Supporting Information Appendix

Contents

Variable definitions and descriptive statistics

Table S1. Definition of covariates and sources

Variable	Definition	Source
Country-level variables		
Health spending	Measured as a share of GDP, and as a share of total government expenditures.	IMF, 2011, and World Development Indicators
IMF program	Dummy variable produced by the IMF: 'the starting year of an IMF-supported program [is defined] as the year in which the program was approved, provided this occurred in the first half of the year. If the approval date was in the second half of the year, the starting year is the following year. The end year is the year in which the program expired.'	IMF, 2011.
GDP per capita	Gross domestic product per capita (constant 2000 USD) – logged (to correct for the skewed distribution).	WDI, Sep. 2012.
Government balance	General government balance (share of GDP). Calculated by subtracting general government expenditure from general government revenue.	Authors' calculation using IMF-WEO data.
High inflation	Dummy variable: = 1 if year-to-year change in inflation over 20%, 0 otherwise.	Authors' calculation using IMF-WEO data.
Dependency ratio	Combined shares of populations aged 0-14 and 65 and above.	Authors' calculations using WDI data.
Trade	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI, Sep. 2012
Democracy	Democracy, Range: 0-10 (Freedom House/Imputed Polity). Average of Freedom House and Polity (transformed to a scale 0-10). Hadenius & Teorell (2005) show that this average index performs better both in terms of validity and reliability than its constituent parts.	Quality of Governance Database, 2011.
Negative growth	Dummy variable: = 1 if negative growth in a given year, 0 otherwise.	Authors' calculation using IMF-WEO data.
ODA	Net ODA received (% of GNI).	WDI, Sep. 2012
Low income country	Dummy variable. Country is eligible for concessional lending from the IMF	IMF, 2011
Sub-Saharan Africa	Dummy variable. Refers to countries located south of the Sahara Desert.	World Development Indicators
Civil war	Magnitude score of episode(s) of civil warfare	Center for Systemic Peace
Household-level variables		
Nr children	Number of individuals under the age of 18	Demographic and Health

		Survey; Multiple Indicator Cluster Survey
Nr of Adults	Number of individuals over the age of 18	Demographic and Health Survey; Multiple Indicator Cluster Survey
Education	Ordinal variable (no education, primary, and secondary+). Measures the head of household's level of education.	Demographic and Health Survey; Multiple Indicator Cluster Survey
Wealth index	Ordinal variable (Quintiles). The index is a composite measure of the household's material standard. It is calculated from selected assets such as ownership of television, mobile phones, bicycles.	Demographic and Health Survey; Multiple Indicator Cluster Survey.
Urban rural	Dummy variables. Captures the geographical location of households.	Demographic and Health Survey; Multiple Indicator Cluster Survey
Child-level variables		
Severe child health deprivation	Dummy variable. Children under the age of 5 who had not been immunized against diseases or had a recent illness involving diarrhea and had not received any medical advice or treatment two weeks prior to the survey	Demographic and Health Survey; Multiple Indicator Cluster Survey. (1)
Sex of the child	Dummy variable.	Demographic and Health Survey; Multiple Indicator Cluster Survey
Age	Age of the child in number of years.	Demographic and Health Survey; Multiple Indicator Cluster Survey

Table S2. Country samples and averages in the dependent variables

	country	Year	Children	health	water	malnutrition	shelter	sanitation	IMF program last year
1	Albania	2000	1677	19.80	4.90	19.00	6.40	0.00	1.00
2	Angola	2001	6721	24.50	45.00	24.60	76.40	42.60	0.00
3	Azerbaijan	2000	2498	29.20	25.90	9.90	14.60	0.10	1.00
4	Bangladesh	2006	41738	16.70	4.00		83.10	29.40	1.00
5	Armenia	2000	2232	12.80	11.10	3.00	1.40	0.00	1.00
6	Bolivia	2004	12727	18.30	11.80	8.90	51.60	37.90	1.00
7	Bosnia and Herzegovina	2000	3127	12.60	2.10	4.90		0.00	1.00
8	Brazil	1996	6738	13.80	0.00	3.30	13.90	19.40	0.00
9	Burundi	2005	8447	28.00	51.80		87.90	2.90	0.00
10	Cambodia	2006	10146	23.20	17.90	17.10	66.50	79.20	0.00
11	Cameroon	2006	7827	20.80	36.10	14.90	59.00	8.20	1.00
12	Chad	2000	6630	89.60	48.70	13.80	91.80	52.70	1.00
13	Colombia	2005	19480	8.90	7.40	1.70	12.80	12.50	1.00
14	Congo	2005	5490	13.20	32.50	11.00	47.70	12.10	0.00
15	Congo, Democratic Republic	2007	10078	29.60	59.40	22.80	77.60	12.30	1.00
16	Benin	2001	6282	18.40	26.20	13.40	45.70	73.80	1.00
17	Dominican Republic	2002	15415	13.30	9.70	1.60	13.40	10.40	0.00
18	Ethiopia (-1992)	1992	12167	38.40	84.00	20.00	90.30	80.30	0.00
19	Gabon	2000	5607	1.00	39.10	0.30	32.30	2.90	1.00
20	Gambia	2000	4867	48.60	30.40	17.80	47.90	13.80	1.00
21	Ghana	2006	4287	20.50	25.80	9.70	44.40	40.40	1.00
22	Guatemala	1999	6212	22.20	17.80	15.30	58.80	24.60	0.00
23	Guinea	1999	7155	24.90	42.30	6.00	57.30	33.90	1.00
24	Guyana	2001	3298	8.10	27.40	6.70	32.40	3.80	1.00
25	Haiti	2000	8073	35.60	54.70	6.50	56.40	48.10	1.00
26	India	2006	62591	13.30	10.00	23.10	60.10	45.00	0.00
27	Indonesia	2003	18955	17.60	18.60	0.00	9.30	25.60	1.00
28	Iraq	2000	18022	12.30	23.40	9.60	5.80	9.80	0.00
29	Jamaica	2005	1769	7.50	5.40			1.10	0.00
30	Jordan	1997	7967	12.00	0.90	2.20	13.50	0.80	1.00
31	Kenya	2003	6819	21.50	59.50	9.00	69.00	23.60	1.00
32	Kyrgyzstan	2006	3471	12.50	15.50	5.40	16.50	0.00	1.00
33	Laos	2006	5255	43.70	29.40	19.90	39.40	63.80	1.00
34	Lesotho	2000	4505	42.00	46.90	26.10	52.30	43.80	0.00
35	Madagascar	2004	13924	22.40	60.90	15.20	10.80	54.60	1.00
36	Malawi	2006	27852	19.60	38.40	20.70	84.60	13.60	1.00
37	Mali	2006	15587	24.30	7.40	22.00	79.40	23.40	1.00
38	Mongolia	2000	4281	8.10	30.30	6.90	48.20	17.30	1.00
39	Morocco	2004	7485	14.50	13.30	10.10	28.60	24.00	0.00
40	Mozambique	1997	8607	14.30	50.90	7.00	75.50	55.10	1.00
41	Namibia	2000	5275	11.60	21.50	5.70	63.10	58.60	0.00
42	Nepal	2006	6768	12.60	20.20	20.70	83.50	57.80	1.00
43	Nicaragua	2001	9148	16.60	13.70	7.40	64.80	24.50	1.00

44	Niger	2006	10736	30.70	24.30	28.60	84.20	71.70	1.00
45	Nigeria	2007	22387	49.10	40.70	23.80	54.20	29.70	0.00
46	Pakistan (1971-)	2007	10922	19.20	9.10		54.20	30.20	0.00
47	Peru	2004	3266	12.70	30.00	0.00	52.70	24.80	1.00
48	Philippines	2003	8999	17.70	7.50		14.20	13.40	0.00
49	Rwanda	2000	8559	17.50	63.80	20.40	80.50	3.00	1.00
50	Senegal	2005	13374	20.30	12.80	7.20	45.60	26.90	1.00
51	Sierra Leone	2006	7633	33.50	51.80	23.50	78.40	35.90	1.00
52	Vietnam	2006	3314	9.10	9.80		31.60	24.60	1.00
53	South Africa	1998	7292	7.50	30.40	0.00	26.40	18.80	0.00
54	Zimbabwe	2006	7136	30.10	27.80	11.30	48.70	40.10	0.00
55	Sudan (-2011)	2000	30914	39.50	36.60	31.60	91.40	43.50	0.00
56	Suriname	2000	2276	7.00	13.80	4.20	9.40	13.90	0.00
57	Swaziland	2000	4380	5.70	62.70	10.80	26.90	29.40	0.00
58	Tajikistan	2000	4291	11.10	53.90	0.00	51.00	0.50	1.00
59	Thailand	2006	11293	6.90	1.80	2.70	13.10	1.30	0.00
60	Uganda	2001	8402	21.10	75.30	9.80	75.70	12.80	1.00
61	Ukraine	2005	3209		0.40		1.80	0.00	0.00
62	Egypt	2005	15565	8.00	0.60	9.20	20.60	1.70	0.00
63	Tanzania	2005	9692	11.20	33.90	13.60	77.20	21.10	1.00
64	Burkina Faso	2003	11690	24.60	43.80	19.20	62.00	72.40	1.00
65	Uzbekistan	2006	6053	3.70	3.00	5.40	10.70	0.00	0.00
66	Yemen	2006	4652	45.30	31.30		44.00	22.10	0.00
67	Zambia	2002	7726	17.40	29.40	24.60	70.60	30.50	1.00
	All	2003	670961	21.10	26.10	13.20	53.50	29.80	0.53

Table S3.Children's living conditions—frequency table

Household head No education					
Urban		Nr of children	Rural		Nr of children
age	0	6775	age	0	24306
	1	6254		1	22372
	2	6498		2	22889
	3	6684		3	24816
	4	6393		4	22932
	5	6608		5	24659
	6	7282		6	27612
	7	7242		7	26588
	8	7266		8	27107
	9	6320		9	21562
	10	7921		10	28366
	11	6018		11	18289
	12	7683		12	26035
	13	7219		13	22176
	14	7129		14	20083
	15	6632		15	19387
	16	6625		16	16940
	17	6163		17	15016
		122,712			411,135
Household head Primary educated					
Urban			Rural		
age	0	10733	age	0	26179
	1	10415		1	25116
	2	10606		2	25232
	3	10880		3	26025
	4	10467		4	23916
	5	10290		5	24691
	6	11176		6	26880
	7	11404		7	25867
	8	11400		8	25793
	9	10809		9	23205
	10	12067		10	26978
	11	10420		11	20856
	12	12051		12	25983
	13	11547		13	22698
	14	11516		14	21849
	15	10530		15	19526
	16	10864		16	18249
	17	10238		17	16457

		197,413			399,321
Household head Secondary+ educated					
Urban			Rural		
age	0	18932	age	0	16345
	1	18755		1	15800
	2	18760		2	15848
	3	18939		3	16222
	4	18573		4	15377
	5	18093		5	15451
	6	19119		6	16293
	7	18385		7	15547
	8	18575		8	15562
	9	17960		9	14161
	10	19495		10	15859
	11	16860		11	12857
	12	19621		12	15260
	13	18486		13	13762
	14	18822		14	13223
	15	17420		15	12270
	16	18042		16	12140
	17	17184		17	11000
		332,021			262,977

Notes: Descriptive statistics of the key micro variables in the analysis.

