unearned is the arc percent change in the household income from unearned sources (government payments, pensions, remittances, rent and interest from assets); %ΔPeople is the arc percent change in the number of people living in the household. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.

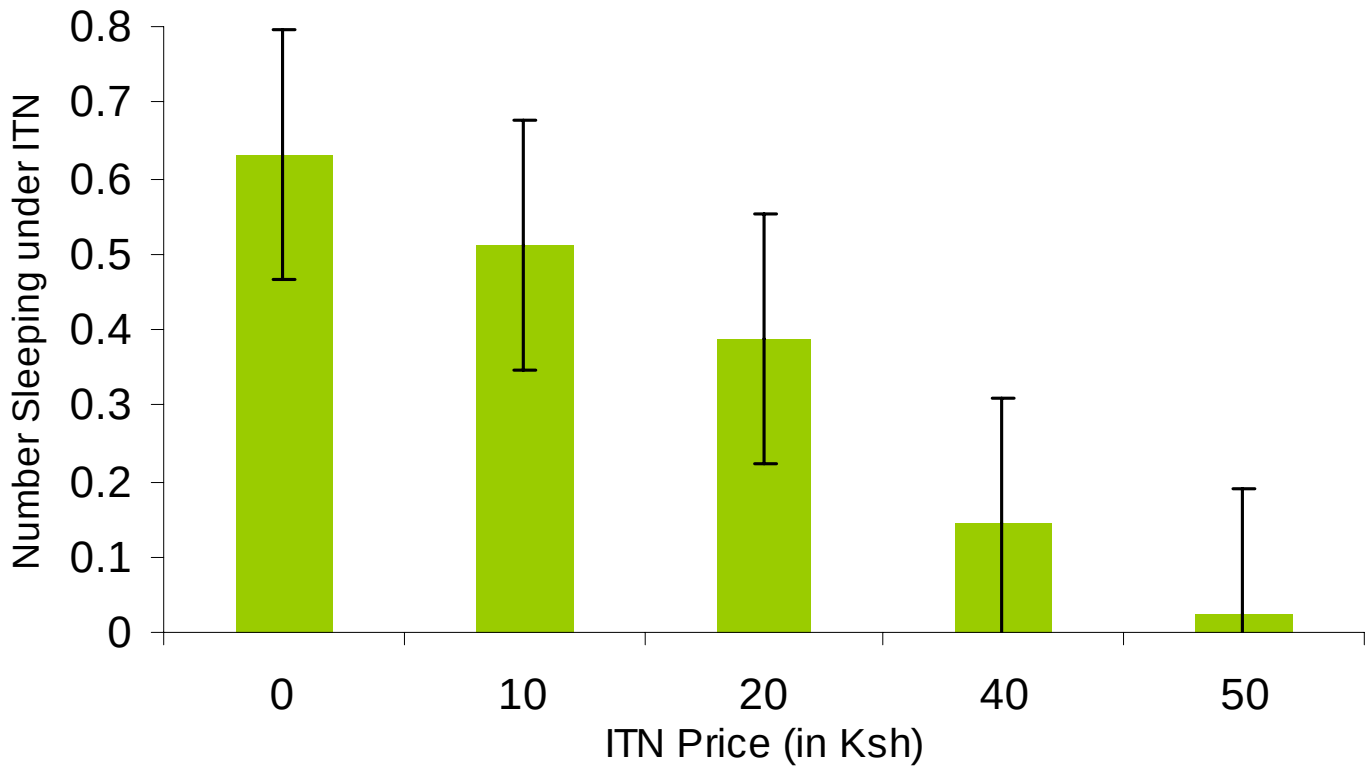
Results: Demand
Monthly Net Sales by ITN Price



