Annex to Chapter 3

3.1: Tables and Graphs Related to Education in Pakistan

Note: Data source for all tables and graphs in this section is PIHS, 1998-99

Table A-3.1: Net Enrollment Rates in 1998-99

		Net Primary Enrollment Rates (%)			Net Secondary Enrollment Rates (%)		
		Male	**Female**	**Overall**	**Male**	**Female**	**Overall**
Punjab	Urban	65.2	67.0	66.1	42.7	49.7	46.2
	Rural	55.4	42.1	48.9	35.4	19.2	27.6
	Overall	57.9	48.7	53.4	37.6	28.5	33.2
Sindh	Urban	72.2	62.1	67.1	51.7	46.9	49.4
	Rural	44.3	24.5	34.7	31.6	7.9	20.5
	Overall	54.6	39.4	47.1	40.6	25.9	33.7
NWFP	Urban	73.4	59.3	66.5	53.1	35.5	44.1
	Rural	57.9	32.8	45.8	37.1	11.8	24.1
	Overall	60.0	36.4	48.6	39.7	15.6	27.4
Balochistan	Urban	68.8	58.1	63.4	46.8	37.6	42.4
	Rural	52.0	28.3	41.1	27.0	8.8	18.2
	Overall	53.8	31.9	43.6	29.7	12.8	21.5
Azad J & K	Urban	80.2	83.6	82.1	48.8	56.3	52.3
	Rural	72.3	71.9	72.1	54.2	36.0	45.4
	Overall	72.8	73.0	72.9	53.8	37.5	45.9
Northern Areas	Urban	67.4	67.1	67.3	50.1	37.9	44.6
	Rural	65.2	48.4	56.2	48.3	27.4	38.1
	Overall	65.4	50.1	57.1	48.5	28.3	38.6
FATA	Rural (Overall)	37.3	8.9	24.4	14.5	0.8	8.1
Pakistan	Urban	68.5	64.6	66.5	46.7	47.4	47.0
	Rural	53.6	36.4	45.2	34.9	15.8	25.6
	Overall	57.2	43.6	50.5	38.3	25.1	31.9

Table A-3.2: Literacy Rates (%) in 1998-99 [1]

		Male	**Female**	**Overall**
Punjab	Urban	71.2	53.6	62.5
	Rural	50.1	20.0	34.7
	Overall	56.7	30.0	43.1
Sindh	Urban	77.5	54.9	66.9
	Rural	52.3	11.2	32.8
	Overall	64.2	31.6	48.8
NWFP	Urban	65.5	35.2	50.2
	Rural	51.5	11.4	30.2
	Overall	53.8	15.1	33.4

[1] Literacy Rates are calculated for all individuals of age 15 and above

Balochistan	Urban	70.9	32.5	52.8
	Rural	47.2	6.8	28.5
	Overall	50.5	10.4	31.9
Azad J & K	Urban	85.2	58.0	71.2
	Rural	77.3	37.9	54.3
	Overall	78.1	39.4	55.7
Northern Areas	Urban	73.4	36.0	55.8
	Rural	54.1	17.3	35.2
	Overall	56.2	19.0	37.3
FATA	Rural (Overall)	29.0	0.6	12.8
Pakistan	Urban	73.2	52.3	63.1
	Rural	51.0	16.8	33.6
	Overall	58.0	27.2	42.5

Table A-3.3: School Attendance Profile (Poor and Non-Poor, 1998-99)[2]

Age in Years	Percentage of Children							
	Okay for Age		Behind for Age		Left School		Never Attended	
	Poor	Nonpoor	Poor	Nonpoor	Poor	Nonpoor	Poor	Nonpoor
5	20.4	37.2	0.0	0.0	0.2	0.3	79.4	62.6
6	21.3	39.1	11.1	16.6	0.1	0.3	67.5	44.0
7	14.1	25.1	30.0	40.8	0.0	0.6	56.0	33.6
8	10.3	22.0	37.2	48.6	1.1	0.9	51.5	28.5
9	12.7	23.2	40.5	51.2	2.0	1.1	44.8	24.5
10	10.9	20.7	37.0	50.4	3.9	3.7	48.2	25.2
11	11.8	24.3	41.6	51.0	9.8	6.3	36.8	18.5
12	6.6	16.6	36.6	47.4	13.3	10.2	43.6	25.7
13	8.2	19.0	33.7	42.1	14.9	15.2	43.3	23.7
14	6.0	18.3	23.3	37.2	25.7	19.8	45.0	24.7
15	5.6	14.1	19.2	33.5	27.8	26.7	47.5	25.8
16	0.0	0.0	20.3	39.3	31.0	33.7	48.7	27.0
17	1.2	8.3	15.5	26.8	36.6	41.0	46.7	23.9
Total	11.0	21.2	26.8	37.1	10.0	11.2	52.2	30.6

[2] *Okay for Age*: Currently enrolled in school in a grade equivalent or higher than what is suitable for age; *Behind for Age*: Currently enrolled, but in a grade less than what is suitable for age; *Left School*: Attended school in the past, but not currently enrolled; *Never Attended*: Never went to school. Target age for Grade 1 is taken to be 6 years, target age for Grade 12 is 17 years. This is done even though technically the age for grade 1 is 5 years, to allow for more leeway in judging whether a child is enrolled in the right grade for his/her age. The same rule was adopted by the PIHS Education Report of the 1990s by the FBS.

Table A-3.4: Effect of Education and Literacy on Monthly Earnings of Wage Workers
(Coefficients of Selected Variables in Wage Equation of Heckman Model)

Log of Earnings of Male Workers of Age>=15	**Urban Non-Agricultural**		**Rural Non-Agricultural**		**Rural Agricultural**	
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Worker not literate, literate member in household	0.071* (2.02)		0.023 (0.78)		-0.045 (-0.94)	
Worker Literate	0.418* (14.08)		0.094* (3.83)		0.042 (0.69)	
Worker's edu: Cl. 1 and above		0.038 (1.31)		-0.051 (-1.55)		0.077 (1.37)
Worker's edu<Cl. 6, max edu in household: Cl. 6 and above		0.087* (3.04)		0.079* (2.78)		-0.021 (-0.38)
Worker's edu: Cl. 6 and above		0.212* (6.45)		0.161* (5.41)		-0.013 (-0.18)
Worker's edu<Cl. 11, max edu in household: Cl. 11 and above		0.153* (5.65)		0.132* (3.86)		0.119 (1.21)
Worker's edu: Cl. 11 and above		0.535* (21.55)		0.113* (3.63)		-0.017 (-0.12)
Log of Earnings of Female Workers of Age>=15						
Worker not literate, literate member in household	0.155 (1.09)		-0.044 (-0.33)		-0.090 (-0.60)	
Worker Literate	1.391* (10.67)		1.613* (7.74)		-0.228 (-0.61)	
Worker's edu: Cl. 1 and above		0.173 (1.25)		0.575* (2.12)		0.157 (0.51)
Worker's edu<Cl. 6, max edu in household: Cl. 6 and above		0.020 (0.19)		-0.062 (-0.47)		-0.443* (-2.42)
Worker's edu: Cl. 6 and above		0.729* (4.26)		0.966* (3.12)		-1.26 (-1.2)
Worker's edu<Cl. 11, max edu in household: Cl. 11 and above		0.119 (1.05)		0.419* (2.88)		
Worker's edu: Cl. 11 and above		0.795* (6.53)		0.364 (1.48)		

Table A-3.5: Education and Literacy Externalities on Earnings of Non-Literate Wage Workers
(Coefficients of Selected Variables in Wage Equation of Heckman Model)

Log of Earnings of Non-Literate Male Workers of Age>=15	**Urban**		**Rural Non-Agricultural**		**Rural Agricultural**	
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Literate member in household	0.132* (3.69)	-0.021 (-0.38)	0.04 (1.26)	-0.120 (-2.40)	0.012 (0.23)	0.024 (0.30)
Max education level in household						
Cl. 1 and above		0.110* (2.08)		0.077 (1.62)		0.0004 (0.01)
Cl. 6 and above		0.117* (2.44)		0.167* (3.96)		-0.039 (-0.52)
Cl. 11 and above		0.103 (1.61)		0.089 (1.10)		0.144 (0.89)
Log of Earnings of Non-Literate Female Workers of Age>=15						
Literate member in household	0.493* (2.93)	0.289 (1.15)	-0.071 (-0.50)	-0.184 (-0.96)	-0.066 (-0.45)	-0.114 (-0.45)
Max education level in household						
Cl. 1 and above		0.022 (0.09)		0.133 (0.62)		0.376 (1.51)
Cl. 6 and above		0.152 (0.79)		-0.052 (-0.34)		-0.208 (-1.06)
Cl. 11 and above		0.252 (1.23)		0.537* (2.62)		-1.410* (-4.12)

Notes for Tables A-3.4 and A-3.5:

- * Signifies that the variable is significant at 5% level of significance; T-ratios are in parentheses.
- Log earnings regressions include correction for sample selectivity bias as well as controls for worker's characteristics: province dummies, age of worker, square of age, land dummies (*only for rural subgroups*), and whether the worker has been to school or not (*only for regressions listed in Table 4.6*).
- Other than the variables in the wage equations, the selection equation included the marital status of the worker, and various household characteristics (including marital status and sex of household head, demographic characteristics of the household, whether household receives domestic/foreign remittances or zakat, land ownership, ownership of buildings). A widely-accepted identifying assumption in estimating earnings regressions with selectivity is used, namely that certain household characteristics influence participation, but do not influence earnings given participation.
- Coefficients from the probit "selection" equations are available on request

Table A-3.6: Main Reasons for Never Attending School (Responses from PIHS, 1998-99)

Main Reasons for Never Attending School	Boys of Age 10-20			Girls of Age 10-20		
	Urban	Rural	Pakistan	Urban	Rural	Pakistan
Too expensive	50.9	33.7	36.9	36.0	21.8	23.6
Child not willing	19.4	24.6	23.7	6.8	6.3	6.3
Too far away	0.6	11.1	9.2	4.3	12.2	11.2
Had to help with work	3.6	7.8	7.0	2.5	2.2	2.2
Parents/elders disapproved	7.9	5.8	6.2	35.3	39.1	38.6
Child sick/handicapped	10.8	5.1	6.2	3.9	1.4	1.7
Had to help at home	2.2	3.1	2.9	4.8	5.3	5.3
No male/female staff	0.0	2.1	1.7	0.1	5.2	4.6
Child too young	1.8	1.6	1.7	1.2	1.0	1.0
Education not useful	1.0	1.3	1.3	0.2	1.5	1.3

Table A-3.7: Main Reasons for Leaving School (Responses from PIHS, 1998-99)

Main Reasons for Leaving School	Boys of Age 10-20			Girls of Age 10-20		
	Urban	**Rural**	**Pakistan**	**Urban**	**Rural**	**Pakistan**
Child not willing	33.3	36.7	35.6	14.8	16.4	15.8
Too expensive	26.5	23.5	24.5	23.2	16.2	18.8
Had to help with work	13.4	10.6	11.5	2.2	3.6	3.0
Had to help at home	4.8	5.9	5.6	8.6	7.6	8.0
Parents/elders disapproved	2.9	3.6	3.3	18.5	18.0	18.2
Education completed	3.6	2.2	2.7	8.5	4.5	6.0
Child sick/handicapped	2.4	2.4	2.4	3.1	3.2	3.2
Service (job)	3.5	1.7	2.3	0.3	0.1	0.2
Poor teaching/behavior	1.1	2.1	1.8	0.8	1.3	1.1
Too far away	0.4	2.3	1.7	5.7	14.5	11.1
Lack of documents	0.9	1.2	1.1	1.0	1.1	1.0
Education not useful	0.9	1.0	0.9	0.6	0.6	0.6
Child too young	0.8	0.8	0.8	0.1	0.3	0.2
No male/female staff	0.0	0.5	0.3	0.6	3.5	2.4
Marriage[3]	.	.	.	4.4	4.0	4.2

[3] "Marriage" is a very insignificant reason for boys to leave school, and is thus not reported.

Table A-3.8: Marginal Effects on the Probability of Attending School for Ages 6-14
(Results from Probit Regressions)

Independent Variables		All Pakistan		Rural		Rural Females		Rural Males	
		Marginal Effect	T-ratio	Marginal Effect	T-ratio	Marginal Effect	T-ratio	Marginal Effect	z
Quintile 2a	*	0.093	8.48	0.063	3.90	0.067	2.88	0.047	2.33
Quintile 3	*	0.159	14.75	0.153	9.74	0.166	7.20	0.126	6.42
Quintile 4	*	0.210	19.45	0.197	12.44	0.189	8.16	0.179	9.13
Quintile 5	*	0.254	21.88	0.245	14.49	0.258	10.17	0.212	10.20
Rural Male[b]	*	-0.044	-3.65						
Urban Female	*	-0.048	-3.30						
Rural Female	*	-0.303	-25.05	-0.241	-24.15				
Age		0.284	23.48	0.316	18.93	0.272	11.79	0.327	15.08
Age squared		-0.015	-24.03	-0.016	-19.42	-0.015	-12.84	-0.016	-14.75
Mother's Education									
Ever Attended School	*	0.227	14.96	0.248	9.42	0.264	7.57	0.196	5.26
Education>=Grade 6	*	0.065	2.35	0.116	1.96	0.296	3.16	-0.014	-0.18
Education>=Grade 11	*	0.024	0.48	0.237	1.13			0.068	0.31
Father's Education									
Ever Attended School	*	0.164	18.21	0.144	11.78	0.136	8.09	0.140	8.77
Education>=Grade 6	*	0.152	13.98	0.143	9.29	0.155	7.52	0.119	5.74
Education>=Grade 11	*	0.082	4.55	0.117	4.25	0.053	1.53	0.192	4.90
Number of Children in Household		0.009	6.59	0.010	4.79	0.010	3.64	0.010	3.47
Agricultural Land Owned				0.003	1.70	0.003	1.44	0.002	1.17
Agri. Land Owned Squared				0.000	-1.53	0.000	-1.58	0.000	-0.94
In PSU/Within 1 km. from PSU									
Primary School	*			0.193	11.36	0.153	7.80	0.215	6.40
Primary, Middle & Sec. School	*			0.079	5.91	0.081	4.17	0.078	4.58
Bus Station	*			-0.006	-0.51	-0.018	-1.07	0.001	0.09
Railway Station	*			0.039	1.87	0.018	0.66	0.061	2.08
Shop	*			0.052	2.75	0.051	1.91	0.050	2.03
Market	*			-0.044	-2.14	-0.067	-2.44	-0.022	-0.82
Bank	*			-0.032	-2.08	-0.028	-1.36	-0.039	-1.87
Phone	*			0.030	2.45	0.038	2.36	0.022	1.36
Post Office	*			-0.001	-0.05	0.021	1.34	-0.020	-1.29
District Capital	*			0.141	3.71	0.095	1.89	0.170	3.35
In PSU									
Hospital/Dispensary	*			0.013	1.04	0.022	1.29	0.007	0.39
Health Worker	*			0.013	1.17	0.004	0.25	0.018	1.21
Drainage Facility	*			0.037	3.19	0.048	3.07	0.021	1.38
Motorable Approach Road	*			0.028	1.55	0.094	3.63	-0.008	-0.37
Mostly Pucca Houses in PSU	*			0.072	6.35	0.069	4.39	0.061	4.09
>=50% of Households with Elec	*			0.127	9.32	0.083	4.38	0.162	9.06
Power Cut >=Once a Day	*			0.014	1.25	0.019	1.29	0.007	0.45

Notes:

- * Signifies 0-1 Variables. Marginal effect measures change in the probability for an infinitesimal change in each independent, continuous variable; for 0-1 variables, it measures discrete change in the probability for discrete change of variable from 0 to 1. T-ratios pertain to underlying probit coefficients
- Specification includes dummy variables for every province (Punjab is the reference state). Detailed tables for all regressions, including for each province, are available upon request

[a] Reference group is Quintile 1 (Poorest)
[b] Reference group is Urban Male

Table A-3.9: Access to School by Economic Status (Rural – 1998-99)

Type of School	% of Population with School in or within 1 km. of PSU: for Different Per Capita Expenditure Deciles (Rural) and for Poor/Nonpoor					
	1st Decile	2nd Decile	9th Decile	10th decile	Poor	Nonpoor
Primary School for Girls	71.4	78.3	82.2	83.4	76.7	79.6
Primary School for Boys	92.3	95.6	96.2	93.4	94.6	95.8
Middle School for Girls	35.7	46.3	47.3	48.9	42.4	46.0
Middle School for Boys	43.7	49.9	51.0	53.0	49.3	50.6
Secondary School for Girls	20.7	25.4	26.9	26.1	24.2	26.3
Secondary School for Boys	35.2	39.7	41.2	45.1	38.8	39.8

Table A-3.10: Access to Schools in Rural Areas (1998-99)

	% of Population							
Nearest Girls' Primary School	**Punjab**	**Sindh**	**NWFP**	**Balochis-tan**	**Azad J & K**	**N. Terr.**	**FATA**	**Overall**
In PSU or <=1 km distance	90.2	45.6	91.1	41.3	100.0	91.5	57.8	78.7
Distance >1 & <6 km	7.2	22.0	5.7	6.1	0.0	4.3	26.5	9.7
Distance >=6 km	2.6	32.4	3.2	52.7	0.0	4.2	15.8	11.6
Nearest Boys' Primary School								
In PSU or <=1 km distance	95.0	94.8	99.6	90.5	100.0	85.9	92.1	95.4
Distance >1 & <6 km	4.0	4.8	0.4	3.5	0.0	4.3	3.6	3.4
Distance >=6 km	1.0	0.4	0.0	5.9	0.0	0.0	4.3	1.1
Not in PSU, distance unknown	0.0	0.0	0.0	0.0	0.0	9.8	0.0	0.1
Nearest Girls' Secondary School								
In PSU or <=1 km distance	26.8	5.4	44.3	7.5	55.9	58.6	27.4	25.7
Distance >1 & <6 km	54.1	17.1	29.2	8.9	31.8	4.3	12.1	38.4
Distance >=6 km	19.2	77.5	26.5	83.6	12.4	23.1	60.6	35.8
Not in PSU, distance unknown	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.1
Nearest Boys' Secondary School								
In PSU or <=1 km distance	41.0	20.2	60.7	14.2	66.7	70.5	30.2	39.4
Distance >1 & <6 km	47.6	18.9	25.0	16.4	25.1	4.3	14.3	34.9
Distance >=6 km	11.5	60.9	14.3	69.4	8.2	21.1	55.5	25.7
Not in PSU, distance unknown	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0