Table S4. Variable descriptive of central variables

	health_sp	GDPperC	Gov_sp_blnc	Neg_growth	Trade	Dep_ratio	Democ	Aid	Child_age	NrofChild	NrofAdult	SCburden	QCburden	IMFburden	CivWar
nbr.na	104457	0.00	213414	0.00	56588	0.00	0.00	79588	0.00	19.00	19.00	25219	25219	25219	0.00
min	0.40	4.53	-13.96	0.10	14.41	31.26	0.25	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
max	9.56	8.48	12.98	34.80	201.06	97.65	9.33	51.36	17.00	98.13	102.06	377.00	656.00	25.00	6.00
range	9.17	3.95	26.94	34.70	186.65	66.39	9.08	51.33	17.00	98.13	102.06	377.00	656.00	25.00	6.00
median	1.41	6.24	-3.04	5.49	47.93	80.76	6.50	3.67	8.00	3.00	2.00	52.00	185.00	10.00	0.00
mean	2.00	6.30	-3.14	6.03	60.97	78.16	5.50	7.54	8.18	3.91	2.94	77.27	229.67	11.56	0.17
CI.mean.0.95	0.00	0.00	0.01	0.01	0.05	0.02	0.00	0.01	0.01	0.00	0.00	0.10	0.24	0.01	0.00
var	3.68	0.78	19.05	27.84	1222.88	158.80	7.44	85.60	25.67	8.12	4.67	4642.00	29025.19	45.77	0.73
std.dev	1.92	0.88	4.36	5.28	34.97	12.60	2.73	9.25	5.07	2.85	2.16	68.13	170.37	6.77	0.85
coef.var	0.96	0.14	-1.39	0.88	0.57	0.16	0.50	1.23	0.62	0.73	0.73	0.88	0.74	0.59	5.02

Notes: Basic statistics, which are: the number of missing values (nbr.na), the minimal value (min), the maximal value (max), the range (range, that is, max-min); the median (median), the mean (mean), the confidence interval of the mean (CI.mean) at the p level, the variance (var), the standard deviation (std.dev) and the variation coefficient (coef.var) defined as the standard deviation divided by the mean

Table S5. Correlation matrix of key country variables

	IMF	Civ war	Int. war	Health spd	GDP per capita	Growth neg	Trade	Dependency ratio	Democracy	Aid	UN vote with G7	Countries under IMF
IMF	1											
Civ war	0	1										
Int. war	-0.04	-0.01	1									
Health spd	-0.01	-0.09	-0.01	1								
GDP per capita	-0.31	-0.13	-0.07	0.36	1							
Growth neg	-0.07	-0.05	-0.02	-0.1	0.01	1						
Trade	-0.15	0.02	0	0.28	0.23	0.18	1					
Dependency ratio	0.2	0.13	0.02	-0.34	-0.61	-0.1	-0.19	1				
Democracy	0.08	-0.13	-0.06	0.31	0.27	-0.12	0.01	-0.27	1			
Aid	0.28	0.1	0.05	-0.11	-0.54	0.04	0.02	0.42	-0.08	1		
UN vote with G7	0.15	-0.04	0	0.3	0.18	-0.01	0.07	-0.38	0.28	-0.05	1	
Countries under IMF	0.12	0.05	0	-0.04	-0.03	-0.13	-0.02	0.12	0	0.04	0.28	1

Regression results

Table S6. IMF programs and the five dimensions of child health

	health	malnutrition	water	shelter	sanitation
Intercept	20.53	129.43	0.01	0.77	2.18
	[1.82; 230.94]	[2.66; 6297.75]	[0.00; 0.25]	[0.01; 53.95]	[0.02; 298.12]
Country-level					
IMF	0.72	0.43	1.32	0.77	0.88
	[0.40; 1.27]	[0.14; 1.31]	[0.57; 3.09]	[0.28; 2.07]	[0.27; 2.85]
InvMill	1.09	1.31	0.75	1.24	0.55
	[0.53; 2.24]	[0.32; 5.28]	[0.26; 2.17]	[0.36; 4.30]	[0.12; 2.38]
Civil war	1.08	1.15	1.04	1.19	1.22
	[0.92; 1.28]	[0.88; 1.50]	[0.81; 1.34]	[0.89; 1.59]	[0.86; 1.72]
log GDP per Cap	0.60	0.43	0.92	0.69	0.45
	[0.46; 0.78]	[0.28; 0.66]	[0.62; 1.35]	[0.43; 1.09]	[0.26; 0.76]
Aid	0.99	1.01	1.00	1.01	0.97
	[0.97; 1.01]	[0.98; 1.04]	[0.97; 1.03]	[0.98; 1.05]	[0.93; 1.01]
Health spending (of GDP)	0.99	0.99	1.06	0.94	1.06
	[0.86; 1.14]	[0.79; 1.25]	[0.85; 1.31]	[0.74; 1.21]	[0.79; 1.42]
Dependency ratio	1.00	0.99	1.04	1.03	1.03
	[0.98; 1.01]	[0.97; 1.01]	[1.02; 1.07]	[1.00; 1.06]	[1.00; 1.06]
Democracy	1.00	0.96	0.92	1.00	1.16
	[0.94; 1.07]	[0.87; 1.06]	[0.84; 1.01]	[0.89; 1.12]	[1.02; 1.32]
House/child-level					
Year of Interview	1.01	1.05	0.91	1.01	0.99
	[0.96; 1.06]	[0.97; 1.13]	[0.85; 0.98]	[0.93; 1.10]	[0.90; 1.10]
Children in household	1.02	1.04	1.03	1.07	1.03
	[1.01; 1.02]	[1.03; 1.04]	[1.03; 1.03]	[1.07; 1.07]	[1.03; 1.03]
Educated, primary (ref=unedc.)	0.72	0.84	0.87	0.66	0.65
	[0.70; 0.73]	[0.82; 0.86]	[0.86; 0.88]	[0.65; 0.66]	[0.64; 0.65]
Educated, secondary+ (ref=unedc.)	0.54	0.58	0.60	0.34	0.34
	[0.53;	[0.56; 0.60]	[0.59;	[0.34; 0.35]	[0.33; 0.34]

	0.55]		0.60]		
Adults in household	0.97	0.94	0.98	0.94	0.95
	[0.97; 0.98]	[0.94; 0.95]	[0.97; 0.98]	[0.94; 0.94]	[0.94; 0.95]
Urban (ref=rural)	1.50	1.49	5.02	3.49	5.25
	[1.47; 1.53]	[1.45; 1.53]	[4.96; 5.08]	[3.46; 3.52]	[5.19; 5.31]
Boy (ref=girl)	1.01	1.06	1.01	1.01	1.01
	[0.99; 1.02]	[1.04; 1.08]	[1.00; 1.02]	[1.01; 1.02]	[1.00; 1.02]
Child age	0.66	0.79	0.99	0.99	0.98
	[0.65; 0.66]	[0.79; 0.80]	[0.99; 0.99]	[0.98; 0.99]	[0.98; 0.99]
Country variance	0.27	0.63	0.60	0.81	1.15
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	54	48	54	52	54
Children Num. obs.	688425	577170	1465243	1450009	1464123

Notes: Logistic regressions; the parameters presented are odds ratios, with 95%-CI; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models. The model was estimated using MLwiN version 2.36 with its algorithm iterative generalized least-square (IGLS), using the first order maximum quasi-likelihood method (MQL1).

Table S7. IMF moderation effect on head of household's education

	health	malnutrition	water	shelter	sanitation
Intercept	17.57	113.39	0.01	0.60	1.71
	[1.57; 197.06]	[2.16; 5963.89]	[0.00; 0.22]	[0.01; 41.25]	[0.01; 245.83]
Country-level					
IMF	0.53	0.31	1.19	0.51	0.95
	[0.30; 0.95]	[0.10; 0.97]	[0.51; 2.75]	[0.19; 1.37]	[0.29; 3.14]
InvMill	1.11	1.33	0.78	1.32	0.57
	[0.54; 2.28]	[0.32; 5.52]	[0.27; 2.23]	[0.38; 4.54]	[0.13; 2.55]
Civil war	1.08	1.14	1.03	1.17	1.22
	[0.91; 1.27]	[0.87; 1.49]	[0.80; 1.31]	[0.87; 1.56]	[0.86; 1.73]
log GDP per Cap	0.60	0.43	0.92	0.70	0.45
	[0.46; 0.78]	[0.28; 0.67]	[0.63; 1.35]	[0.44; 1.11]	[0.26; 0.78]
Aid	0.99	1.01	1.00	1.02	0.97
	[0.97; 1.01]	[0.98; 1.04]	[0.97; 1.03]	[0.98; 1.05]	[0.93; 1.01]
Health spending (of GDP)	0.99	0.99	1.05	0.94	1.05
	[0.85; 1.14]	[0.78; 1.25]	[0.85; 1.30]	[0.74; 1.21]	[0.78; 1.42]
Dependency ratio	1.00	1.00	1.05	1.03	1.03
	[0.99; 1.01]	[0.97; 1.02]	[1.03; 1.07]	[1.01; 1.06]	[1.00; 1.06]
Democracy	1.00	0.96	0.93	1.00	1.16
	[0.94; 1.07]	[0.87; 1.07]	[0.84; 1.02]	[0.90; 1.12]	[1.01; 1.32]
House/child-level					
Year of Interview	1.01	1.05	0.91	1.01	0.99
	[0.96; 1.06]	[0.97; 1.14]	[0.85; 0.98]	[0.93; 1.10]	[0.90; 1.10]
Urban (ref=rural)	1.51	1.34	4.04	3.29	6.16
	[1.44; 1.58]	[1.26; 1.43]	[3.91; 4.17]	[3.22; 3.36]	[6.00; 6.33]
Educated (ref=unedc.)	0.59	0.62	0.61	0.46	0.44
	[0.56; 0.62]	[0.58; 0.66]	[0.59; 0.63]	[0.45; 0.48]	[0.42; 0.45]
Children in household	1.02	1.04	1.03	1.07	1.04
	[1.02; 1.02]	[1.04; 1.04]	[1.03; 1.03]	[1.07; 1.08]	[1.03; 1.04]
Adults in household	0.98	0.95	0.98	0.94	0.95
	[0.97;	[0.94; 0.95]	[0.98;	[0.94;	[0.94; 0.95]

	0.98]		0.98]	0.94]	
Boy (ref=girl)	1.01	1.06	1.01	1.01	1.01
	[0.99; 1.02]	[1.04; 1.08]	[1.00; 1.02]	[1.01; 1.02]	[1.00; 1.02]
Child age	0.66	0.79	0.99	0.99	0.98
	[0.65; 0.66]	[0.79; 0.80]	[0.99; 0.99]	[0.99; 0.99]	[0.98; 0.99]
Interactions					
IMF:Urban	1.23	1.30	1.10	1.64	0.91
	[1.15; 1.32]	[1.19; 1.42]	[1.06; 1.15]	[1.59; 1.69]	[0.88; 0.94]
IMF:Educated	1.41	1.29	0.90	1.31	1.41
	[1.31; 1.52]	[1.17; 1.42]	[0.86; 0.94]	[1.27; 1.35]	[1.35; 1.47]
Urban:Educated	1.05	1.14	1.28	1.07	1.22
	[0.99; 1.11]	[1.06; 1.23]	[1.23; 1.33]	[1.04; 1.10]	[1.18; 1.27]
IMF:Urban:Educated	0.77	0.87	1.14	0.66	0.62
	[0.71; 0.84]	[0.78; 0.97]	[1.08; 1.20]	[0.64; 0.69]	[0.59; 0.65]
Country variance	0.27	0.66	0.59	0.81	1.18
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	54	48	54	52	54
Children Num. obs.	688425	577170	1465243	1450009	1464123

Notes: Logistic regressions; the parameters presented are odds ratios, with 95%-CI; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models. The model was estimated using MLwiN version 2.36 with its algorithm iterative generalized least-square (IGLS), using the first order maximum quasi-likelihood method (MQL1).

Table S8. The patterns of erosion in the protective effect of education—stratified by urban and rural population (marginal effect)

		Rural population			**Urban population**		
Deprivation	*IMF?*	*OR of Edc.*	*Upper*	*Lower*	*OR of Edc.*	*Upper*	*Lower*
health	No	0.59	0.62	0.56	0.61	0.63	0.59
	Yes	0.83	0.87	0.78	0.67	0.69	0.65
malnutrition	No	0.62	0.66	0.58	0.70	0.73	0.68
	Yes	0.79	0.86	0.74	0.79	0.82	0.76
water	No	0.61	0.63	0.59	0.78	0.79	0.77
	Yes	0.55	0.57	0.53	0.80	0.82	0.79
shelter	No	0.46	0.48	0.45	0.50	0.50	0.49
	Yes	0.61	0.62	0.59	0.43	0.44	0.42
sanitation	No	0.44	0.45	0.42	0.54	0.54	0.53
	Yes	0.62	0.63	0.60	0.47	0.48	0.46

Notes: Authors' calculations (odds-ratios; reference category is non-educated). This table shows marginal effect derived from *Table S7*. *Upper* and *Lower* designate the 95% confidence interval thresholds, respectively.