Results: Usage Share Observed Using ITN at follow-up



Effective Coverage: Share of Prenatal Clients Sleeping Under ITN, by Price



Effective Coverage: Share of Prenatal Clients Sleeping Under ITN, by Price

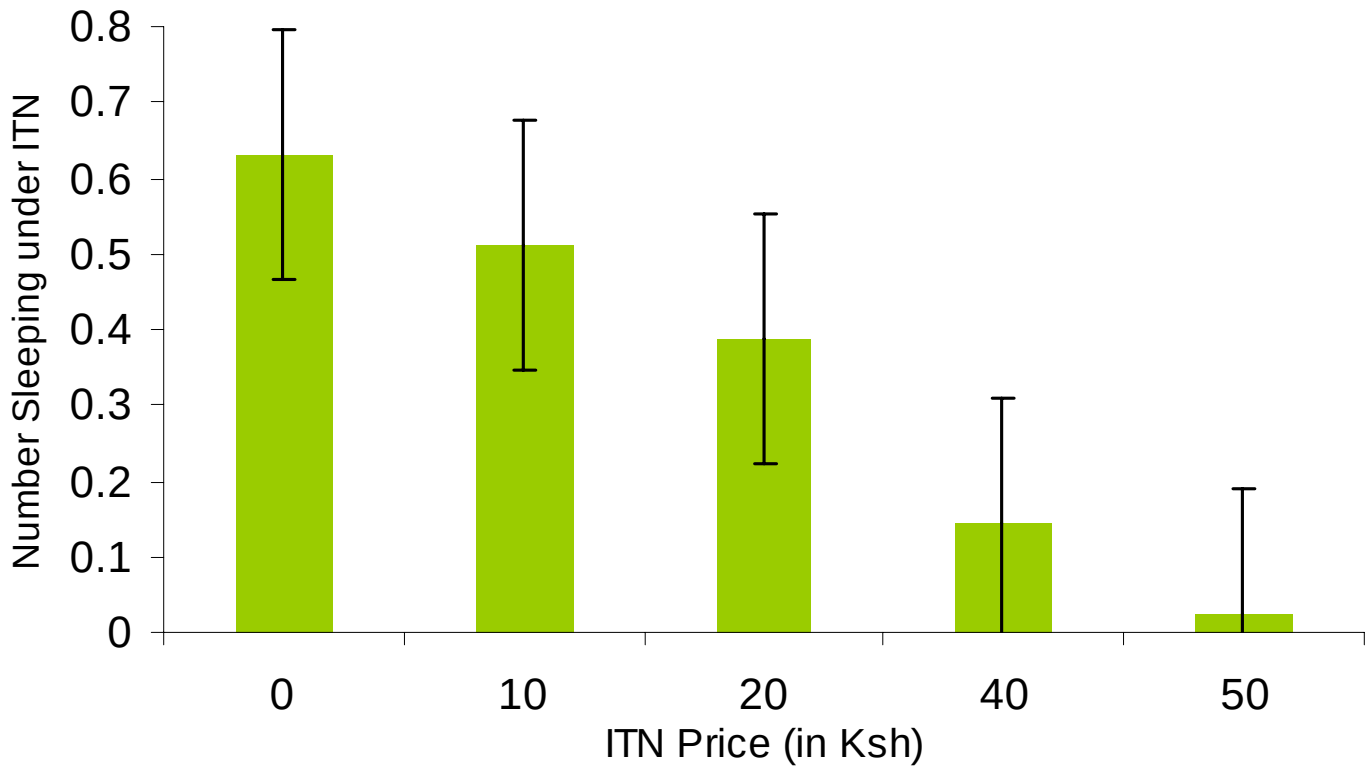
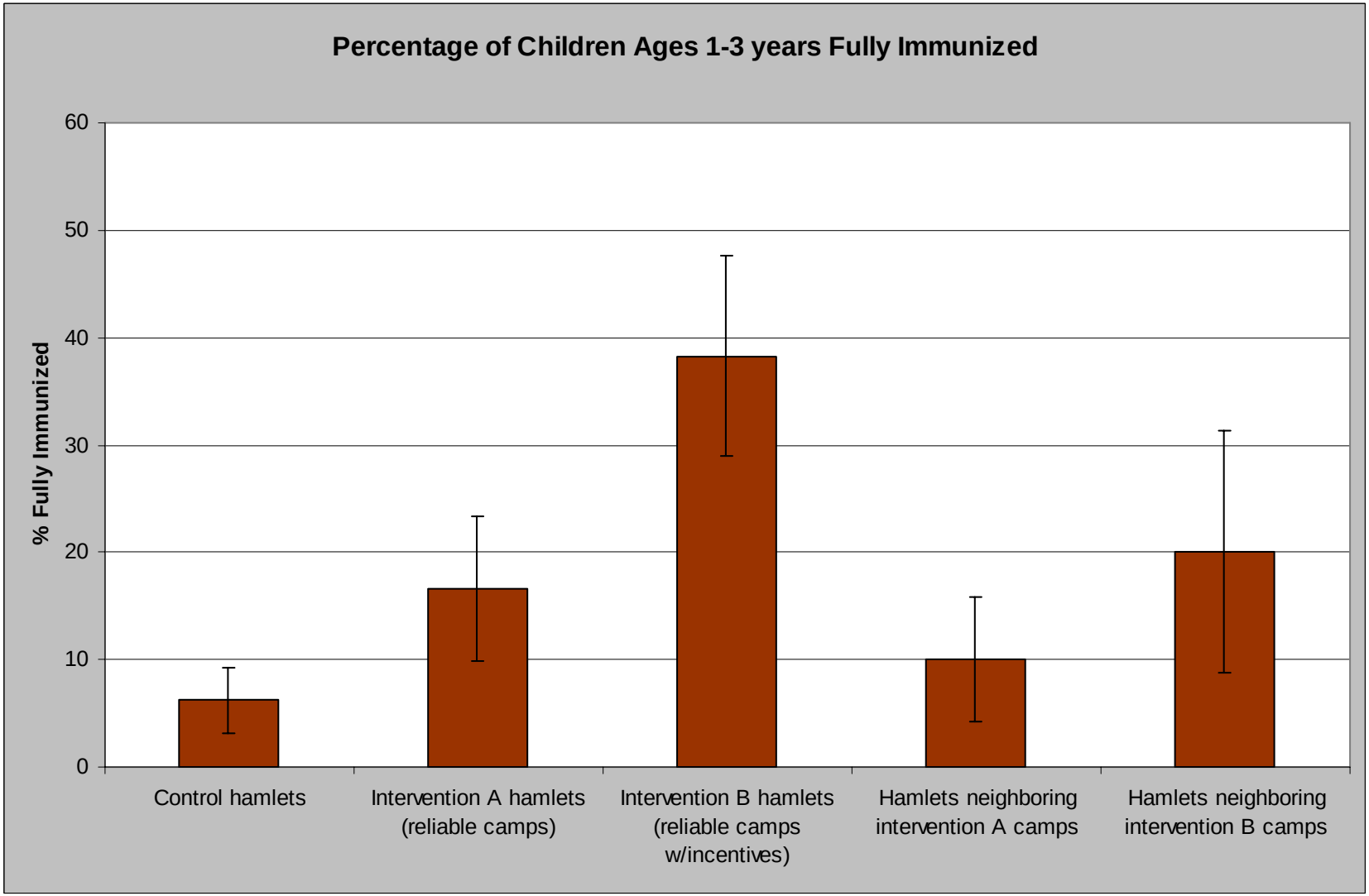