Figure A-3.1: School Attendance Profile for Urban Boys: 1998-99

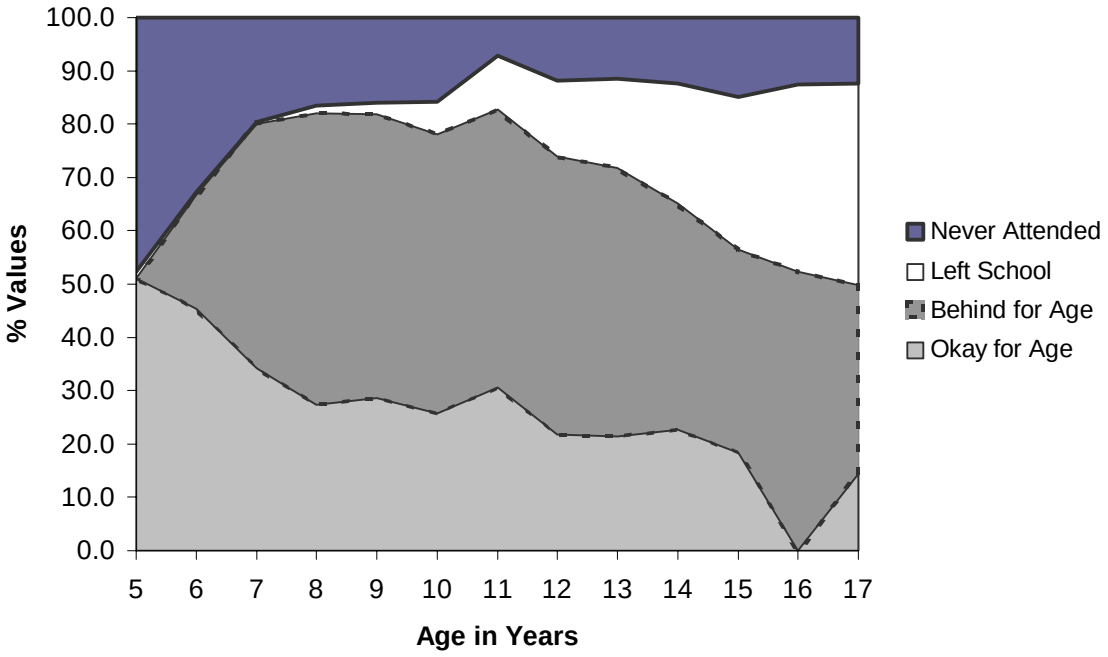
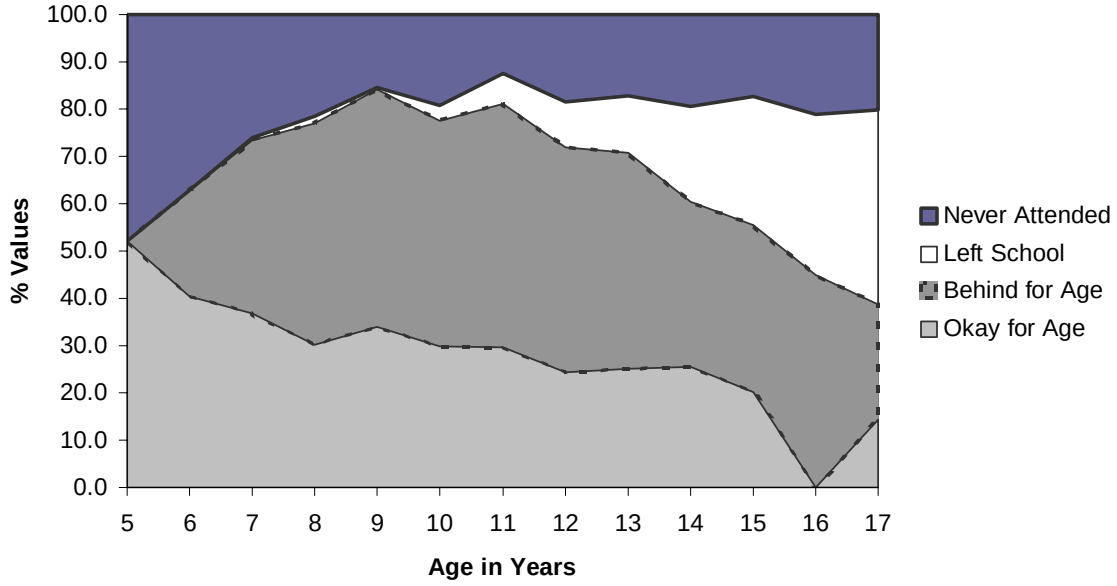


Figure A-3.2: School Attendance Profile for Urban Girls: 1998-99



3.2: Analysis of Child Nutrition (Anthropometric Measurements) using PRHS (2001)

First, we are interested in examining whether there have been significant *changes* in the last decade with regards to the nutritional status of children in the population. In order to do so, we construct standard measures of stunting, low weight, and wasting (defined below) and compare the prevalence of these conditions to those obtained previously, notably from surveys conducted by the International Food Policy Research Institute (henceforth IFPRI) between 1986 and 1989 and the Living Standards Measurement Survey (henceforth LSMS) in 1991.

Second, we are also interested in evaluating alternative policy options available to improve existing health status in the population. Within this broad topic, the particular concern that we will restrict ourselves to is an evaluation of the importance of *household income* in increasing the nutritional status of children. Note that the pathway through which government policy may impact on nutritional status is critically dependant on the sensitivity of nutrition to household income: a finding that increases in household income have a large impact on the nutritional status of children suggest that appropriate policies should focus primarily on improving income at the household level, while leaving the choice of the consumption bundle and allocation of health care to the household itself. Alternatively, findings that household incomes do not impact significantly on nutrition might suggest the need for more targeted interventions (perhaps through food subsidies for children) through improvements in access to health and nutrition.

The results presented here build on the work by Alderman and Garcia (1993), Alderman et al (2001), Haddad et al (1996), Hughes and Dunleavy (2000) and Alderman (2000). The body of work by Alderman et al. on Pakistan is particularly relevant for our results, and will form the basis of the comparisons that we undertake in this section. Specifically, we will focus on decomposing the impact of income through nutrition into *household effects*- richer households have children with better nutritional status, perhaps through their ability to afford better food and health care- and *community effects* -richer communities have children with better nutritional status, perhaps through their ability to command resources at the community level. Our findings echo, to a large extent, the previous results obtained by Alderman and Garcia (1993) and Alderman, et al (2001)- there are significant differences between communities in the nutritional status of children: communities that have higher average incomes are better able to command/use resources that improve the nutritional status of their children.

Data Discussion

Throughout this study we will focus on three anthropometric measures: height-for-age, weight-for-age and weight-for-height, using data from the Pakistan Rural Household Survey, 2001. Note that each of these measures provide information on different facets of the health status of children: height-for-age for instance, is an indicator of long-term malnutrition, weight-for-height provides more information on *acute* or *short-term* fluctuations in nutritional status and weight-for-age is an indicator of both acute and chronic malnutrition. For each of these measures, we compute the z-score based on standard growth charts as $z = \frac{measured\ \mathrm{var}iable - median\ value}{s\tan dard\ deviation}$ and use this score as an indicator of the nutritional status of the child. All variables used in the study were measured by the surveyors and measurement error in the weight of the child was significantly reduced through the use of electronic scales with an error margin of <100 gms. Finally, note that our measures incorporate innate differences in growth patterns by gender as well as age in their construction.

The PRHS 2001 contains information from 2,800 households in 141 villages of rural Pakistan, from 14 districts. Although the results are not representative of the country as a whole, a key advantage in using this data is that a resurvey was conducted for the *same households* as those in the IFPRI sample thus allowing us to make accurate claims about changes in nutritional status over time: although clearly there will be differences in household attributes over the 15 year time period, these differences are a reflection of time trends in income and infrastructure across half a generation rather than differences in the composition of the sample.

Summary statistics for important variables in the dataset are presented in Table A-3.11: note in particular that households in this sample are poorly educated, with 88% of mother's illiterate and 46% of children under 15 currently enrolled, predominantly landless with 48% of households reporting no land ownership and report a poverty profile that is comparable to those obtained from the Pakistan Integrated Household Survey, with 35.6% of the households falling below the poverty line of Rs. 690 per capita per month. There are also important differences among communities in access to health care and medical facilities- only 37.5% of the villages report a health facility within 5 kms, and a portion of households (12%) report using surface water (as opposed to well or piped water sources) as their primary drinking water source.