Table S9. IMF moderation effect on head of household's education (sample weighted)

	health	**malnutrition**	**water**	**shelter**	**sanitation**
Intercept	17.57	113.39	0.01	0.60	1.71
	[1.28; 240.39]	[3.38; 3799.18]	[0.00; 0.13]	[0.01; 41.60]	[0.03; 116.46]
Country-level					
IMF	0.53	0.31	1.19	0.51	0.95
	[0.31; 0.92]	[0.15; 0.64]	[0.46; 3.03]	[0.19; 1.38]	[0.22; 4.08]
InvMill	1.11	1.33	0.78	1.32	0.57
	[0.77; 1.60]	[0.85; 2.08]	[0.35; 1.73]	[0.57; 3.05]	[0.10; 3.25]
Civil war	1.08	1.14	1.03	1.17	1.22
	[0.95; 1.22]	[1.06; 1.23]	[0.89; 1.19]	[0.98; 1.39]	[1.01; 1.47]
log GDP per Cap	0.60	0.43	0.92	0.70	0.45
	[0.44; 0.82]	[0.31; 0.60]	[0.65; 1.31]	[0.45; 1.09]	[0.29; 0.70]
Aid	0.99	1.01	1.00	1.02	0.97
	[0.98; 1.01]	[0.98; 1.04]	[0.97; 1.03]	[0.99; 1.05]	[0.93; 1.01]
Health spending (of GDP)	0.99	0.99	1.05	0.94	1.05
	[0.83; 1.17]	[0.80; 1.22]	[0.88; 1.27]	[0.78; 1.14]	[0.82; 1.35]
Dependency ratio	1.00	1.00	1.05	1.03	1.03
	[0.99; 1.01]	[0.97; 1.02]	[1.03; 1.07]	[1.01; 1.06]	[1.00; 1.05]
Democracy	1.00	0.96	0.93	1.00	1.16
	[0.93; 1.08]	[0.90; 1.04]	[0.84; 1.02]	[0.90; 1.11]	[1.00; 1.34]
House/child-level					
Year of Interview	1.01	1.05	0.91	1.01	0.99
	[0.97; 1.06]	[0.96; 1.15]	[0.86; 0.97]	[0.95; 1.09]	[0.90; 1.10]
Urban (ref=rural)	1.51	1.34	4.04	3.29	6.16
	[1.34; 1.70]	[1.16; 1.55]	[2.19; 7.47]	[2.13; 5.08]	[4.24; 8.96]
Educated (ref=unedc.)	0.59	0.62	0.61	0.46	0.44
	[0.46; 0.75]	[0.50; 0.76]	[0.49; 0.77]	[0.39; 0.55]	[0.29; 0.65]
Children in household	1.02	1.04	1.03	1.07	1.04
	[1.00; 1.04]	[1.01; 1.07]	[1.01; 1.04]	[1.02; 1.13]	[1.01; 1.06]
Adults in household	0.98	0.95	0.98	0.94	0.95
	[0.95;	[0.90; 0.99]	[0.96;	[0.90;	[0.91; 0.98]

	1.00]		0.99]	0.99]	
Boy (ref=girl)	1.01	1.06	1.01	1.01	1.01
	[0.99; 1.03]	[0.99; 1.12]	[1.00; 1.02]	[0.99; 1.03]	[1.00; 1.02]
Child age	0.66	0.79	0.99	0.99	0.98
	[0.62; 0.70]	[0.75; 0.84]	[0.99; 1.00]	[0.98; 0.99]	[0.98; 0.99]
Interactions					
IMF:Urban	1.23	1.30	1.10	1.64	0.91
	[1.01; 1.51]	[1.09; 1.55]	[0.57; 2.13]	[0.94; 2.87]	[0.44; 1.87]
IMF:Educated	1.41	1.29	0.90	1.31	1.41
	[1.06; 1.88]	[0.99; 1.68]	[0.67; 1.22]	[0.92; 1.85]	[0.70; 2.84]
Urban:Educated	1.05	1.14	1.28	1.07	1.22
	[0.92; 1.18]	[0.96; 1.35]	[0.89; 1.83]	[0.85; 1.33]	[0.89; 1.69]
IMF:Urban:Educated	0.77	0.87	1.14	0.66	0.62
	[0.62; 0.97]	[0.69; 1.11]	[0.74; 1.74]	[0.39; 1.13]	[0.27; 1.41]
Country variance	0.27	0.66	0.59	0.81	1.18
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	54	48	54	52	54
Children Num. obs.	688425	577170	1465243	1450009	1464123

Notes: Logistic regressions; the parameters presented are odds ratios, with 95%-CI; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Weighted models. The model was estimated using MLwiN version 2.36 with its algorithm iterative generalized least-square (IGLS), using the first order maximum quasi-likelihood method (MQL1).

Controlling for selection into IMF programs

The Heckman selection model (treatment version)

Since participation in IMF programs is a non-random treatment (i.e., countries opt into the programme), then selection bias—a form of endogeneity—may be introduced to the analyses if the same forces that determine IMF participation also affect levels of child health in the country. If we fail to account for these factors, then their effects may erroneously be attributed to IMF programme participation. While observable variables affecting both selection into an IMF programme and child health are already included as controls in our model (e.g., GDP per capita), we cannot directly control for unobservable factors such as 'political will' (i.e., an executive dedicated to overcoming economic difficulties versus one that is more interested in personal empowerment).

Four approaches have been used in the IMF program evaluation literature to address this type of selection bias: matching methods; instrumental variable approaches; system GMM estimation; and Heckman selection models. Matching is a non-parametric technique that seeks to address the issue of selection bias by pairing observations with near-identical context but that feature different IMF participation decisions (2). The strengths of these methods are that they neither require identification of a valid instrument, nor depend on modelling and distributional assumptions that accompany parametric approaches. The main weakness is that it does not account for unobserved factors, making it unsuitable for our study.

Instrumental variable approaches seek to isolate endogeneity by identifying a relevant third variable, called an instrument (2). To act as a valid instrument, that third variable must influence IMF participation (relevance criterion) but not affect the outcome variable except via participation (exclusion restriction); the effect of the instrument needs to be as good-as-random (the independence assumption) with regards to omitted variables (substantively, it could be the political will to implement programs; statistically, it means that the instrument is uncorrelated with the error-term). Most studies rely on United Nations General Assembly (UNGA) voting similarity with the United States or G7 (3). Nonetheless, identifying valid instruments for all possible outcomes of interest remains a key problem. For example, if the outcome is democracy then the UNGA instrument is not excludable, since democratic states exhibit similar voting patterns to those cast by the United States. Additionally, instrumental variable approach are less suitable for dichotomous outcome variables (4), the type of variable this study deals with.

System generalized method-of-moments (GMM) estimators for dynamic panels have recently been utilized to allay concerns of endogeneity in IMF participation (5). Unlike standard instrumental variable approaches, this method does not assume that valid instruments are available outside the immediate dataset, instead employing internally derived instruments based on lagged values of levels and differences of IMF participation. Aside from circumventing the need for an external instrument, a further strength of system GMM is its ability to accommodate country fixed effects in dynamic panels—for instance, where a lagged dependent variable is included as a regressor. Despite its advertised flexibility, system GMM estimation makes strong assumptions about the data. It assumes that the correct model for the outcome is dynamic (i.e., present changes are a function of past trends), that lagged differences can predict contemporaneous levels, and that first differences of instruments are uncorrelated with country fixed effects. As our data are not of a panel format, system GMM is not an option.

For our purposes, Heckman's (6) two-step method is the most suitable choice to address concerns of selection bias. The Heckman model correct for this bias by treating non-random assignment of countries into IMF participating and non-participating groups as an omitted variable problem. Like instrumental variable approaches, the appeal of Heckman-style models is that they can control for selection on unobservables, such as political will (7). One potential weakness of this method is that it needs a variable to fulfil the exclusion criteria, which can be difficult to identify. We outline our choices for such variables below.

The Heckman model involves first modelling IMF participation, and second modelling the outcome of interest using the inverse Mills ratio from the first step. Accordingly, in the first step, we estimate a probit model to predict the likelihood of IMF participation:

$$\Phi(Z_{k,t}\gamma) = Probit(imf.prog.cgn_{k,t}) = \gamma_0 + \gamma_1 imf.prog.cgn_{k,t-1} + \gamma_2 gdp.growth_{k,t-1} + \gamma_3 cab.gdp_{k,t-1} + \gamma_4 demo.fhpol_{k,t-1} + \gamma_5 lngdppc_{k,t-1} + \gamma_6 civilwar_{k,t-1} + \gamma_7 int.war_{k,t-1} + \gamma_9 UNvoteG7_{k,t-1} + \gamma_{10} CountriesWithIMF_{k,t-1}$$

As a point of reference, we rely on a version of the specification suggested by the Independent Evaluation Office of the IMF (8): one that retain the best data coverage but which still gives analogous results. The outcome variable, $imf.prog.cgn_{k,t}$, measures if country *k* had an IMF program at year *t*. Our choice of which central mechanism affect selection into programs, builds on Moser and Strum's suggestions (9):

- Previous IMF participation (imf.prog.cgn, t-1): a country's past involvement with the IMF tend to positively determine future program participation. The nearer historically, the more likely participation is. We use whether the country had a program last year.
- GDP growth (gdp.growth): Countries with lower growth are more likely to become economically constrained, and ask for IMF credit.
- Current account balance (cab.gdp as share of GDP): One of the key objective of the IMF is to support countries to overcome balance of payment issues deriving from trade. The higher the imbalance, the more likely the country is to ask for IMF help.
- Democracy (demo.fhpol): Autocratic regimes can with less political cost invite the IMF, compared to more democratic countries.
- Log GDP per capita (lngdppc): low income countries tend to seek concessional IMF assistance, whereas middle income countries with short term economic disturbances (e.g. currency crisis) tend to ask for non-concessional loans (e.g. Brazil, Argentina).
- Civil war (civilwar): Even if countries with a high degree of domestic civil conflict might need more economic help, the IMF might avoid involvement during violent periods. Also, the political cost to call for IMF assistance might be high.
- International war (int.war): Countries involved in armed conflicts between sovereign nations deters the IMF.
- UN votes with G7 (UN vote G7): this variable captures how often countries vote in line with G7. This shows political proximity with the key nations driving the IMF.
- Countries on IMF programs (CountriesWithIMF): In any given year, the more countries that have IMF funding, the less likely the IMF is to issue new programs as its funds are limited.

The total number of countries on IMF programmes and UN voting patterns with G7 act as our exclusion restrictions: these variable explain significantly the country's participation decision in IMF programs but are not correlated with the dependent variable of the outcome equation, in our case child health. Voting pattern has stronger relevance as it is significantly correlated in all alternative selection specifications (see M1 to M3 in Table S10).

We choose not to include government balance (lagged one year) as it reduced many observations due to missing data (6 countries less with corresponding cases of children which would result in about 10% less cases). We calculate the inverse Mills ratio and include it in the outcome equation to control for the remaining unobserved variation (6).

The equation below defines the inverse Mills ratio, λ, which isolates unobserved factors determining IMF participation:

$$\lambda_{k,t} = \begin{cases} \phi(Z_{k,t}\hat{\gamma})/\Phi(Z_{k,t}\hat{\gamma}), & \text{if } T_{k,t} = 1. \\ -\phi(Z_{k,t}\hat{\gamma})/(1 - \Phi(Z_{k,t}\hat{\gamma})), & \text{otherwise.} \end{cases}$$

The Mills ratio is calculated for each observation: country *k* at time point *t*, and depending on their treatment status T_j (present or absent IMF program). The function ϕ denotes the standard normal density function, and Φ the standard normal cumulative distribution function; $Z_{k,t}$ represents the covariates and $\hat{\gamma}$ are the vector of estimated parameter from the first equation. The inverse Mills ratio, λ, is then used as a covariate, in the outcome equation (in our case, the multilevel models with child health as outcomes) controlling for self-selection.

Its coefficient is interpreted as follows: if significantly negative, then unobserved variables that make IMF participation more likely are associated with lower government health expenditure; if significantly positive, then unobserved variables that make IMF participation more likely are associated with higher government health expenditure; if non-significant, then there is no association.

Table S10. Alternative selection specifications

	Dependent variable IMF program (t)		
	M1	M2	M3
IMF program (t-1)	1.910***	1.959***	
	(0.064)	(0.094)	
GDP growth (t-1)	-0.018***	-0.042***	-0.026***
	(0.006)	(0.010)	(0.009)
Current account balance (t-1)	-0.007*	-0.008	-0.008*
	(0.004)	(0.005)	(0.005)
Democracy (t-1)	0.027**	0.033*	0.046***
	(0.013)	(0.019)	(0.016)
Log GDP per capita (t-1)	-0.256***	-0.253***	-0.336***
	(0.034)	(0.053)	(0.054)
Log aid per capita (t-1)			0.004
			(0.004)
Civil war (t-1)	-0.026	0.042	0.030
	(0.035)	(0.069)	(0.054)
International war (t-1)	0.042	-0.213	
	(0.072)	(0.156)	
Dependency ratio (t-1)			-0.002

			(0.004)
Countries on IMF programs	0.011***	0.006	0.001
	(0.004)	(0.005)	(0.005)
UN voting pattern with G7	0.886**	1.041*	3.303***
	(0.419)	(0.546)	(0.686)
Constant	-0.570*	-0.418	-0.130
	(0.309)	(0.478)	(0.741)
Observations	2,482	1,264	1,066
Log Likelihood	-1,000.302	-471.559	-631.869
Akaike Inf. Crit.	2,020.605	963.118	1,283.739
Note: probit models			*p**p***p<0.01

Classification matrices

A classification matrix—also known as a confusion matrix—is used as a tool for model diagnostics of probit (and logit) models (10). It shows the proportion of country-year cases our fitted models classified correctly. High accuracy implies a well fitted model to the data, see Table S11.

Table S12 (M1 above) shows the accuracy of the selection model we use to produce the original results in this paper. It demonstrates 84.8% accuracy. This serves as a reference in case our model fails to identify a relevant exclusion(s)—IEO uses a similar selection model, but omitting the exclusion (8).

To avoid overfitting, we also test the external validity of our model (Table S13, and M2), that is, the prediction accuracy of our model on a test sample (previously unseen data) (10). In this model, we used a distinct training and test sample. First, we fitted the probit model on a training sample, which lay aside all the country-year cases containing our 67 countries for which we have micro-data. Second, we now use only our country-year cases of our 67 countries to predicted a country's IMF participation. This procedure ensures that we are not overfitting the model. Our model correctly predicts 83.3% of the cases, which is reassuring.