Figure 2: Percentage of children 1-3 years fully immunized by intervention status



Note: Fully immunized is defined as reporting 5 or more immunizations. Weighted means are reported, and the bars reflect the 95% clustered confidence interval.

Figure 3: Number of immunizations received by children 1-3 years

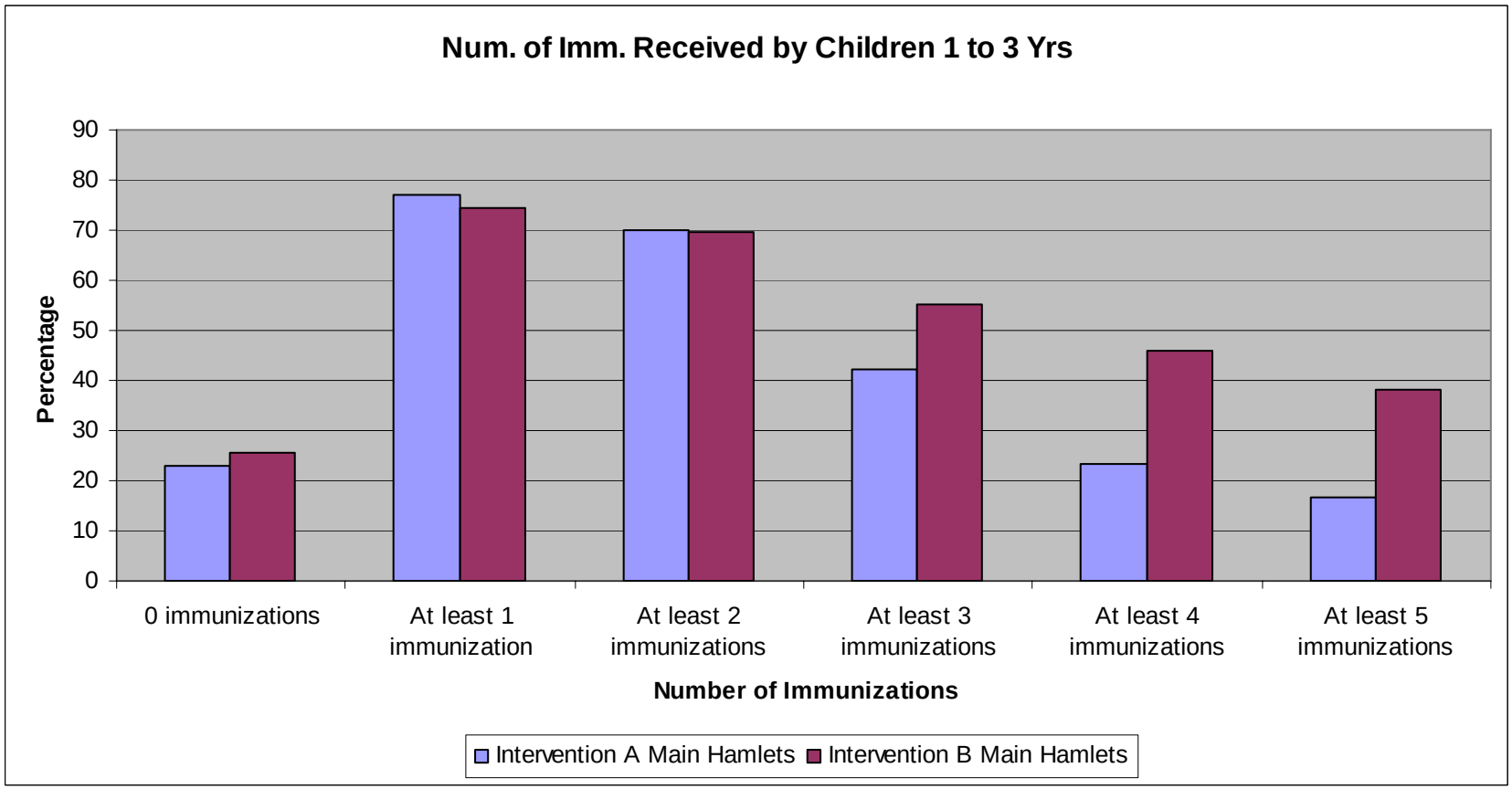


Table 7
Overall Treatment Effect on Incidence of Childbearing by Adult Men

	Comparison Group Base=100	Treatment Group	# Averted	Treatment Effect
# Observed Teen Pregnancies	100	68.6	31.4	-31.4%
Share of Observed Pregnancies by Adult Men	48%	24%		-23.2%
# Observed Pregnancies by Adult Men	47.6	16.7	30.9	-64.8%
# Observed Pregnancies by Young Men	52.4	51.9	0.5	-1.0%
Share of Cross-Generational Pregnancies among Averted Pregnancies			98%	

Notes: Treatment = Relative Risks Information Campaign. First row: treatment effect on number of teen pregnancies reported from Table 5 (-0.17/0.53). Second row: treatment effect on share of pregnancies by adult men reported from Table 6, regression (3).