A note of caution. The results presented in this study are extremely preliminary. We are particularly concerned about the number of observations that are unusable at this moment due to incongruities in the dataset. Specifically, the results that we provide below are based on approximately 2000 observations out of a potential 4,700. Out of the initial 4,700 observations, a large number could not be used due to lack of identifiers and/or reliable information on heights and weights of the respondents. Table A-3.11 checks if the observations that have been dropped differ along observable dimensions from those that form the final sample for estimation. For the six variables that we consider- per capita income, mother's education, number of family members, access to water, access to land and age we find no statistically significant differences between the final sample and the original observations. While this does provide some ground for assuming that missing observations are not selected along any particular dimension, it also decreases the total number of observations for the estimations implemented below. Particularly in the case of within-community comparisons, the loss of half our sample could result in a substantial drop in the precisions of our estimates and hence an increase in their confidence intervals. For this reason, we present our results at the 10% level of significance in addition to the standard 1% and 5% levels- in the next draft of this study, we hope to use the expanded sample following an extensive round of cleaning and re-matching.

Nutritional Status of Children

Figure 3.12 shows the overall nutritional status of children in the sample. For each child, we compute three measures of nutritional status: stunting, under-weight and wasting, each defined as a z-score of the variables (height-for-age, weight-for-age, and weight-for-height respectively) less than 2 standard deviations from their respective median values. For all four districts, we note that by the time a child reaches the age of 5, he/she has a 62% probability of being stunted, a 45% probability of being under-weight and a 12% probability of being wasted representing high levels of chronic malnutrition in the population. More disturbing however is the complete lack of improvement in the four districts of the IFPRI sample over the 15 year period: there are now more children who are stunted and under-weight compared to results obtained during the late eighties.

While the aggregated statistics provide an overview of childhood nutrition in Pakistan, they also hide a significant amount of variation among the provinces. Table A-3.12 disaggregates each of these measures by province and age in order to explore this variation further. We find that among the four provinces surveyed, Balochistan and Sindh report the worst results, while Punjab and NWFP do significantly better in terms of weight-for-age and to a lesser extent, for height-for-age as well. Interestingly however, weight-for-height results do not follow the same patterns with Punjab reporting *less* than the 5% one would expect from a normally distributed variable, and Sindh and NWFP reporting the highest proportion (14.6% and 12.1% respectively) among the four provinces. Although it is hard to identify why this is so, one potential explanation is a region-specific shock, such as a poor harvest that differentially impacted on these four provinces immediately preceding the survey.

Table A-3.12 also shows the impact of age on the z-score of the child. From the table it appears that there is a significant decline in the nutritional status of the child between birth and 2 years, followed by a slight improvement. This relationship between the nutritional status and the age of the child is confirmed in Figure 3.13, which show the z-scores of height-for-age, weight-for-age and weight-for-height in the PRHS sample. As with Alderman and Garcia (1993), we find that chronic malnutrition as measured through the z-scores of height-for-age and weight-for-age starts early in childhood with the z-score dropping rapidly from one standard deviation below the median (weight-for-age) and 1.5 standard deviations below the median (height-for-age) to longer term values of between 2 and 1.5 standard deviations below (weight-for-age) and between 3 and 2.5 standard deviations below the median for height-for-age by the second year of the child. Our findings at the cross-sectional level are in accordance with research from other countries that show the importance of nutrition in early childhood and the relative inefficacy of interventions beyond the second year of the child.

For instance, a number of studies now show that poor nutrition in early childhood has lasting repercussions for the productive work-life of the adult: a longitudinal study in Guatemala reported in Martorell et al. (1990 and 1995) showed that while supplements in the first two years of the childhood had significant impacts on adolescent intelligence and adult work-capacity, interventions during the later childhood years did not have any such benefits. These findings reiterate the significance of policies that advocate targeted nutritional programs during pregnancy and early childhood years: in areas with poor catch-up growth and in the presence of cumulative effects of poor early nutrition on long run growth, childhood nutrition programs can impact powerfully on income growth through their impact on morbidity and future work capacity (Scrimshaw, 1995).

The Figure A-3.3 also shows that there are important differences between the four provinces of the study: while NWFP shows extremely strong catch-up growth with z-scores improving from an average of less than –2.5 in the second year to an average of –1.5 in the 5^{th} year, Balochistan shows a steep drop to –3.5 in the 2^{nd} year followed by fluctuations around this level till the 5^{th} year of the child. At this stage, we provide no explanations for why these provinces differ in the growth pattern over the first 5 years of childhood, but these results point towards the need for a more thorough enquiry into the inter-regional differences among provinces in the country.

Interestingly however, the gender of the child, which is typically important in several economic variables (particularly enrollment) does not seem to lead to statistically significant differences in nutritional status. As Figure A.3-4 shows, all three measures of nutritional status show similar trends and levels, and are even slightly biased towards girls compared to boys. One potential explanation for this result could be selection in the sample induced by higher mortality among

young girls compared to boys: if it is the case that infant mortality among girls is significantly higher, the sample of children observed for each cohort will select on `more-healthy' girls compared to boys, and this could lead us to (erroneously) conclude that there is no gender discrimination in nutrition status in our sample. While this is currently under investigation, at this point we are unable to say whether such patterns exist in the infant mortality data.

The basic description of our sample with regard to the nutritional status of children under six provides considerable information, both about changes over time and differences across provinces in Pakistan. To summarize, we find that:

1. The anthropometric status of children in the population is indicative of chronic nutritional deficiencies, with half of the sample classified as `stunted' or `underweight'.
2. There are significant differences between provinces with Balochistan and Sindh reporting the poorest nutritional levels, and NWFP reporting the highest.
3. Discouragingly, over the last 15 years there seems to have been almost no change in the nutritional status of children. Comparisons for the *same households* as those surveyed under the IFPRI panel survey in 1986-89 show no significant differences, either in the height or weight status of the child as measured through stunted and under-weight children.
4. As with the IFPRI panel, we find strong age effects for the nutritional status of the child: anthropometric measures decline steadily through the first two years of childhood, and then remain steady (or improve slightly) around their long-term averages of 2.41 standard deviations below the median (height-for-age) and 1.77 standard deviations below the median (weight-for-age).
5. As opposed to chronic nutritional deficiencies, short-term nutritional problems as measured through weight-for-height do not seem to be severe. In Punjab and Balochistan, the number of wasted children follows the distributional norm, and although the numbers are slightly higher for NWFP and Sindh, they are still within reasonable bounds. These results match up with those reported by Alderman and Garcia (1993) for the IFPRI survey.

The description we have provided so far points towards an important policy implication regarding the implementation of targeted childhood nutrition programs during pregnancy and early childhood, that could improve the long term nutritional status of the child. In the next section, we now turn to an analysis of the determinants of nutritional status, with a particular emphasis on the role of income. As argued previously, the sensitivity of nutritional status to household income is critical for the targeting of policy programs: high sensitivity would argue for the placement of programs that generate more income for households, while the converse would argue for the placement of programs that may be orthogonal to income with greater concentration of other correlates of nutritional status.

Nutritional Status and Household Expenditure

Figure 3.14 plots the impact of a measure of household income (as measured through household consumption expenditure) on the three measures that we are using as proxies for the nutritional status of the child. For all three, we find a significant positive correlation with income: an increase in the log of per-capita income from 6 to 9 improves the z-score of height-for-age by 1 standard deviation and the z-scores of weight-for-age and weight-for-height by over 1.5 standard deviations. In itself, these graphs would present strong conditional evidence for the importance of the economic status of the household for the well-being of the child. Note however, that in itself

these correlates do not allow us to draw any causal implications regarding the importance of economic status in the determinant of childhood nutrition. In particular, there are two issues that we may be concerned about:

1. We may be concerned that average income in the community impacts on the nutritional status of the child through other resources that the community may be able to command. For instance, it is entirely possible that richer communities are better able to implement nutritional programs/ensure higher quality medical care than poorer communities. In this case, what may look like a positive relationship between household income and nutritional status may be masking the true underlying determinant at the *community level* such as better nutrition or sanitary provisions.
2. We may also be concerned about the endogenous nature of income at the household level: households may differ in inherent characteristics such as `entrepreneurship' that is correlated positively to both the economic status of the household, and to the well-being of the child. For instance, entrepreneurial households may use more advance production techniques on their farms, but may also be more up-to-date with the benefits of early childhood nutrition for the child. In this case, income would proxy for an underlying characteristic at the *household level* that is causally linked to better nutritional outcomes for the child.

In the exercise below, we address the first of the problems, but not the second. Specifically, we examine whether there are attributes of communities that cause them to differ systematically in the treatment of their children. Doing so yields surprising results that we discuss in some detail, with special emphasis on their policy implications.