Lastly, we challenge our selection model (M3) further by, first, re-specifying our selection model by removing a highly influential covariate (previous year IMF program), remove one exclusion restriction (UN voting pattern with G7), and add two new variables (Foreign aid, and Dependency ratio); secondly, use external validation (test sample) to evaluate model accuracy. Not unsurprisingly, this model exhibits a lower accuracy of 63.8%, see Table S14.

Table S11. An interpretation guide

Frequencies of actual and predicted outcomes

		Predicted		
		0	1	Total
Actual	0	True negative (a)	False positive (b)	
	1	False negative (c)	True positive (d)	
	Total			

Correctly predicted (accuracy): (a + d) / (a +b + c +d)

Table S12. Probit with additional controls (with two explicit exclusion criteria)

Frequencies of actual and predicted outcomes

Actual	Predicted 0	Predicted 1	Total
0	1162	189	1351
1	189	942	1131
Total	1351	1131	2482

Correctly predicted: 84.8%

$$\Phi(Z_{k,t}\gamma) = Probit(imf.prog.cgn_{k,t}) = \gamma_0 + \gamma_1 imf.prog.cgn_{k,t-1} + \gamma_2 gdp.growth_{k,t-1} + \gamma_3 cab.gdp_{k,t-1} + \gamma_4 demo.fhpol_{k,t-1} + \gamma_5 lngdppc_{k,t-1} + \gamma_6 civilwar_{k,t-1} + \gamma_7 int.war_{k,t-1} + \gamma_8 UNvoteG7_{k,t-1} + \gamma_9 CountriesWithIMF_{k,t-1}$$

Table S13. Assessment of fit via external validation

Frequencies of actual and predicted outcomes

Actual	Predicted 0	Predicted 1	Total
0	455	99	554
1	104	560	664
Total	559	659	1218

Correctly predicted: 83.3%

$$\Phi(Z_{k,t}\gamma) = Probit(imf.prog.cgn_{k,t}) = \gamma_0 + \gamma_1 imf.prog.cgn_{k,t-1} + \gamma_2 gdp.growth_{k,t-1} + \gamma_3 cab.gdp_{k,t-1} + \gamma_4 demo.fhpol_{k,t-1} + \gamma_5 lngdppc_{k,t-1} + \gamma_6 civilwar_{k,t-1} + \gamma_7 int.war_{k,t-1} + \gamma_8 UNvoteG7_{k,t-1} + \gamma_9 CountriesWithIMF_{k,t-1}$$

Note: This model was first fitted to all countries but our 67; second, the prediction are then solely based on the 67 unseen countries (country-years) to evaluate the external validity of our model. In this way, we can assess whether we are overfitting our models; a low accuracy would indicate overfitting.

Table S14. Assessment of fit with re-specified selection model and external validation

Frequencies of actual and predicted outcomes

Actual	Predicted 0	Predicted 1	Total
0	432	128	560
1	315	349	664
Total	747	477	1224

Correctly predicted: 63.8%

$$\Phi(Z_{k,t}\gamma) = Probit(imf.prog.cgn_{k,t}) = \gamma_0 + \gamma_1 dep.ratio_{k,t-1} + \gamma_2 gdp.growth_{k,t-1} + \gamma_3 cab.gdp_{k,t-1} + \gamma_4 demo.fhpol_{k,t-1} + \gamma_5 lngdppc_{k,t-1} + \gamma_6 int.war_{k,t-1} + \gamma_8 UNvoteG7_{k,t-1} + \gamma_9 aid_{k,t-1} +$$

The difference between a less and a more robust selection model

We re-analyzed our results using the less robust selection model (with less prediction accuracy, M3 in Table S10) to assess the overall sensitivity of our result. This exercise gives a point of reference of how much our results would change due to misspecification of the first stage model.

Comparing these results (predictive power presented in Table S14) with the original (M1), that the direction of our estimates is robust. Educated rural population is still generally worse off under programs, with a similar mixed trend in the urban. This analysis shows that the Inverse Mills ratio tends to efficiently captures selection bias, even with a less accurate selection equation.

There are some important differences between a more (M1) and less accurate selection model (M3). For example, the effect on sanitation deprivation changes direction from reduced beneficial effect (with M1 as first stage) to detrimental effect (with M3 as first stage)—similar trend for water deprivation but now in the urban population. Similarly, the results regarding malnutrition, based on the weaker selection model, shows overlapping confidence intervals between program and no program participation group, failing to identify an effect. These observations imply that had we specified a less robust selection equation, we would have attributed this detrimental effect erroneously to IMF program participation.

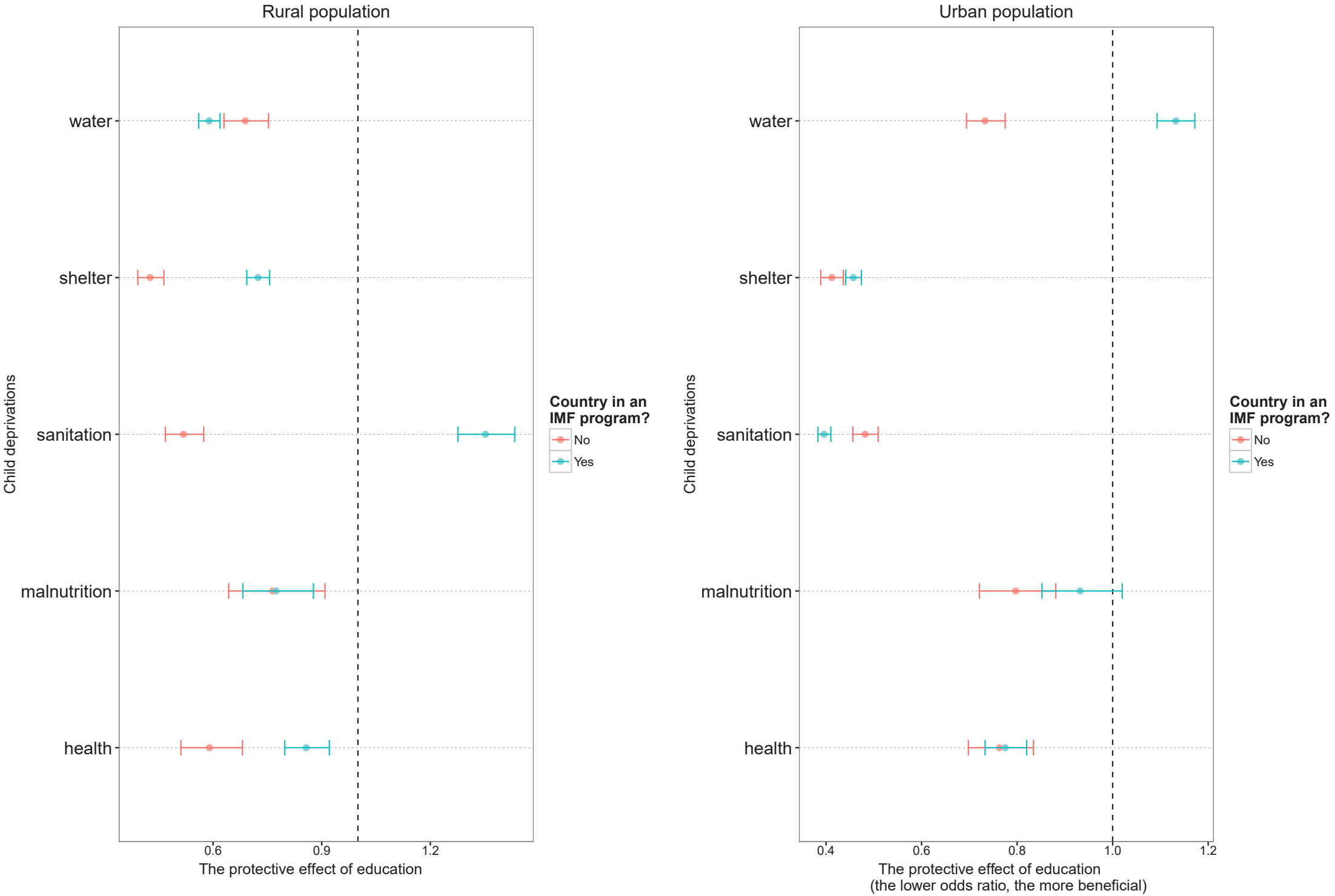

Figure S1. Results based on a less robust selection model

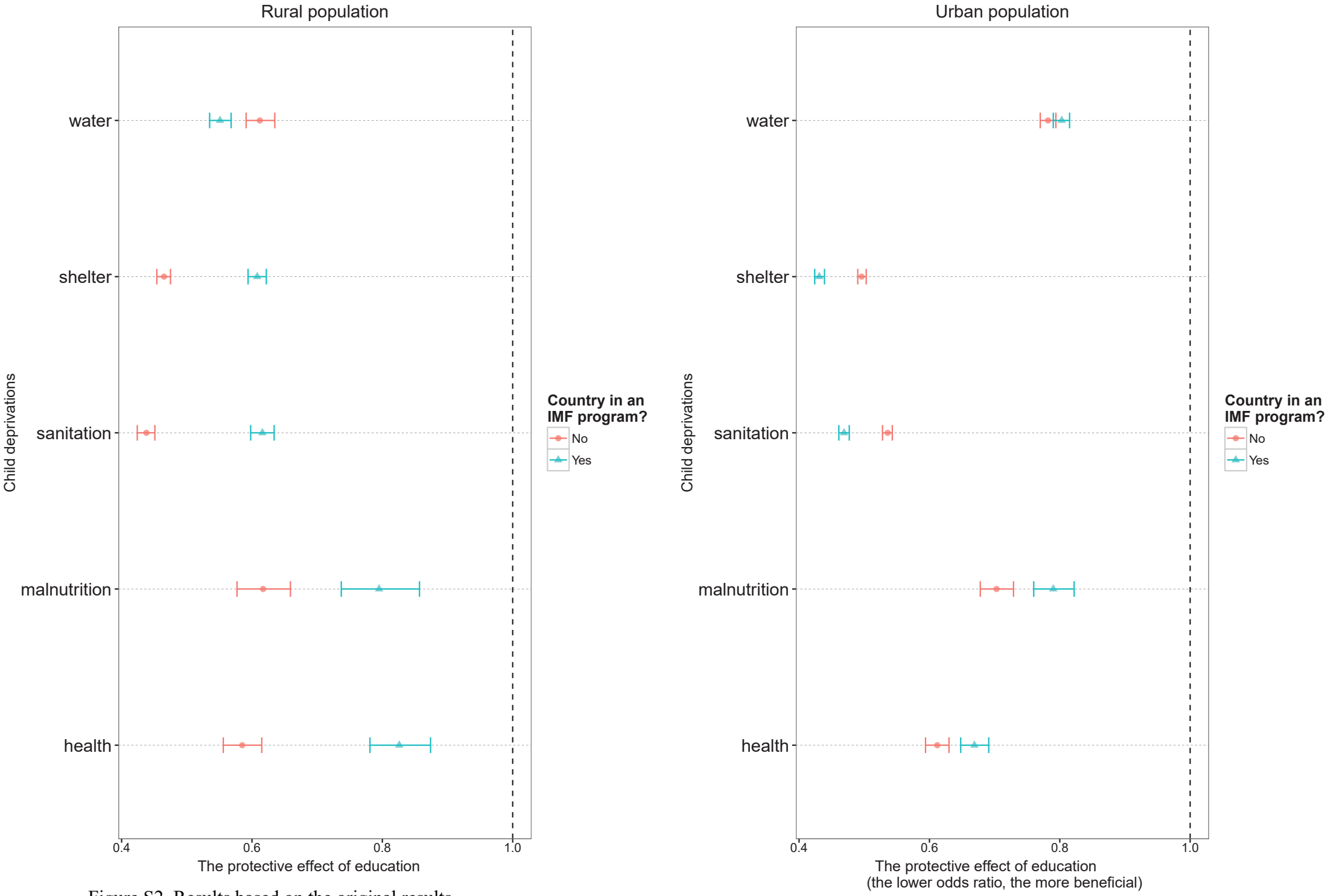

Figure S2. Results based on the original results

Sensitivity analysis of the Multilevel Models

Head of Household´s education level (none, primary, secondary +)

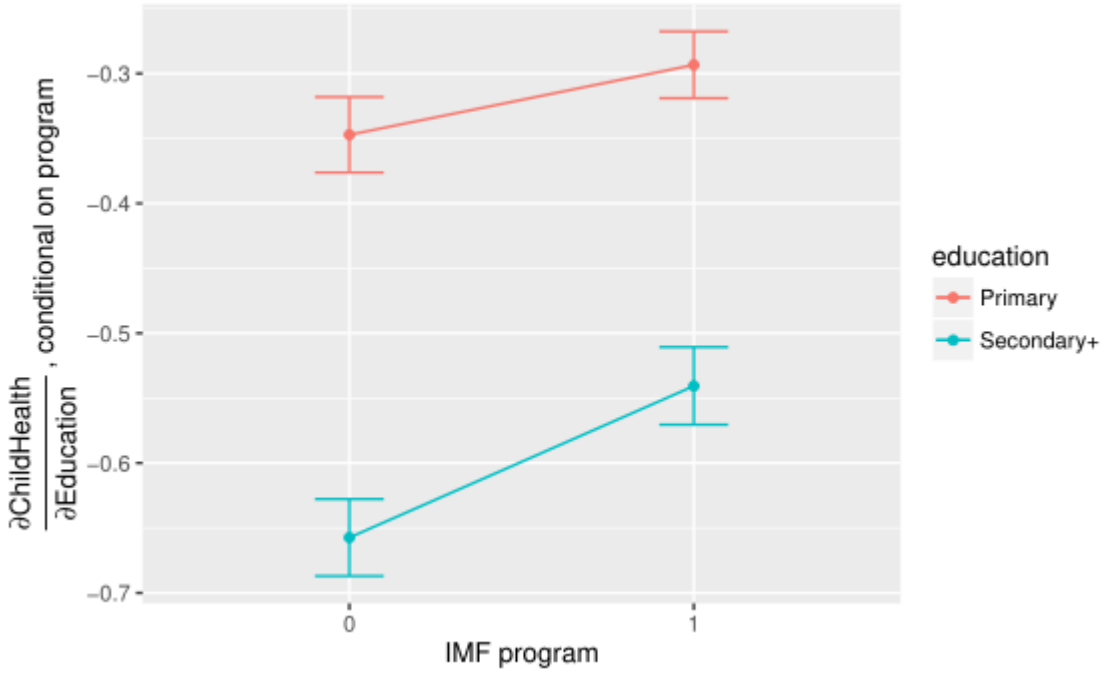

Figure S3. IMF program moderates the effect of education on child health deprivation. The figure captures the partial marginal effect on the logit-scale as a latent-model representation in child health deprivation (ChildHealth*). The effect of education is less beneficial in an IMF program than without a program. The differences are significant across all education groups. Error bars are 95% CIs

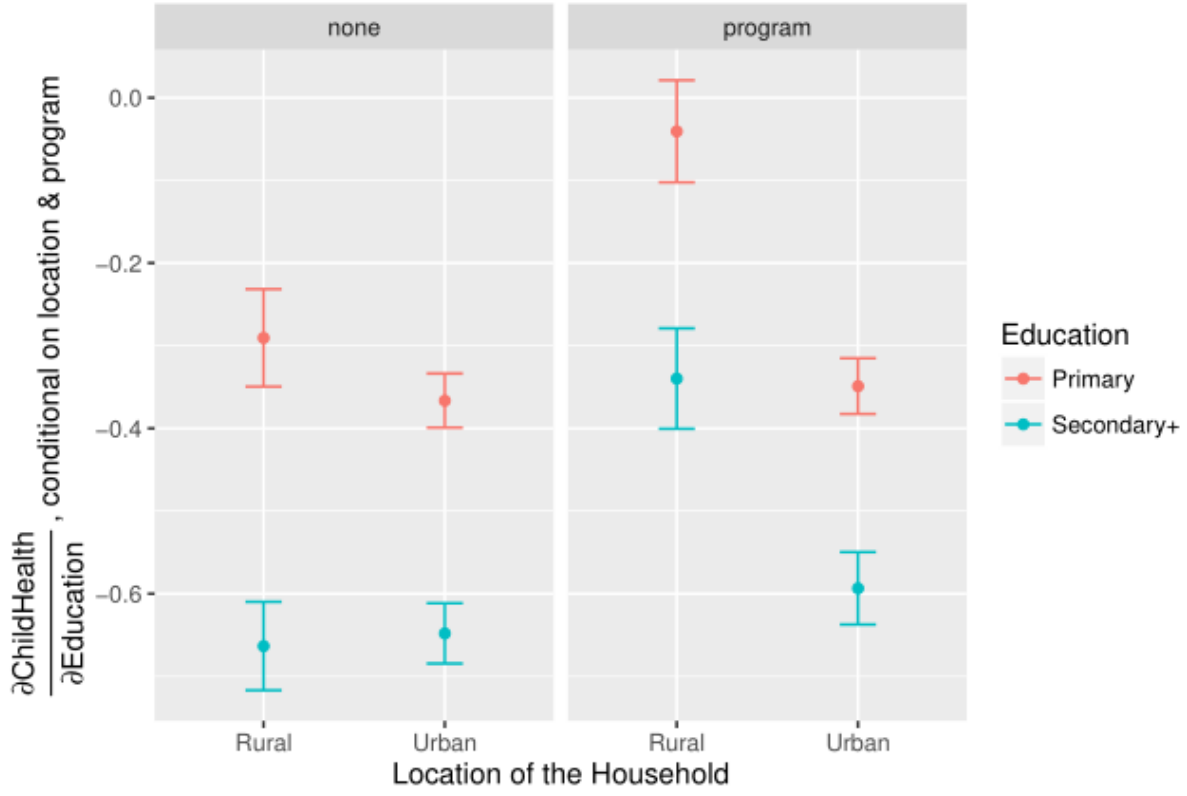

Figure S4. IMF program moderates the effect of location and education on child health deprivation. Based on model 5, table2. The figure captures the partial marginal effect on the logit-scale as a latent-model representation in child health deprivation (ChildHealth*). The effect of education is less beneficial in an IMF program than without a program. The differences are significant across all education groups. Error bars are 95% CIs

Table S15. IMF moderation effect on head of household's education level, five deprivations

	health	**malnutrition**	**water**	**shelter**	**sanitation**
Intercept	19.31*	134.34*	0.01**	0.85	2.36
	(23.67)	(265.31)	(0.02)	(1.86)	(5.93)
IMF	0.67	0.42	1.42	0.86	0.98
	(0.19)	(0.24)	(0.61)	(0.44)	(0.59)
InvMill	1.09	1.30	0.74	1.25	0.54
	(0.40)	(0.92)	(0.40)	(0.79)	(0.41)
EducatedPrimary(ref=unedc.)	0.70***	0.81***	0.86***	0.68***	0.69***
	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)
EducatedSecondary+(ref=unedc.)	0.51***	0.58***	0.65***	0.37***	0.36***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Civil war	1.08	1.15	1.04	1.19	1.22
	(0.09)	(0.15)	(0.13)	(0.18)	(0.22)
log GDP per Cap	0.60***	0.43***	0.91	0.69	0.44**
	(0.08)	(0.09)	(0.18)	(0.16)	(0.12)
Aid	0.99	1.01	1.00	1.01	0.97
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Health spending (of GDP)	0.99	0.99	1.06	0.95	1.06
	(0.07)	(0.12)	(0.12)	(0.12)	(0.16)
Children in household	1.02***	1.04***	1.03***	1.07***	1.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Adults in household	0.97***	0.94***	0.98***	0.94***	0.95***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Urban (ref=rural)	1.50***	1.48***	5.00***	3.47***	5.23***
	(0.01)	(0.02)	(0.03)	(0.02)	(0.03)
Boy (ref=girl)	1.01	1.06***	1.01*	1.01***	1.01$^{\cdot}$
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Child age	0.66***	0.79***	0.99***	0.99***	0.98***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dependency ratio	1.00	0.99	1.04***	1.03*	1.02$^{\cdot}$
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Democracy	1.00	0.96	0.92$^{\cdot}$	1.00	1.16*
	(0.03)	(0.05)	(0.04)	(0.06)	(0.08)
Year of Interview	1.01	1.05	0.91*	1.01	0.99
	(0.02)	(0.04)	(0.03)	(0.04)	(0.05)
IMF:EducatedPrimary(ref=unedc.)	1.07**	1.08**	1.00	0.90***	0.86***
	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)

IMF:EducatedSecondary+(ref=unedc.)	1.15***	0.98	0.82***	0.80***	0.81***
	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)
Country variance	0.27	0.63	0.60	0.83	1.16
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	54	48	54	52	54
Children Num. obs.	688425	577170	1465243	1450009	1464123

***p < 0.001, **p < 0.01, *p < 0.05, ˙p < 0.1

Notes: Logistic regressions; the parameters presented are odds ratios, with standard errors in parantheses; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models.

IMF historical burden

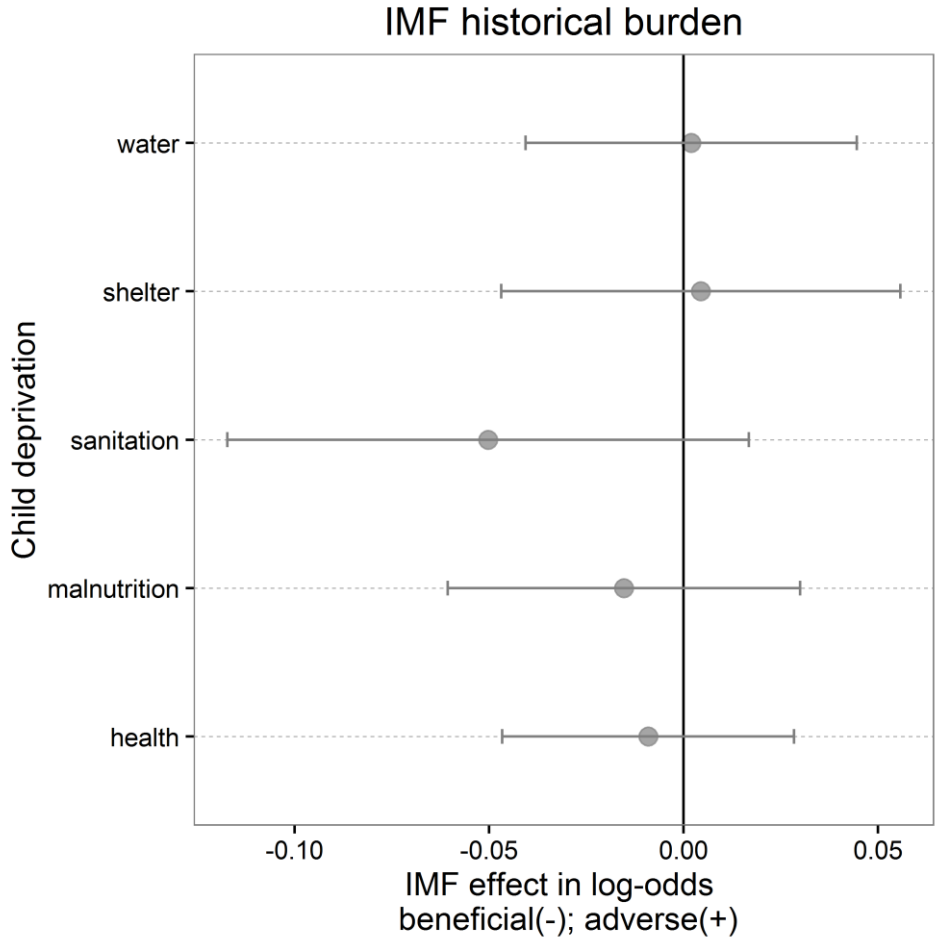

Figure S5. IMF historical burden is defined as the sum of programs a country i has had between 1980 and DHS survey defined in this study.

Table S16. IMF historical burden (Education levels), five deprivations

	health	**malnutrition**	**water**	**shelter**	**sanitation**
Intercept	0.06**	0.02***	0.01***	0.01***	0.00***
	(0.05)	(0.02)	(0.01)	(0.01)	(0.00)
IMF burden	0.99	0.98	1.00	1.00	0.95
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)

Civil war	0.95	1.02	1.05	1.14	0.92
	(0.10)	(0.13)	(0.13)	(0.17)	(0.18)
Health spending (of GDP)	0.90	0.89	0.95	0.85	0.79
	(0.08)	(0.09)	(0.09)	(0.10)	(0.12)
Children in household	1.02***	1.03***	1.03***	1.06***	1.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
EducatedPrimary(ref=unedc.)	0.75***	0.85***	0.87***	0.67***	0.69***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
EducatedSecondary+(ref=unedc.)	0.56***	0.59***	0.61***	0.36***	0.39***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Adults in household	0.98***	0.95***	0.98***	0.94***	0.95***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Urban (ref=rural)	1.45***	1.45***	4.68***	3.41***	4.72***
	(0.01)	(0.02)	(0.03)	(0.01)	(0.03)
Boy (ref=girl)	1.01	1.06***	1.01*	1.01***	1.01·
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Child age	0.66***	0.78***	0.99***	0.99***	0.99***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Growth negative	1.06	1.08·	0.93·	1.02	0.90
	(0.04)	(0.04)	(0.04)	(0.05)	(0.06)
Dependency ratio	1.03**	1.03**	1.05***	1.05***	1.07***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Democracy	0.98	0.96	0.94	1.03	1.15·
	(0.04)	(0.04)	(0.04)	(0.06)	(0.08)
Year of Interview	1.01	1.09*	0.90**	1.01	1.09
	(0.04)	(0.05)	(0.04)	(0.05)	(0.07)
Country variance	0.45	0.55	0.60	0.85	1.48
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	59	53	60	58	60
Children Num. obs.	759076	647470	1556585	1541351	1555465

***p < 0.001, **p < 0.01, *p < 0.05, ·p < 0.1

Notes: Logistic regressions; the parameters presented are odds ratios, with standard errors in parantheses; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models.