For this exercise, we estimate four different model specifications, based on a reduced form household maximization program as in Alderman, et al. (2001). For the first model, we estimate Ordinary Least Squares (OLS) with the z-score of all three measures as the dependant variable. Apart from the log of per capita income, we also control for child-specific characteristics, such as age and gender; household specific characteristics such as water source, land ownership and education of the mother, and community characteristics such as distance from the closest health center. As a comparison to previous work in Pakistan, we also present results for the 4 districts from the IFPRI sample, and compare them to results obtained previously. Since we are using the log of per capita expenditure, we may be concerned that measurement error in this variable would bias our coefficients downwards due to an increase in the overall variance of the regression. To deal with this attenuation bias, we present a second estimation using household assets as instruments for consumption expenditure.

Our third model then introduces community fixed effects in the model. By doing so, we implicitly argue that there may be attributes of communities that determine the nutritional status of the child, and that may be correlated positively with income (since from the graphs, there is a positive relationship between expenditure and z-scores). Finally, we present the same estimation with instrumentation in model 4.

The results from these estimations are presented in Table A-3.13a,b and c. For both height and weight-for-age, we find that the OLS estimates of log per capita income are significant and positive, particularly so in the case of the four IFPRI districts. Further, the gradient of the z-score with expenditure increases substantially once we instrument consumption expenditure with household assets. Specifically, in the case of height-for-age, a one standard deviation increase in log per capita income improves the z-score of a child at the mean of the sample by 0.23 (0.11 for

OLS) and for weight-for-age by 0.14 (0.11 for OLS) at the mean of the sample. The results for the IFPRI sample are far stronger, with equivalent numbers of 0.34 (0.18 for OLS) and 0.22 (0.12 for OLS).

The estimation results from Model 3 and 4 show however that this strong relationship between income and nutritional status, at least in the case of chronic malnutrition, *is entirely driven* by differences in the average per capita income across communities: richer communities have taller and less underweight children, but once we control for the average per capita income of the community, there is no impact of household expenditure on z-scores of height and weight-for-age across different households in the community. This implies that a child in a *poor household* in a *rich community* will have a better nutritional status than a child in a *rich household* living in a *poor community*, pointing towards the presence of strong externality effects within communities in the child's well-being. Such results have been noted, both in Alderman, et al (2001) with regard to anthropometric and Hughes and Dunleavy (2000) for mortality data in Peru and India respectively. One concern that we may have regarding this result is that it is an artifact of the income characteristics of the sample: if most of the variation in income is *across* communities, then the lack of significance within communities could be indicative of the lack of variation, rather than the lack of a relationship. In our particular sample however, this is not a concern: decomposing the variation of income into *within community* and *across community* components, we find that over 70% of the variation in income is generated by *within community* differences, and less than 30% by differences across communities. In combination with our previous result, this provides strong evidence that most differences in nutritional status of children are driven by community level rather than household level effects.

Community Level Characteristics: Health Facilities

At this stage, we might be interested in knowing more about what the community level fixed effects proxy for. A reasonable hypothesis would be that that these community level characteristics are a substitute for the availability of health facilities and services (see for instance, Thomas, et al. (1992), with richer communities being in a better position to influence the location of a health facility as well as ensure more regular, high quality operation compared to a poor village. From the OLS instrumented estimation in column 10 of Table A-3.13a, b, and c, we note that, at least as measured as distance to the closest facility, the presence (or not) of health services do not impact significantly on the nutritional status of the child. This leads us to worry that what may matter for the well-being of a child is not the presence of a facility per se, but the presence of a *well-functioning* facility close to the village.

Our preliminary results on this front shows that there are significant differences across facilities in the sample. We base these observations on the facility-level survey component of the PRHS, as a part of which facilities *in the village* were surveyed along with households. Due to this strategy, the total number of facilities in the sample are small, with only 12 Regional Health Centers (RHC's) and 38 BHU's. In addition, it was found that record-keeping at the facility level was of insufficient quality to collect important data on availability of medicines and other process indicators. To depict at an anecdotal level the variation in the quality of the facility, we thus use the *number of OPD visits* for a one year period (separated by month) for each of these facilities.

The figure in Box 3.6 shows the pattern of these visits for the median facility, for the average of the top 3 facilities, and for the average of the bottom 3 facilities. Note that both for the median and the top 3 facilities visits follow a seasonal trend with declines during the winter months of November to March and increases during the summer and monsoon months of April to October.

What is perhaps more striking however, is the vast difference in the number of visits across the facilities: while the top 3 facilities regularly show more than 1,500 visits per month, the bottom 3 facilities consistently report 0 visits each month during the year preceding the survey. One explanation could be that this graph actually captures variation *within* facilities as opposed to variation *across* facilities: i.e., the number of OPD patients in each facility fluctuates with other services (such as the availability of medicines) and hence the *identity* of the top 3 and the bottom 3 facilities changes across the sample period. The table in Box 3.6 shows that this is not the case. For each month, we see that less than 0.1 proportion of facilities change their relative ranking by more than 4 points, and the standard deviation of each facilities rank is less than 2. These results thus indicate that the health facilities in the sample differ considerably across communities, with some facilities consistently catering to far higher OPD populations than others.

To a certain extent, these results could be due to the presence of health personnel in the facilities: as Table 3.14 shows, better facilities tend to have a greater proportion of positions filled as a fraction of positions sanctioned, although they have a lower proportion of personnel present over positions filled. Apart from this, there seem to be no systematic differences across facilities in terms of infrastructure: while the top facilities report more usable well water and more reliable electricity, the differences remain insignificant in a sample of this size.

Conclusion

Both the discussion of the nutrition status of children and the state of health facilities in the sample point towards the importance of effects at the community level in determining the health status of the population. One way to disentangle this important effects would be to think of what community level variables impact on the nutritional status of the child. Note however, that once we include these fixed effects in our estimation, it is not possible to include any other variable that does not vary within a community due to problems of multi-co linearity and thus the impact of variables such as the average price of food, or the distance to the health facility can be included in the estimation only if community fixed effects are removed. An alternative way to analyze the differences between communities is to follow Islam (1995), in decomposing the fixed effect itself with regard to various community level attributes. Figure A-3.5 presents the kernel densities of the fixed effects for our three measures, and shows that there is significant variation across communities. To decompose these fixed effects, we would use the estimated fixed effects from the first stage regression as a dependent variable in the second-stage regression, with community level variables as the relevant regressors, and this remains the focus of our continuing enterprise.

Note: Data source for all tables and graphs in this section is PRHS (2001)

Table A-3.11: Summary Statistics (PRHS, 2001)

	Obs		Mean		
	Sample for estimation	Full sample	Sample for estimation	Full sample	Difference[a]
Z-score: height for age	2389	…	-2.41	…	…
			(1.93)		
Z-score: weight for age	2389	…	-1.77	…	…
			(1.34)		
Z-score: weight for height	2389	…	-0.37	…	…
			(1.38)		
log per capita income	2311	4789	6.67	6.75	-0.08**
			(0.52)	(0.56)	
[b]literacy of mother (%)	2319	3944	12%	13%	-1%
			(0.07)	(0.05)	
[c]Landless household (%)	2311	4789	48%	47%	1%
			(0.10)	(0.07)	
[d]gender of child (% male)	2389	4036	52%	53%	-1%
			(0.10)	(0.08)	
[e]wellwater (%)	2387	4997	87%	87%	0%
			(0.07)	(0.05)	
Household size	2311	4789	10.20	9.99	0.21
			(5.40)	(5.94)	
[f]access to health facility (%)	1985	4023	38%	37%	1%
			(0.01)	(0.08)	
age of child	2389	3870	38.05	38.57	-0.52
			(20.64)	(25.19)	

Notes: Standard deviation in parentheses.
[a]Difference includes the result of t-test for differences of mean between estimation sample and full sample. ** indicates mean of estimation sample is significantly different from that of full sample at a level of 1 %. * significant at 5%, + significant at 10 %.
[b]literacy of mother: 1 if Mother completes at least primary education; 0 otherwise
[c]landless household: 1 if a household does not own any land; 0 otherwise
[d]gender of child: 1 if male; 0 otherwise
[e]wellwater: 1 if the source of water is tap, pump, well, or purchased water; 0 otherwise
[f]access to health facility: 1 if the nearest health facility is within 5 km; 0 otherwise

Table A-3.12: The overall nutritional status of children

Age category	Punjab			Sindh			NWFP			Balochistan			All Provinces		
	Stunted[a]	Under-weighted[b]	Wasted[c]	Stunted	Under-weighted	Wasted	Stunted	Under-weighted	Wasted	Stunted	Under-weighted	Wasted	Stunted	Under-weighted	Wasted
	(Percent)														
All ages	60.1	39.4	7.8	63	54.6	14.9	53.5	33.1	15.9	73.5	45.3	9.1	61.9	44.6	11.7
0-6 months	47.2	26.4	9.4	39.2	31.4	9.8	50	22.2	11.1	43.8	31.3	6.3	44.2	28.3	9.4
6-12 months	57.5	50	13.8	60.6	62.1	12.1	50	22.2	2.8	70.6	47.1	17.6	58.3	48.7	11.6
1 years	70.9	53.8	13.7	84.3	66.1	18.1	68	28	22	79.2	62.5	20.8	76.4	55.3	17.3
2 years	63.6	47	9.3	74.5	66.4	15.3	71.4	54	15.9	77.4	49.1	1.9	70.3	55	11.4
3 years	61	34.4	4.5	57.3	51.4	15.7	41.9	30.6	19.4	66.1	46.4	10.7	57.5	42.2	11.8
4 years	54.7	35.8	8	55.6	45.2	13.7	45.5	34.8	19.7	70	40	6	55.4	39.3	11.7
5- years	58.3	29.9	2.7	57	50.6	14.6	46.6	25.9	12.1	81.7	43	9.7	60.9	38.5	8.9

Source: PRHS Pakistan Rural Household Survey 2001.

[a]Stunted: Z-score of less than –2 standard deviation from median height for age

[b]Under-weighted: Z-score of less than –2 standard deviation from median weight for age

[c]Wasted: Z-score of less than –2 standard deviation from median weight for height

Figure A-3.3: Z-score vs. age for each province (Annex)

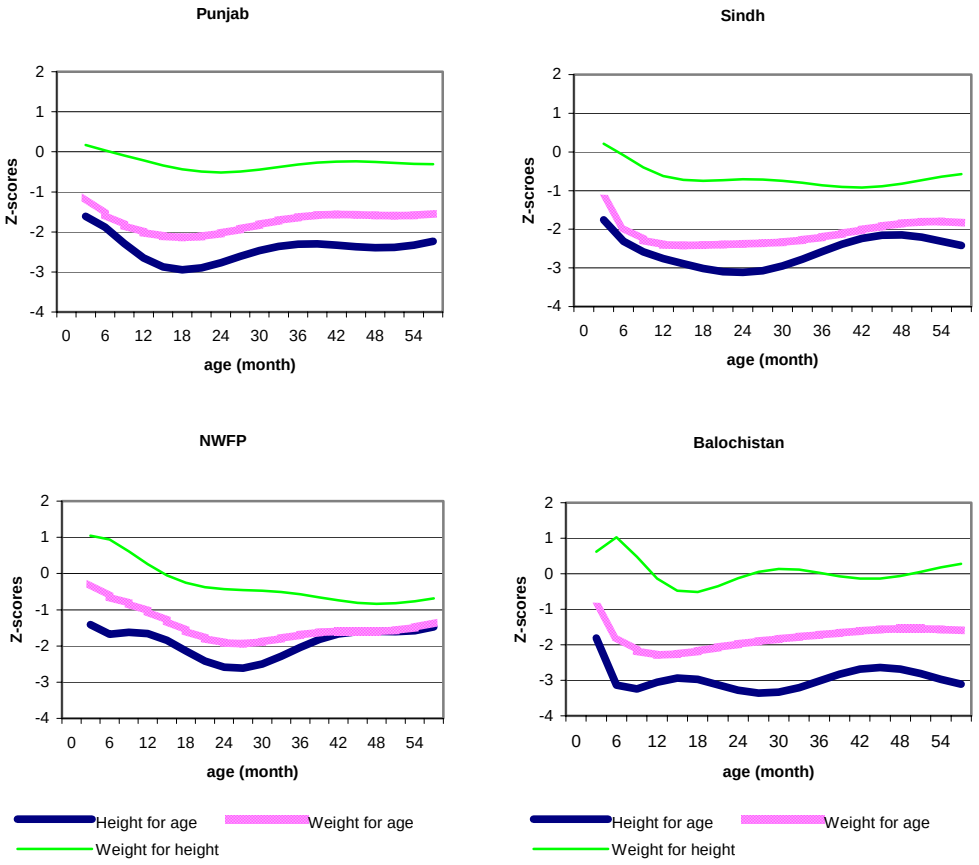


Figure A-3.4: Kernel density of Z-scores for boys and girls

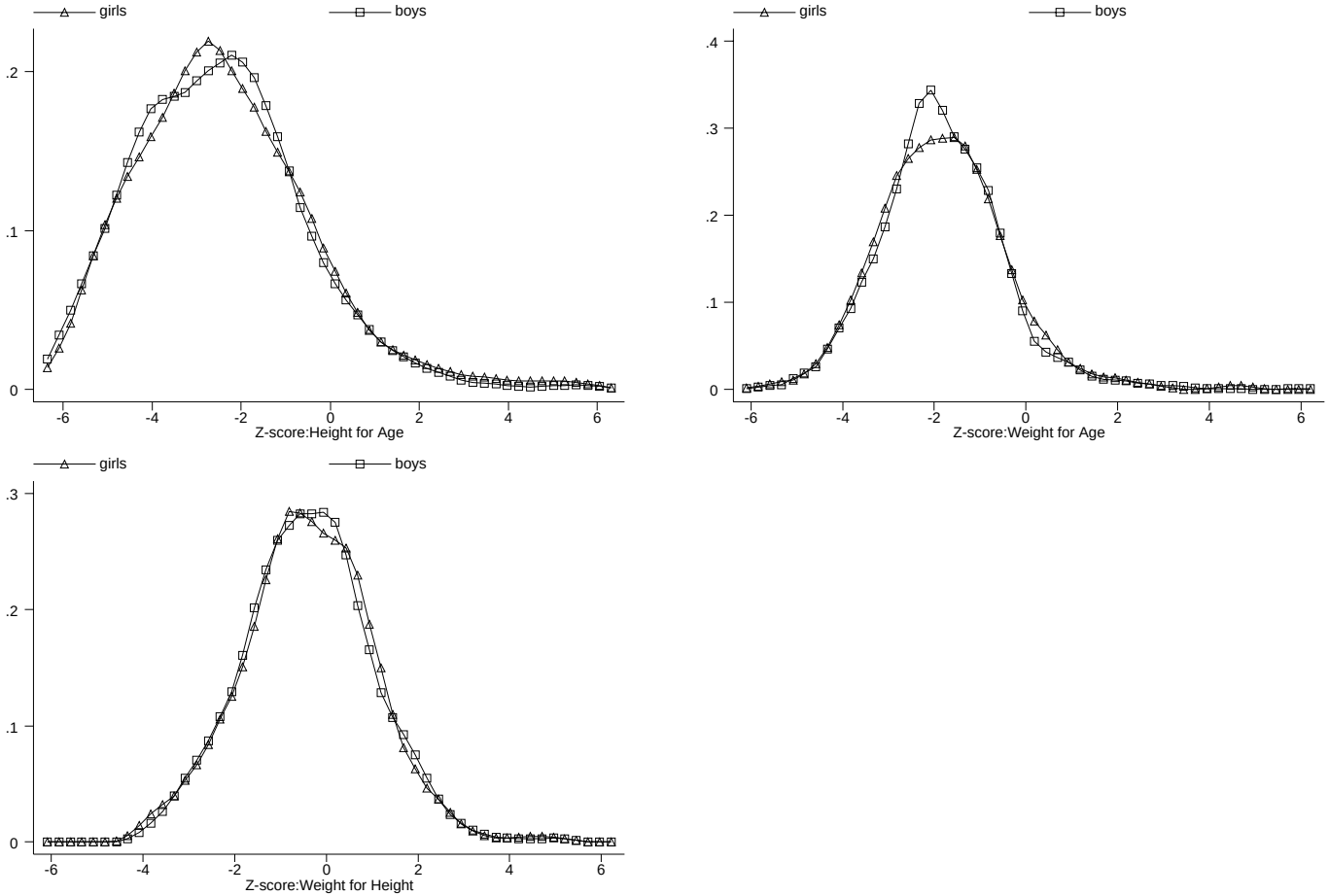


Table A-3.13a:Regressions of Z-score of Height for age

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	All	All	All	All	IFPRI	IFPRI	IFPRI	IFPRI	All	All	IFPRI	IFPRI
Estimation	OLS	IV	FE	FE IV	OLS	IV	FE	FE IV	OLS	IV	OLS	IV
Z-score	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age	Height for age
log per capita income	0.347 (3.80)**	0.531 (3.22)**	-0.072 (0.62)	-0.057 (0.22)	0.389 (2.53)*	0.746 (2.82)**	0.017 (0.09)	0.291 (0.73)	0.197 (1.80)+	0.347 (1.48)	0.106 (0.52)	0.164 (0.46)
[a]literacy of mother	0.424 (2.96)**	0.359 (2.37)*	0.253 (1.63)	0.251 (1.58)	0.338 (1.73)+	0.244 (1.20)	0.248 (1.15)	0.222 (1.01)	0.527 (3.19)**	0.486 (2.77)**	0.677 (2.77)**	0.663 (2.61)**
age of child	-0.019 (2.26)*	-0.019 (2.26)*	-0.017 (2.08)*	-0.017 (2.08)*	-0.034 (2.16)*	-0.034 (2.15)*	-0.033 (2.13)*	-0.033 (2.11)*	-0.016 (1.79)+	-0.016 (1.75)+	-0.033 (1.80)+	-0.033 (1.78)+
age of child^2	0.000 (2.63)**	0.000 (2.66)**	0.000 (2.72)**	0.000 (2.72)**	0.001 (2.69)**	0.001 (2.66)**	0.001 (2.80)**	0.001 (2.77)**	0.000 (2.18)*	0.000 (2.15)*	0.001 (2.26)*	0.001 (2.22)*
[b]Landless household	0.221 (2.36)*	0.259 (2.64)**	0.107 (0.98)	0.110 (0.93)	0.308 (1.82)+	0.381 (2.17)*	0.161 (0.81)	0.222 (1.03)	0.152 (1.50)	0.181 (1.66)+	0.397 (1.94)+	0.404 (1.94)+
[c]gender of child	-0.144 (1.62)	-0.142 (1.59)	-0.147 (1.67)+	-0.147 (1.67)+	-0.036 (0.23)	-0.031 (0.20)	-0.074 (0.47)	-0.074 (0.47)	-0.097 (1.01)	-0.098 (1.02)	-0.001 (0.01)	-0.001 (0.01)
[d]wellwater	0.016 (2.02)*	0.018 (2.14)*	0.006 (0.58)	0.006 (0.56)	-0.015 (1.06)	-0.016 (1.14)	-0.020 (1.26)	-0.018 (1.07)	0.023 (2.48)*	0.026 (2.57)*	0.013 (0.62)	0.013 (0.64)
Household size	0.054 (0.41)	0.048 (0.37)	-0.214 (1.21)	-0.216 (1.20)	0.255 (1.14)	0.276 (1.23)	0.026 (0.10)	0.006 (0.03)	0.161 (1.14)	0.156 (1.10)	0.454 (1.75)+	0.461 (1.76)+
[e]access to health facil	… …	… …	… …	… …	… …	… …	… …	… …	0.108 (1.08)	0.099 (0.98)	-0.323 (1.71)+	-0.318 (1.67)+
Constant	-4.806 (7.33)**	-6.055 (5.31)**	-1.667 (2.02)*	-1.771 (0.98)	-4.780 (4.22)**	-7.265 (3.87)**	-1.908 (1.37)	-3.839 (1.35)	-4.073 (5.19)**	-5.098 (3.16)**	-3.350 (2.22)*	-3.764 (1.45)
Observations	1840	1840	1840	1840	632	632	632	632	1526	1526	413	413
R-squared	0.02	0.02	0.01	…	0.04	0.03	0.03	…	0.02	0.02	0.06	0.06
N of village	…	…	143	143	…	…	43	43	…	…	…	…

Notes: Absolute value of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%

[a]literacy of mother: 1 if Mother completes at least primary education; 0 otherwise

[b]landless household: 1 if a household does not own any land; 0 otherwise

[c]gender of child: 1 if male; 0 otherwise

[d]wellwater: 1 if the source of water is tap, pump, well, or purchased water; 0 otherwise

[e]access to health facil: 1 if the nearest health facility is within 5 km; 0 otherwise

Table A-3.13b:Regressions of Z-score of Weight for age

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	All	All	All	All	IFPRI	IFPRI	IFPRI	IFPRI	All	All	IFPRI	IFPRI
Estimation	OLS	IV	FE	FE IV	OLS	IV	FE	FE IV	OLS	IV	OLS	IV
Z-score	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age	Weight for age
log per capita income	0.250 (4.01)**	0.301 (2.67)**	0.062 (0.78)	0.206 (1.13)	0.250 (2.38)*	0.470 (2.60)**	-0.047 (0.36)	0.008 (0.03)	0.176 (2.37)*	0.279 (1.75)+	0.016 (0.11)	0.199 (0.80)
[a]literacy of mother	0.050 (0.51)	0.032 (0.31)	0.044 (0.40)	0.024 (0.22)	-0.032 (0.24)	-0.090 (0.65)	-0.083 (0.55)	-0.088 (0.58)	0.131 (1.16)	0.102 (0.86)	0.206 (1.22)	0.163 (0.93)
age of child	-0.028 (4.83)**	-0.028 (4.84)**	-0.026 (4.44)**	-0.026 (4.42)**	-0.043 (4.07)**	-0.043 (4.06)**	-0.043 (4.07)**	-0.043 (4.06)**	-0.019 (3.09)**	-0.019 (3.05)**	-0.018 (1.43)	-0.017 (1.33)