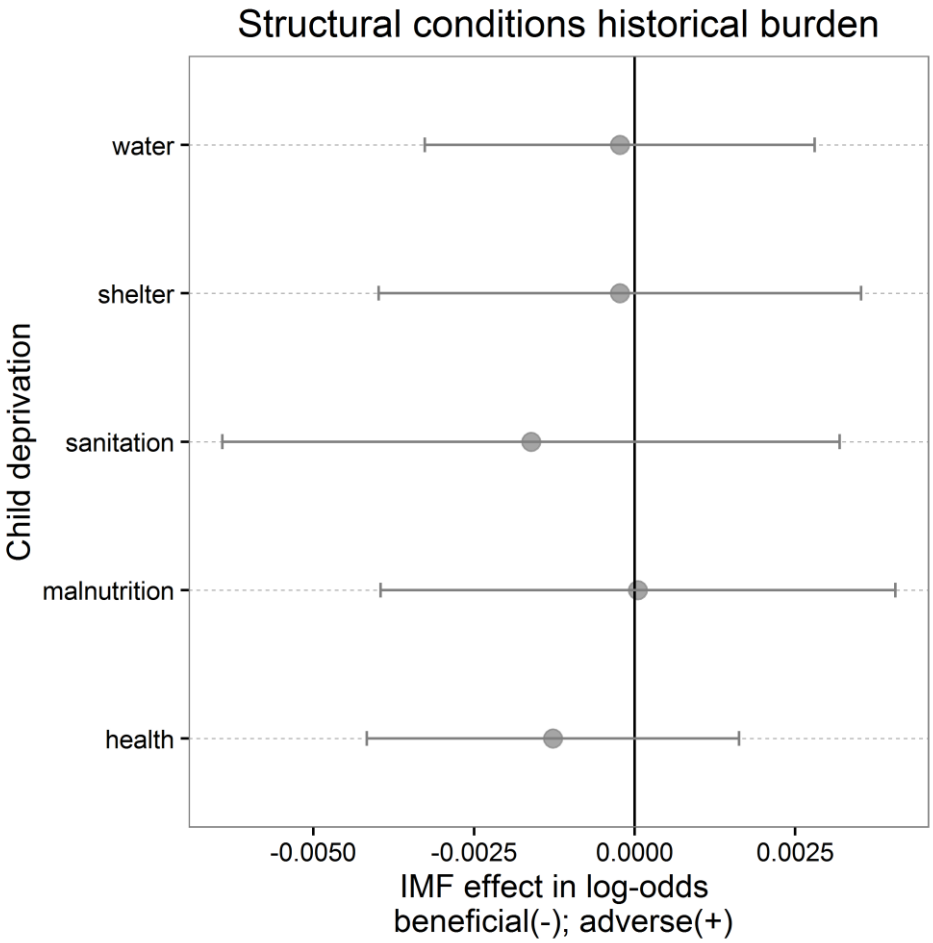

Figure S6. Structural conditions burden. Notes: A structural condition is a macroeconomic reform aimed at either dismantling government organizations or installing institutional features of modern market economy (e.g. privatizing state-owned governments, or independent central banks).

Table S17. Structural conditions burden (Education levels), five deprivations

	health	**malnutrition**	**water**	**shelter**	**sanitation**
Intercept	0.06**	0.02***	0.01***	0.01***	0.00***
	(0.05)	(0.02)	(0.01)	(0.01)	(0.00)
Structural cond. burden	1.00	1.00	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Civil war	0.96	1.05	1.04	1.13	1.03
	(0.09)	(0.12)	(0.12)	(0.15)	(0.19)
Health spending (of GDP)	0.90	0.90	0.95	0.85	0.82
	(0.08)	(0.09)	(0.09)	(0.10)	(0.12)
Children in household	1.02***	1.03***	1.03***	1.06***	1.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
EducatedPrimary(ref=unedc.)	0.75***	0.85***	0.87***	0.67***	0.70***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
EducatedSecondary+(ref=unedc.)	0.56***	0.59***	0.61***	0.36***	0.39***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)

Adults in household	0.98***	0.95***	0.98***	0.94***	0.95***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Urban (ref=rural)	1.45***	1.45***	4.68***	3.42***	4.68***
	(0.01)	(0.02)	(0.03)	(0.01)	(0.03)
Boy (ref=girl)	1.01	1.06***	1.01*	1.01***	1.01*
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Child age	0.66***	0.78***	0.99***	0.99***	0.99***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Growth negative	1.07.	1.08.	0.93	1.02	0.93
	(0.04)	(0.05)	(0.04)	(0.06)	(0.06)
Dependency ratio	1.03***	1.03**	1.05***	1.05***	1.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Democracy	0.97	0.95	0.94	1.03	1.12.
	(0.04)	(0.04)	(0.04)	(0.05)	(0.08)
Year of Interview	1.01	1.08.	0.91**	1.01	1.04
	(0.03)	(0.04)	(0.03)	(0.04)	(0.06)
Country variance	0.44	0.55	0.60	0.86	1.50
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	59	53	60	58	60
Children Num. obs.	759076	647470	1556585	1541351	1555465

***p < 0.001, **p < 0.01, *p < 0.05, .p < 0.1

Notes: Logistic regressions; the parameters presented are odds ratios, with standard errors in parantheses; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models.

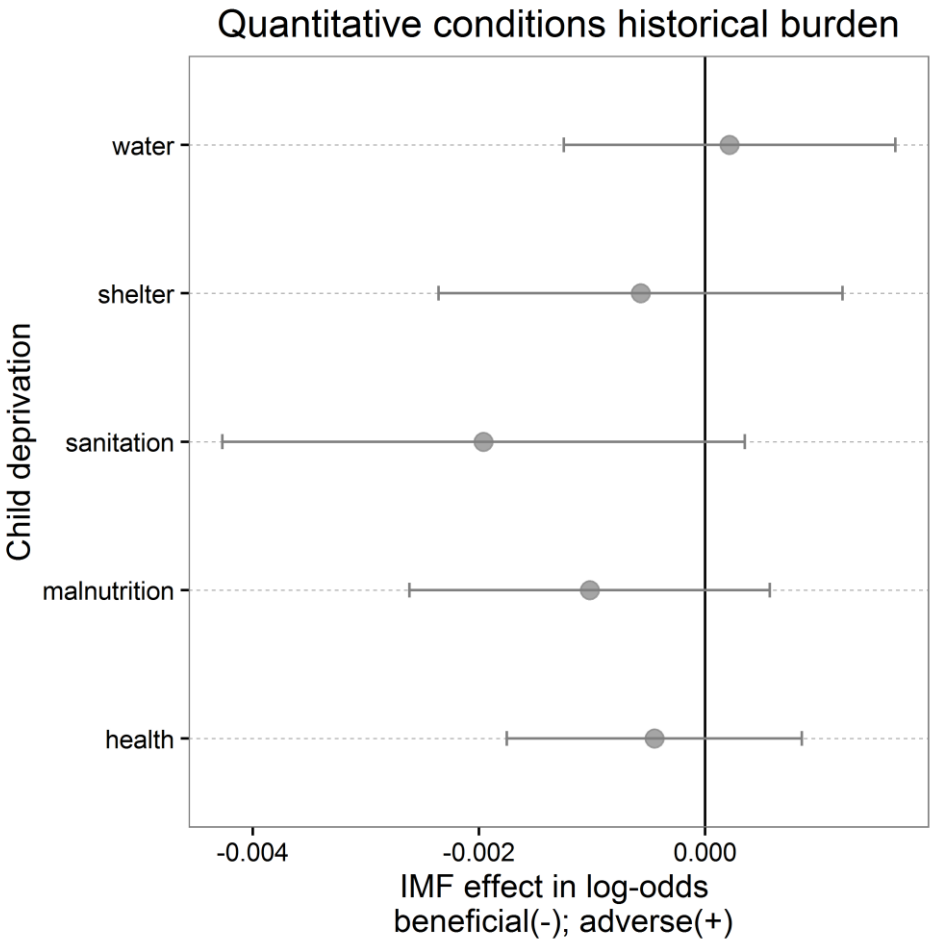

Figure S7. Quantitative conditions burden. Notes: A quantitative condition is a quantifiable macroeconomic target (e.g. limits to government spending)

Table S18. Quantitative conditions burden (Education levels), five deprivations

	health	**malnutrition**	**water**	**shelter**	**sanitation**
Intercept	0.06**	0.01***	0.01***	0.01***	0.00***
	(0.05)	(0.01)	(0.01)	(0.01)	(0.00)
Quantiative cond. burden	1.00	1.00	1.00	1.00	1.00.
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Civil war	0.95	1.01	1.05	1.10	0.94
	(0.10)	(0.12)	(0.12)	(0.16)	(0.18)
Health spending (of GDP)	0.90	0.91	0.95	0.84	0.81
	(0.08)	(0.09)	(0.09)	(0.10)	(0.12)
Children in household	1.02***	1.03***	1.03***	1.07***	1.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
EducatedPrimary(ref=unedc.)	0.75***	0.85***	0.88***	0.66***	0.69***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
EducatedSecondary+(ref=unedc.)	0.56***	0.59***	0.61***	0.35***	0.39***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Adults in household	0.98***	0.95***	0.98***	0.94***	0.95***

	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Urban (ref=rural)	1.45***	1.45***	4.67***	3.45***	4.72***
	(0.01)	(0.02)	(0.03)	(0.01)	(0.03)
Boy (ref=girl)	1.01	1.06***	1.01*	1.01***	1.01·
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Child age	0.66***	0.78***	0.99***	0.99***	0.99***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Growth negative	1.06	1.08·	0.93·	1.03	0.92
	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)
Dependency ratio	1.03***	1.04***	1.05***	1.06***	1.07***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Democracy	0.98	0.96	0.94	1.03	1.14·
	(0.04)	(0.04)	(0.04)	(0.06)	(0.08)
Year of Interview	1.01	1.10*	0.90**	1.03	1.09
	(0.03)	(0.04)	(0.03)	(0.05)	(0.07)
Country variance	0.45	0.55	0.59	0.86	1.47
Child variance	3.29	3.29	3.29	3.29	3.29
Countries Num. obs.	59	53	60	58	60
Children Num. obs.	759076	647470	1556585	1541351	1555465

***p < 0.001, **p < 0.01, *p < 0.05, ·p < 0.1

Notes: Logistic regressions; the parameters presented are odds ratios, with standard errors in parentheses; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models.

Model assumptions of multilevel models

Normality of residuals assumption

Logistic multilevel models assume that the country level error terms are normally distributed; and a binomial distribution for the child–level error (11). In this section we outline the country-level error terms in several Quantile-Quantile plots. With small country-samples, the second level error term is more prone to assumption violation. The plots below are all based on the interactive models presented in Table S7, which the main results are based on. Residuals that lie perfectly on the diagonal line y = x would exhibit the highest degree of conformity to the normal distribution assumption. As demonstrated below, except for the malnutrition outcome, which shows a slight violation of normality, the rest are fairly normal. Countries that tend to lie at the upper-end of the residual distribution (outliers) are Sudan, Bolivia, Malawi, and Guyana. Even when removing these countries from the sample, the main results and inference presented hold.