age of child^2	0.000 (5.50)**	0.000 (5.51)**	0.000 (5.15)**	0.000 (5.14)**	0.001 (4.18)**	0.001 (4.15)**	0.001 (4.29)**	0.001 (4.28)**	0.000 (3.92)**	0.000 (3.89)**	0.000 (1.80)+	0.000 (1.68)+
[b]Landless household	0.058 (0.91)	0.068 (1.03)	0.088 (1.17)	0.117 (1.43)	0.100 (0.87)	0.145 (1.21)	-0.030 (0.22)	-0.018 (0.12)	0.077 (1.11)	0.096 (1.30)	0.182 (1.29)	0.206 (1.44)
[c]gender of child	-0.088 (1.44)	-0.087 (1.43)	-0.089 (1.45)	-0.089 (1.46)	0.065 (0.62)	0.069 (0.64)	0.071 (0.65)	0.071 (0.65)	-0.125 (1.91)+	-0.125 (1.92)+	-0.077 (0.61)	-0.078 (0.62)
[d]wellwater	0.010 (1.88)+	0.011 (1.93)+	0.004 (0.65)	0.007 (0.94)	0.004 (0.47)	0.004 (0.39)	-0.004 (0.35)	-0.003 (0.30)	0.016 (2.43)*	0.018 (2.53)*	0.018 (1.32)	0.021 (1.44)
Household size	0.065 (0.73)	0.063 (0.71)	-0.170 (1.39)	-0.187 (1.50)	0.209 (1.37)	0.222 (1.45)	0.114 (0.65)	0.110 (0.62)	0.111 (1.16)	0.107 (1.11)	0.215 (1.21)	0.239 (1.32)
[e]access to health facil	… …	… …	… …	… …	… …	… …	… …	… …	0.013 (0.19)	0.007 (0.10)	-0.097 (0.74)	-0.080 (0.61)
Constant	-3.296 (7.36)**	-3.642 (4.68)**	-1.826 (3.18)**	-2.810 (2.23)*	-3.217 (4.16)**	-4.748 (3.70)**	-0.950 (0.99)	-1.342 (0.68)	-3.078 (5.77)**	-3.781 (3.44)**	-2.230 (2.15)*	-3.532 (1.97)*
Observations	1840	1840	1840	1840	632	632	632	632	1526	1526	413	413
R-squared	0.03	0.03	0.02	…	0.04	0.03	0.03	…	0.03	0.02	0.03	0.02
N of village	…	…	143	143	…	…	43	43	…	…	…	…

Notes: Absolute value of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%

[a]literacy of mother: 1 if Mother completes at least primary education; 0 otherwise

[b]landless household: 1 if a household does not own any land; 0 otherwise

[c]gender of child: 1 if male; 0 otherwise

[d]wellwater: 1 if the source of water is tap, pump, well, or purchased water; 0 otherwise

[e]access to health facil: 1 if the nearest health facility is within 5 km; 0 otherwise

Table A-3.13c:Regressions of Z-score of Weight for height

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	All	All	All	All	IFPRI	IFPRI	IFPRI	IFPRI	All	All	IFPRI	IFPRI
Estimation	OLS	IV	FE	FE IV	OLS	IV	FE	FE IV	OLS	IV	OLS	IV
Z-score	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height	Weight for Height
log per capita income	0.076 (1.16)	0.004 (0.03)	0.161 (1.94)+	0.363 (1.93)+	0.035 (0.32)	0.033 (0.18)	-0.057 (0.41)	-0.227 (0.78)	0.098 (1.27)	0.122 (0.74)	-0.058 (0.43)	0.103 (0.43)
[a]literacy of mother	-0.247 (2.42)*	-0.222 (2.06)*	-0.130 (1.16)	-0.158 (1.38)	-0.302 (2.21)*	-0.301 (2.12)*	-0.324 (2.06)*	-0.307 (1.93)+	-0.220 (1.89)+	-0.227 (1.83)+	-0.238 (1.45)	-0.276 (1.61)
age of child	-0.046 (7.56)**	-0.046 (7.55)**	-0.045 (7.43)**	-0.045 (7.38)**	-0.051 (4.69)**	-0.051 (4.69)**	-0.052 (4.67)**	-0.052 (4.67)**	-0.038 (5.92)**	-0.038 (5.91)**	-0.021 (1.69)+	-0.020 (1.59)
age of child^2	0.001 (7.09)**	0.001 (7.06)**	0.001 (6.72)**	0.001 (6.70)**	0.001 (3.65)**	0.001 (3.65)**	0.001 (3.65)**	0.001 (3.66)**	0.000 (5.67)**	0.000 (5.66)**	0.000 (1.12)	0.000 (1.01)
[b]Landless household	-0.085 (1.28)	-0.100 (1.43)	0.044 (0.56)	0.084 (0.99)	-0.090 (0.76)	-0.091 (0.74)	-0.112 (0.77)	-0.150 (0.96)	-0.009 (0.13)	-0.005 (0.06)	-0.040 (0.29)	-0.019 (0.14)
[c]gender of child	-0.055 (0.86)	-0.056 (0.88)	-0.055 (0.87)	-0.055 (0.87)	0.044 (0.40)	0.044 (0.40)	0.068 (0.60)	0.068 (0.60)	-0.132 (1.95)+	-0.132 (1.95)+	-0.151 (1.24)	-0.152 (1.24)
[d]wellwater	0.003 (0.45)	0.002 (0.37)	0.002 (0.36)	0.006 (0.79)	0.020 (2.06)*	0.020 (2.06)*	0.014 (1.22)	0.013 (1.05)	0.004 (0.66)	0.005 (0.67)	0.020 (1.49)	0.022 (1.60)
Household size	0.044 (0.47)	0.046 (0.49)	-0.071 (0.56)	-0.094 (0.73)	0.092 (0.59)	0.092 (0.59)	0.128 (0.69)	0.140 (0.75)	0.038 (0.38)	0.037 (0.37)	-0.017 (0.10)	0.004 (0.02)
[e]access to health facil	… …	… …	… …	… …	… …	… …	… …	… …	-0.092 (1.29)	-0.093 (1.31)	0.083 (0.65)	0.097 (0.76)
Constant	-0.155 (0.33)	0.332 (0.41)	-0.680 (1.14)	-2.065 (1.58)	-0.071 (0.09)	-0.054 (0.04)	0.611 (0.61)	1.813 (0.88)	-0.426 (0.77)	-0.589 (0.52)	0.124 (0.12)	-1.023 (0.59)
Observations	1840	1840	1840	1840	632	632	632	632	1526	1526	413	413
R-squared	0.04	0.03	0.04	…	0.06	0.06	0.06	…	0.03	0.03	0.04	0.03
N of village	…	…	143	143	…	…	43	43	…	…	…	…

Notes: Absolute value of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%

[a]literacy of mother: 1 if Mother completes at least primary education; 0 otherwise

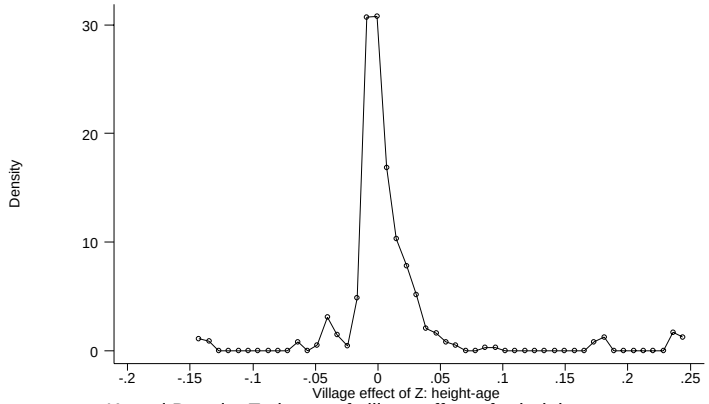
[b]landless household: 1 if a household does not own any land; 0 otherwise

[c]gender of child: 1 if male; 0 otherwise

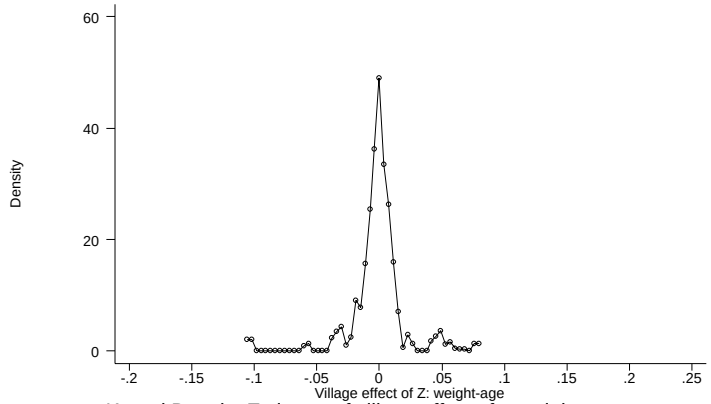
[d]wellwater: 1 if the source of water is tap, pump, well, or purchased water; 0 otherwise

[e]access to health facil: 1 if the nearest health facility is within 5 km; 0 otherwise

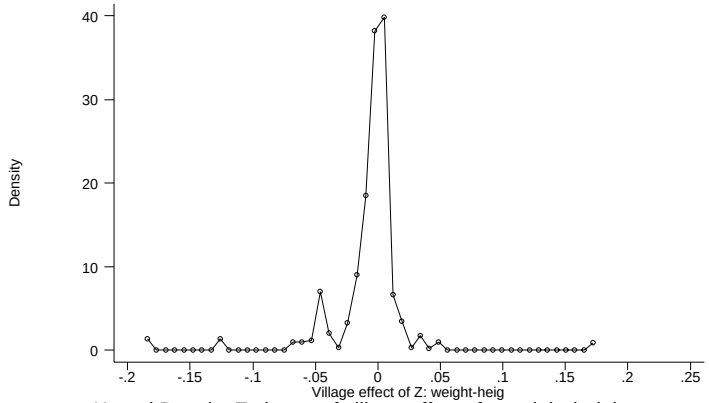
Figure A-3.5:Kernel density of village effects



Kernel Density Estimate of village effects for height-age



Kernel Density Estimate of village effects for weight-age



Kernel Density Estimate of village effects for weight-height

Effects

3.3: Tables and graphs on health indicators

Note: Data source for all tables and graphs in this section is PIHS (1998-99)

Figure A-3.6: Infant Mortality (Per 1000 Live Births), 1998-99

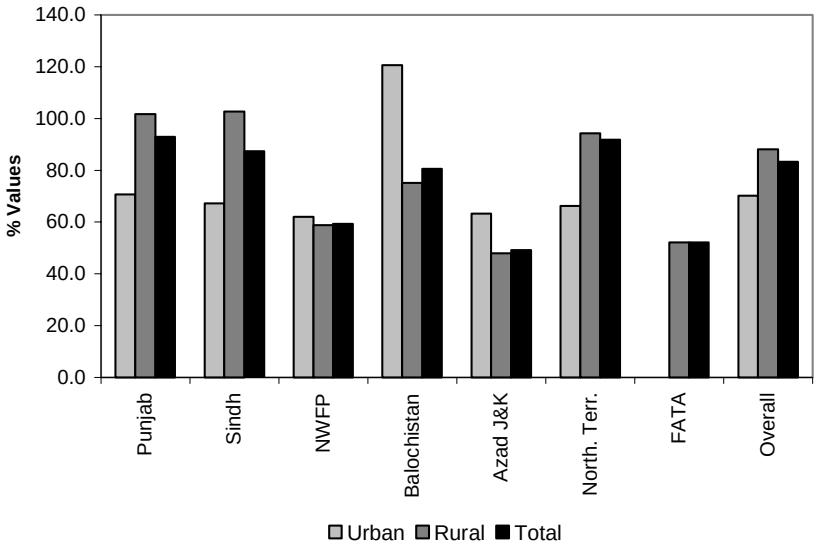


Table A-3.14: Access to Health Facilities in Rural Areas by Province (1998-99)

	% of Rural Population with Health Facilities in PSU			% of Rural Popl. with Family Planning Facility within 3 km. of PSU
	Hospital, Dispensary or Clinic[4]	Hospital, Dispensary, Clinic or Health Worker	Any Health Facility or Worker[5]	
Punjab	38.2	54.4	70.8	79.6
Sindh	36.9	56.5	62.5	65.3
NWFP	54.3	63.5	75.9	72.1
Balochistan	54.9	58.1	60.4	60.9
Azad J & K	55.9	68.1	71.3	81.7
N. Areas	53.0	83.6	83.6	74.5
Overall Rural	42.0	56.4	69.1	73.5

[4] All public and private hospital, dispensaries and clinics (including BHUs, RHCs, Mother & Child Clinics, and Family Welfare Clinics).
[5] Includes private practitioners and nurses

Table A-3.15: Regional Differences in Selected Human Development Indicators (1998-99)

	Male Literacy Rate	Female Literacy Rate	Infant Mortality (Per 1000 Live Births)	Incidence of Diarrhea: Children of Age 5 and Below (%)	Pre-natal Consultation for Women (%)	Ever Use Contraception: Married Women of Age 15-49 (%)
Rural:						
Punjab	50.1	20.0	101.7	13.9	24.6	18.0
Sindh	52.3	11.2	102.7	8.7	19.0	7.9
NWFP	51.5	11.4	58.7	15.6	19.6	13.9
Balochistan	47.2	6.8	75.1	9.9	14.9	5.7
Azad J & K	77.3	37.9	48.0	8.4	32.7	16.0
Northern Areas	54.1	17.3	94.3	15.4	45.7	26.5
FATA	29.0	0.6	52.2	11.3	5.4	3.4
Urban:						
Punjab	71.2	53.6	70.6	10.5	57.9	33.9
Sindh	77.5	54.9	67.1	11.7	70.4	36.4
NWFP	65.5	35.2	62.0	11.7	36.0	27.2
Balochistan	70.9	32.5	120.6	10.7	42.5	24.0
Azad J & K	85.2	58.0	63.2	12.8	61.3	40.0
Northern Areas	73.4	36.0	66.2	22.0	68.6	29.6