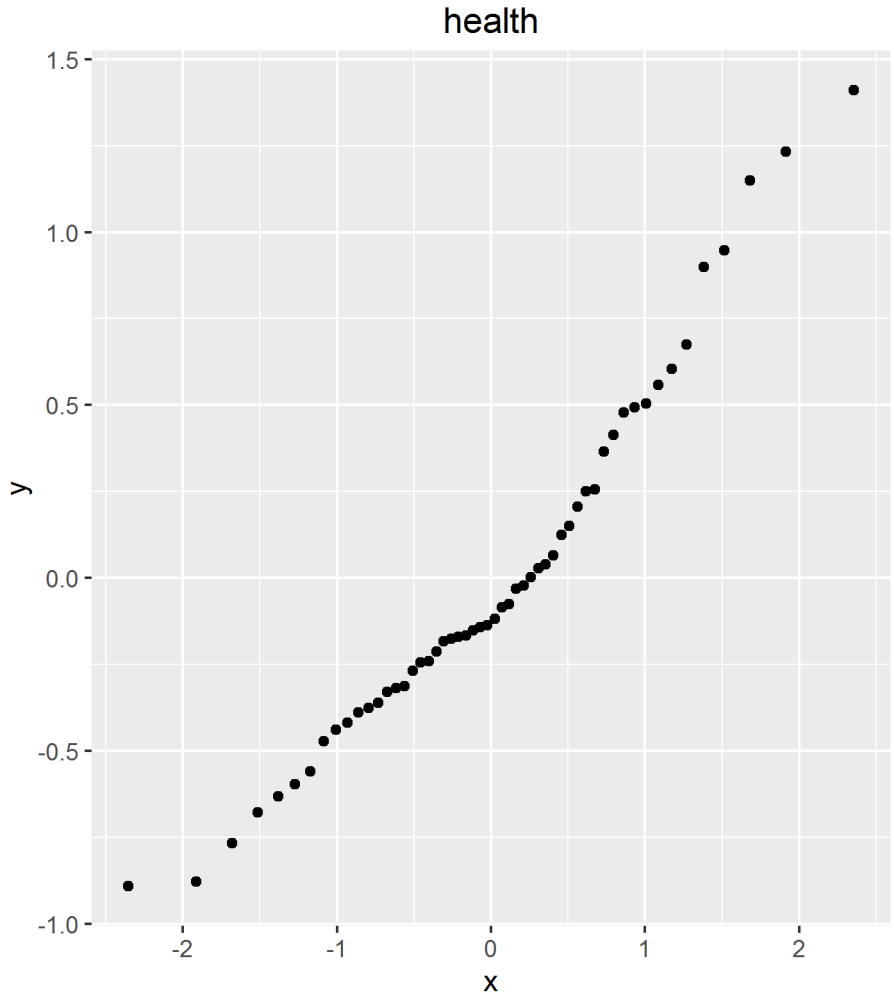

Figure S8. Quantile-quantile plot—health deprivation. Notes: y=sample quantiles; x=theoretical quantiles

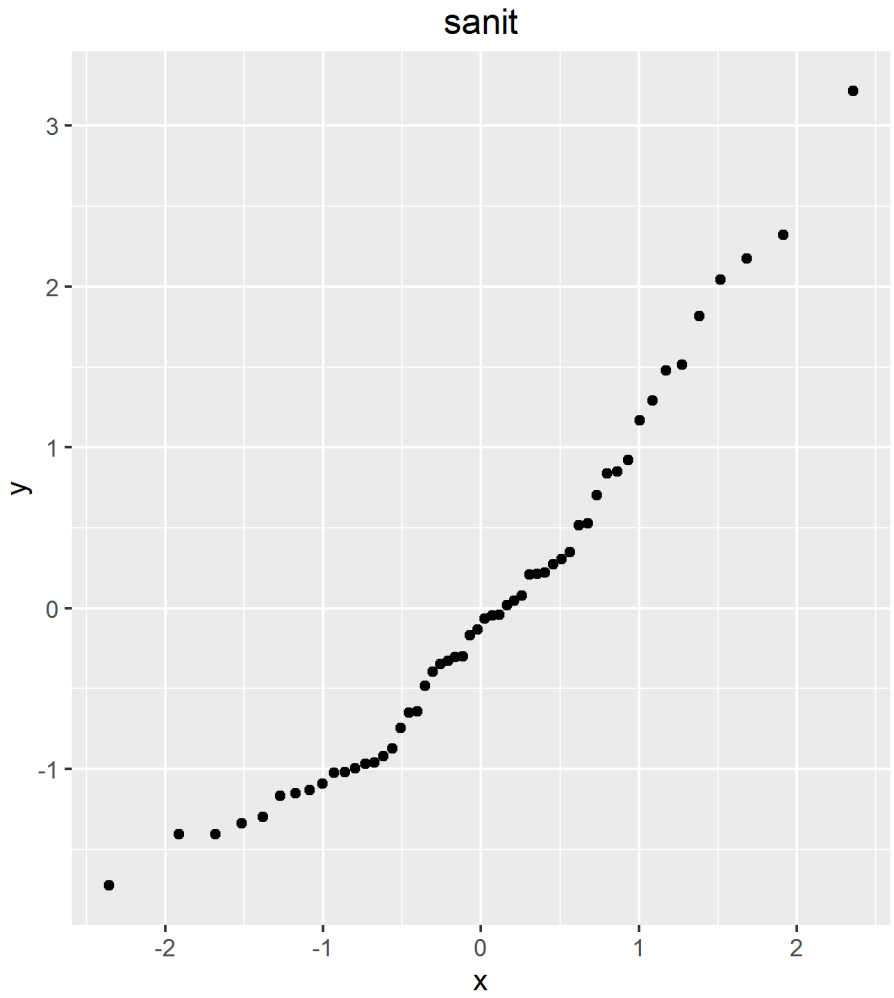

Figure S9. Quantile-quantile plot—sanitation deprivation. Notes: y=sample quantiles; x=theoretical quantiles; Guyana has an error quantile to quantile value that is border line (upper right corner).

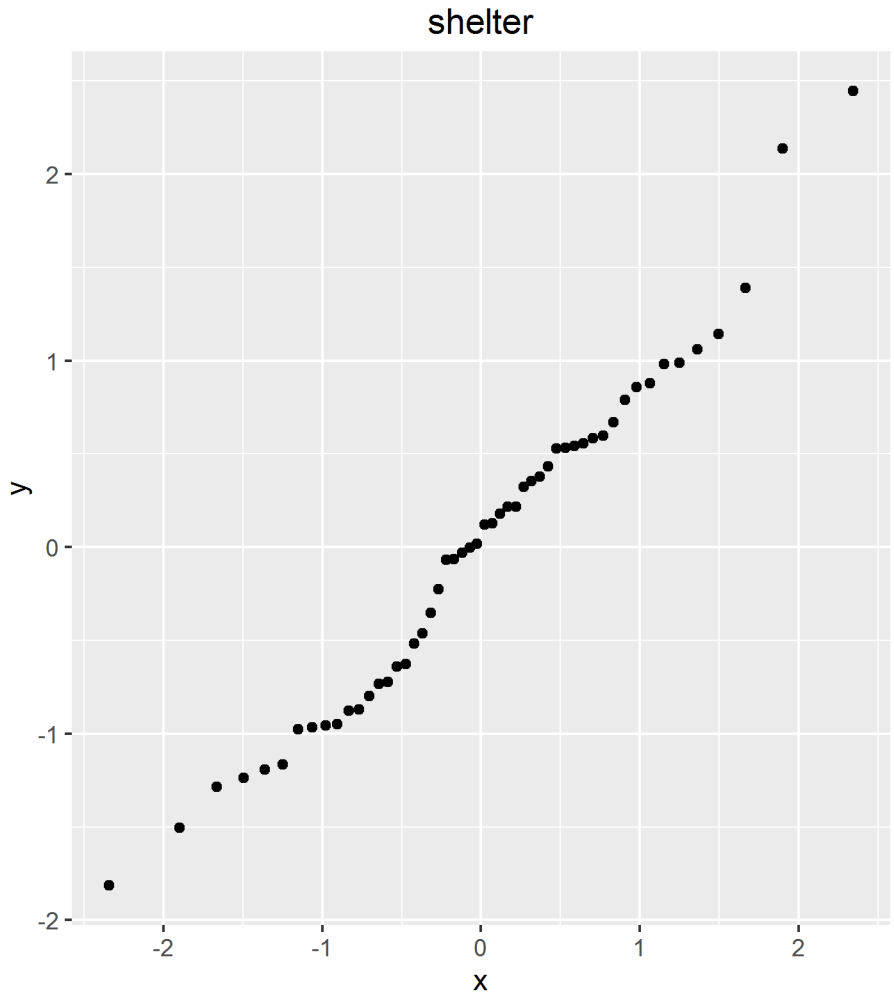

Figure S10. Quantile-quantile plot—shelter deprivation. Notes: y=sample quantiles; x=theoretical quantiles; Bolivia and Sudan's residuals lay in the upper right corner.

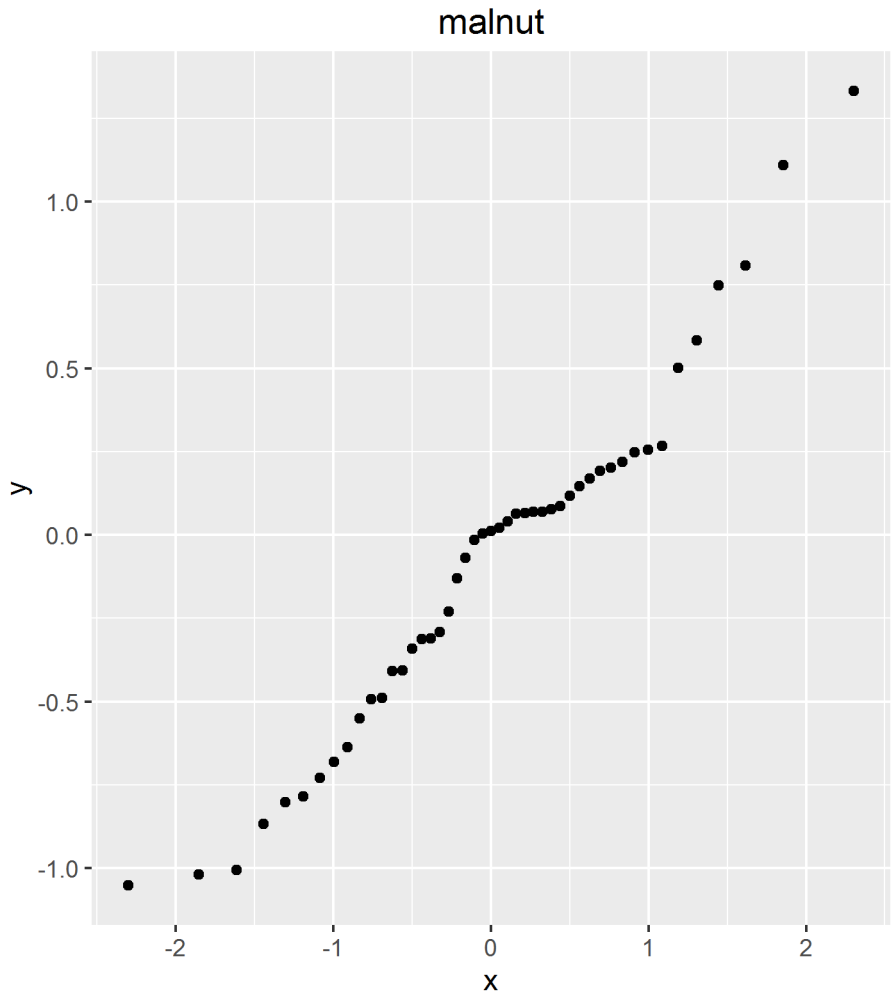

Figure S11. Quantile-quantile plot—malnutrition deprivation. Notes: y=sample quantiles; x=theoretical quantiles; Less than optimal Q-Q, which indicate a slight violation of the assumption of country-level residual being normally distributed.

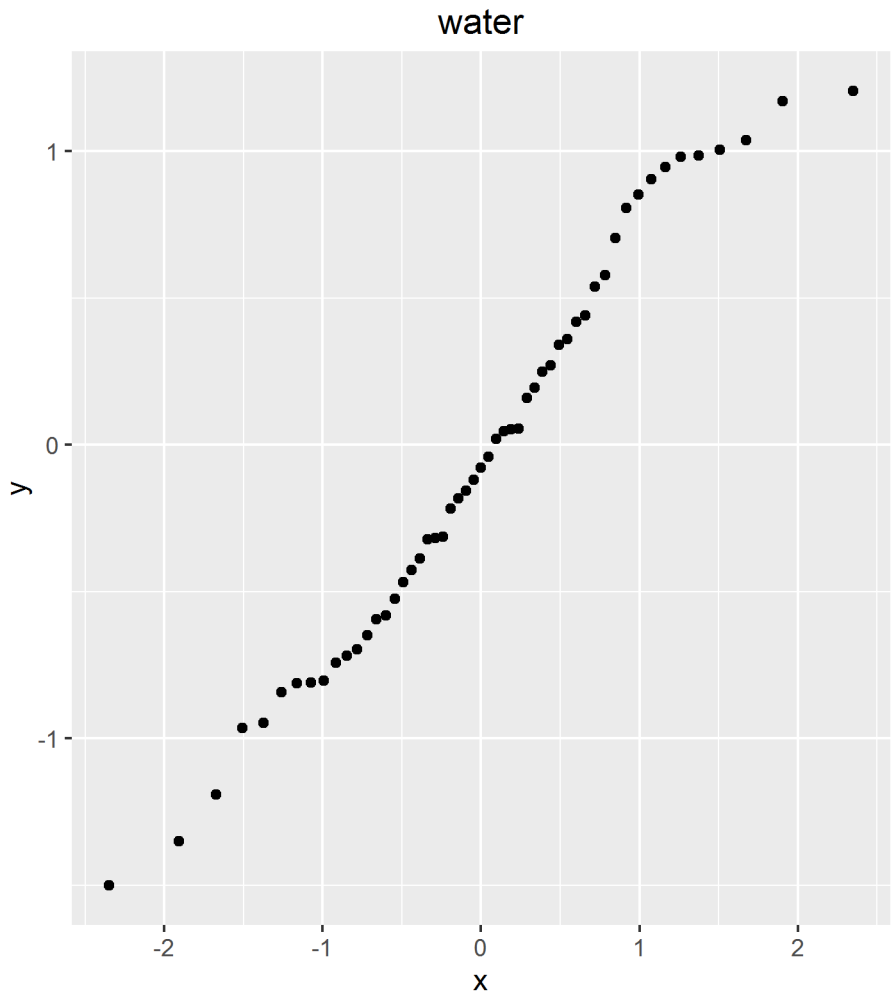

Figure S12. Quantile-quantile plot—water deprivation. Notes: y=sample quantiles; x=theoretical quantiles

Homoscedasticity assumption

A second assumption of logistic multilevel models are the assumption of homoscedasticity for the second level residuals (11), namely, that the variance of the residuals is constant across all the values of the covariates. We can check the conformity of our models to this assumption by plotting the residuals against the fixed part of the model. From the plots below, we can see that all models are fairly homoscedastic, with a slight skewness for the water deprivation model.

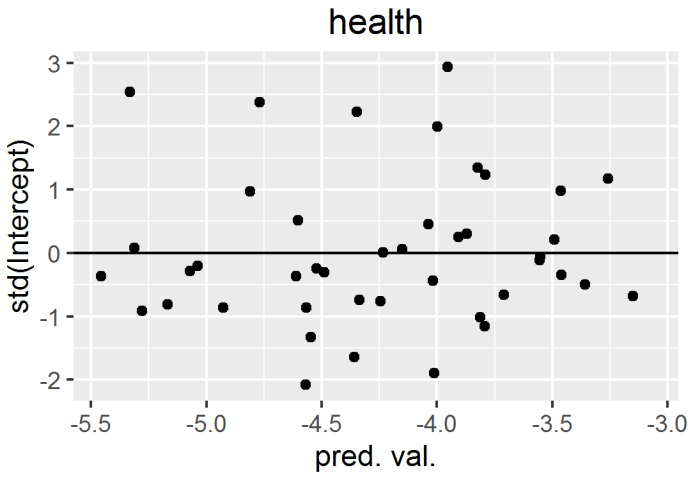

Figure S13. Checking homoscedasticity assumptions—health deprivation. Notes: x= predicted values, y = standardized residuals

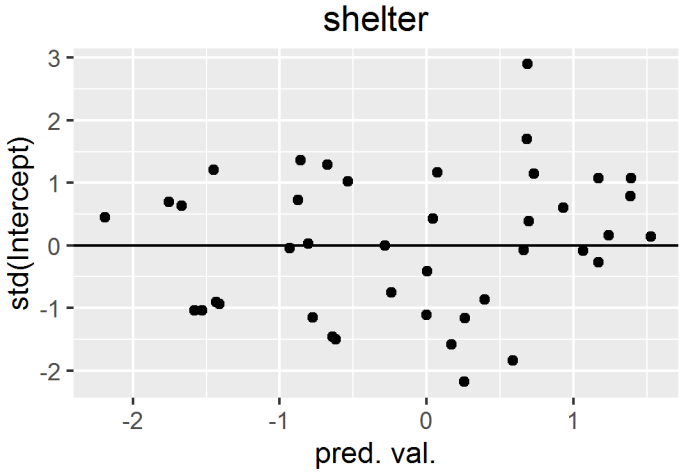

Figure S14. Checking homoscedasticity assumptions—shelter deprivation. Notes: x= predicted values, y = standardized residuals

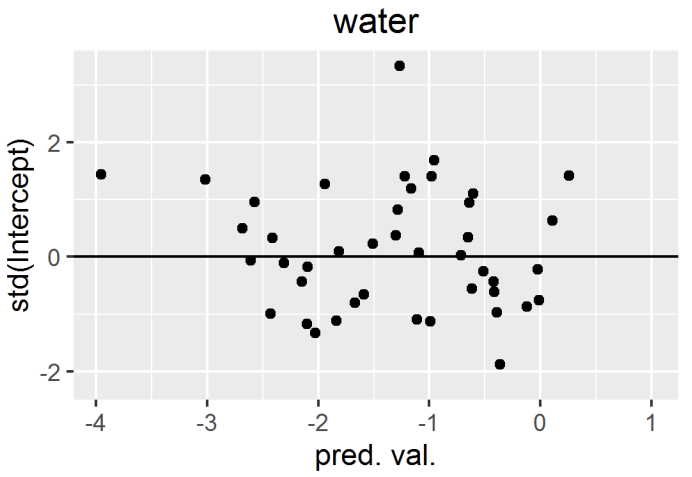

Figure S15. Checking homoscedasticity assumptions—water deprivation. Notes: x= predicted values, y = standardized residuals

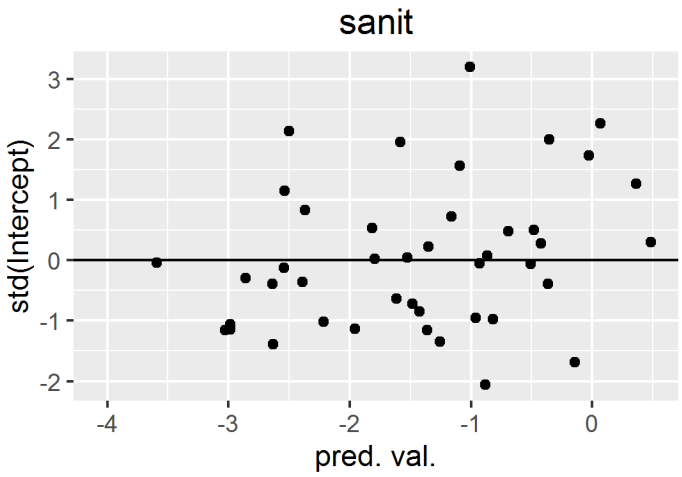

Figure S16. Checking homoscedasticity assumptions—sanitation deprivation. Notes: x= predicted values, y = standardized residuals

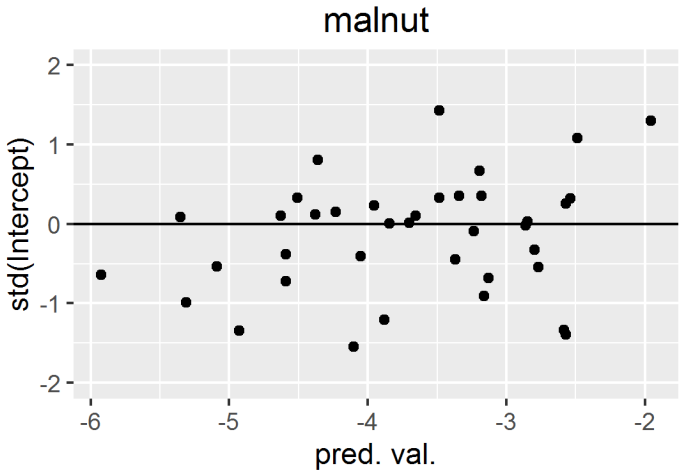

Figure S17. Checking homoscedasticity assumptions—malnutrition deprivation. Notes: x= predicted values, y = standardized residuals

Health spending

We used health spending as a proportion of gdp lagged one year in the main analysis (l_h_gdp_cgn). This variable has unexpectedly no effect on child health. The absence of any effect is consistent across different models. However, realistically increased health spending should have some beneficial effect on children's health. In this section we outline using alternative measures for health spending lagged (l_) and differenced (d_): d_h_gdp_cgn, d_h_tot_cgn, l_h_tot_cgn, d_h_gdp_wdi, l_h_gdp_wdi, d_h_tot_wdi, l_h_tot_wdi. We derived these variables from the World Development Indicators (wdi) and from Clements *et a.* (2013). Of all these measures, only d_h_tot_cgn turns significant with a beneficial effect of reducing severe child health deprivation (health care access and immunization).

Table S19. Health expenditure 1-4

	Model 1	**Model 2**	**Model 3**	**Model 4**
Intercept	20.53*	20.25*	15.62*	19.58*
	(25.35)	(24.56)	(18.08)	(23.50)
IMF	0.72	0.71	0.81	0.72
	(0.21)	(0.21)	(0.23)	(0.21)
InvMill	1.09	1.07	1.03	1.10
	(0.40)	(0.39)	(0.35)	(0.40)
l_h_gdp_cgn	0.99			
	(0.07)			
Civil war	1.08	1.08	1.12	1.08
	(0.09)	(0.09)	(0.09)	(0.09)
log GDP per Cap	0.60***	0.60***	0.64***	0.60***
	(0.08)	(0.07)	(0.08)	(0.08)
Aid	0.99	0.99	0.99	0.99
	(0.01)	(0.01)	(0.01)	(0.01)
Children in household	1.02***	1.02***	1.02***	1.02***
	(0.00)	(0.00)	(0.00)	(0.00)
EducatedPrimary(ref=unedc.)	0.72***	0.72***	0.71***	0.72***
	(0.01)	(0.01)	(0.01)	(0.01)
EducatedSecondary+(ref=unedc.)	0.54***	0.54***	0.53***	0.54***
	(0.01)	(0.01)	(0.01)	(0.01)
Adults in household	0.97***	0.97***	0.97***	0.97***
	(0.00)	(0.00)	(0.00)	(0.00)
Urban (ref=rural)	1.50***	1.50***	1.50***	1.50***
	(0.01)	(0.01)	(0.01)	(0.01)
Boy (ref=girl)	1.01	1.01	1.01	1.01
	(0.01)	(0.01)	(0.01)	(0.01)
Child age	0.66***	0.66***	0.66***	0.66***
	(0.00)	(0.00)	(0.00)	(0.00)
Dependency ratio	1.00	1.00	1.00	1.00
	(0.01)	(0.01)	(0.01)	(0.01)
Democracy	1.00	1.00	1.00	1.00
	(0.03)	(0.03)	(0.03)	(0.03)

Year of Interview	1.01	1.01	1.01	1.01
	(0.03)	(0.02)	(0.02)	(0.02)
d_h_gdp_cgn		1.10		
		(0.24)		
d_h_tot_cgn			0.90*	
			(0.04)	
l_h_tot_cgn				0.99
				(0.02)
Country variance	0.27	0.27	0.25	0.27
Child variance	3.29	3.29	3.29	3.29
Countries Num. obs.	54	54	54	54
Children Num. obs.	688425	688425	688425	688425

***p < 0.001, **p < 0.01, *p < 0.05, ˙p < 0.1

Notes: Logistic regressions; the parameters presented are odds ratios, with standard errors in parantheses; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models.

Table S20. Health expenditure 5-8

	Model 1	**Model 2**	**Model 3**	**Model 4**
Intercept	44.70**	36.70**	51.36**	32.99**
	(59.72)	(49.97)	(68.52)	(43.11)
IMF	0.77	0.76	0.74	0.78
	(0.23)	(0.23)	(0.22)	(0.23)
InvMill	1.00	1.07	1.08	1.05
	(0.37)	(0.39)	(0.39)	(0.38)
d_h_gdp_wdi	1.18			
	(0.21)			
Civil war	1.07	1.08	1.07	1.06
	(0.10)	(0.09)	(0.09)	(0.09)
log GDP per Cap	0.56***	0.58***	0.55***	0.58***
	(0.08)	(0.09)	(0.08)	(0.08)
Aid	0.98	0.99	0.98˙	0.99
	(0.01)	(0.01)	(0.01)	(0.01)
Children in household	1.02***	1.02***	1.02***	1.02***
	(0.00)	(0.00)	(0.00)	(0.00)
EducatedPrimary(ref=unedc.)	0.71***	0.71***	0.71***	0.71***
	(0.01)	(0.01)	(0.01)	(0.01)
EducatedSecondary+(ref=unedc.)	0.54***	0.54***	0.54***	0.54***
	(0.01)	(0.01)	(0.01)	(0.01)
nradults	0.97***	0.97***	0.97***	0.97***
	(0.00)	(0.00)	(0.00)	(0.00)
Urban (ref=rural)	1.47***	1.47***	1.47***	1.47***

	(0.01)	(0.01)	(0.01)	(0.01)
Boy (ref=girl)	1.01	1.01	1.01	1.01
	(0.01)	(0.01)	(0.01)	(0.01)
Child age	0.67***	0.67***	0.67***	0.67***
	(0.00)	(0.00)	(0.00)	(0.00)
Dependency ratio	1.00	1.00	1.00	1.00
	(0.01)	(0.01)	(0.01)	(0.01)
Democracy	0.99	0.99	0.99	1.00
	(0.03)	(0.03)	(0.03)	(0.03)
Year of Interview	1.00	1.00	0.99	1.00
	(0.03)	(0.03)	(0.03)	(0.03)
l_h_gdp_wdi		0.97		
		(0.08)		
d_h_tot_wdi			1.04	
			(0.04)	
l_h_tot_wdi				0.98
				(0.02)
Country variance	0.29	0.28	0.28	0.27
Child variance	3.29	3.29	3.29	3.29
Countries Num. obs.	54	54	54	54
Children Num. obs.	655872	655872	655872	655872

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Logistic regressions; the parameters presented are odds ratios, with standard errors in parantheses; the child level variance is fixed to 3.29, according to the normal assumptions of logistic regression; Unweighted models.

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