SUPPLEMENTARY INFORMATION

May 13, 2018

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1 Variable description

Below we describe the variables included in the indices for which we have both baseline and endline data. For these outcomes, we will conduct a difference-in-difference analysis; for outcome measures where we have endline data only, we will conduct a cross-sectional analysis. For education and water, where the data is at the village level, we run two regressions *without controls*, one with and one without cluster fixed effects. For health we did not include cluster fixed effects as there is only one health center per cluster by design. In all models in health and education we include fixed effects for facility type. For health, this is a dummy variable indicating whether the health center is a health center II or III. These two levels of health centers provide somewhat different services and different levels of staffing and funding. We blocked randomization on health center facility type. For education, we include fixed effects for school type, which takes one of four values: government-aided Catholic, government-aided Protestant, government-aided Islamic, and government non-affiliated.

1. Health
   (a) Monitoring:
      - **DHO visits**: number of visits to the facility by DHO in the past three months, as recorded in facility registration book. Count variable, (Audit variable, *V_dho_visit*)
      - **DHO calls**: frequency of calls made by DHO to facility in the past three months, categorical variable. 1 = Never, 2 = about once a month, 3 = about once a week, 4 = several times a week, 5 = every day (Audit variable, *V_dho_call*)
      - **Health inspector visits**: number of visits to the facility by health inspector in the past three months, as recorded in facility registration book, count variable (Audit variable, *V_BE_q67_q62*)
      - **Health inspector calls**: frequency of calls made by health inspector to facility in the past three months, categorical variables. 1 = Never, 2 = about once a month, 3 = about once a week, 4 = several times a week, 5 = every day (Audit variable, *V_freq_calls*)
      - **Inspection reports (Counted at the District of Health)**: number of inspection reports completed by the district/health inspector (Administrative data variable, *A_insp_qtr*)
      - **Inspection (yr.)**: number of times health center inspected according to inspector summary reports for financial year (Administrative variable, *A_insp_yr*)
   (b) Effort:
      - **Outreach**: frequency of outreach campaigns/events the clinic undertook in previous three months, like a visit to a rural village or an immunization drive (Audit variable, *V_outreach*)
      - **Staff present**: average of total staff present across four days, based on register book (Audit variable, *V_staffpresent*
      - **Staff attendance rate**: four day average of total employees present over total employees expected to be present (Audit variable, *V_perc_employ_pres*)
      - **Register book**: whether or not health center has attendance register book (Audit variable, *RegisterBook*)

(c) Inputs:

- **Days w/o antimalarials**: number of days in the past 30 days that anti-malarial medication has been out of stock (Audit variable, *V_inv_so_antimalarials*)
- **Oral rehydration stockout month**: number of days in the past 30 days that oral rehydration salts (ORS) have been out of stock (Audit variable, *V_inv_so_ors_analysis*)
- **Anti-malarial stockout half-year (HMIS:Form 105 Section 5.1)**: number of days in the 7 month period before/after program initiation that anti-malarial medication has been out of stock (Admin variable, *A_so_antimalarial*)
- **Oral rehydration stockout half-year (HMIS:Form 105 Section 5.1)**: number of days in the 7 month period before/after program initiation that oral rehydration salts (ORS) have been out of stock (Admin variable HMIS:Form 105 Section 5.1, *A_so_ors*)
- **Total stockout**: the average number of days in a month that a preventative medication was out of stock (Admin variable, *A_total_so_rate*)
- **Funds received**: the total amount of funds that a health center received over one financial year, millions of shillings (Admin variable HMIS:Form 105 Section 7, *A_Funds_Received*)

(d) Utilization:

- **Out patient**: total out patient attendance at the health clinic including new attendance and re-attendance (Admin variable, *A_OutPat_Att_Total*)
- **OP referral**: total out patient referrals at health clinic (Admin variable, *A_OutPat_Ref_Total*)
- **OP diagnoses**: total diagnoses for out patients at the health clinic (Admin variable, *A_OutPat_Diag_total*)
- **Attendance**: total number of new attendances at health clinics (Admin variable, *A_total_attendence*)
- **Tetanus doses**: total doses of tetanus administered to women, pregnant women included. Patients are administered 1 to 5 doses (Admin variable, *A_TI_Total*)
- **Children immunized**: total number of children from 0 to 4 years old that are immunized (Admin variable, *A_CI_Tot*)
- **IPT doses**: total number of first dose and second dose of IPT/IPT1/IPT2 administered at the antenatal clinic (Admin variable, *A_ANC_IPT*)
- **Iron/acid**: number of pregnant women receiving iron/folic acid on 1st antenatal clinic visit (Admin variable, *A_ANC_Iron*)
- **Free ITN**: number of pregnant women receiving free ITNs at the antenatal clinic (Admin variable, *A_ANC_ITN*)
- **Syphilis test**: number of pregnant women tested for syphilis at the antenatal clinic (Admin variable, *A_ANC_Test_Syph*)
- **Maternity admission**: number of admissions to maternity unit (Admin variable, *A_Mat_Admit*)
- **Maternity delivery**: number of deliveries performed in the maternity unit (Admin variable, *A_Mat_Deliver_InUnit*)
- **Vitamin A (mothers)**: number of mothers given Vitamin A supplement (Admin variable, *A_Mat_Moth_VitA*)
- **Post natal**: total number of post natal attendances (Admin variable, *A_PN_Att*)

- **Vitamin A (children)**: total doses of 1st and 2nd doses of Vitamin A given to children, including infants aged 6-11 months and children aged 12-59 months (Admin variable, *A_CH_VitA_totl*)
- **Deworming doses**: total doses of 1st and 2nd doses of deworming administered to children aged 1 to 14 years old (Admin variable, *A_CH_Deworm_Tot*)

2. Schools

   (a) Monitoring:

   - **DEO visits**: Number of visits to the school by DEO in the past three months, as recorded in facility registration book (Audit variable, *V_deo_visit_rec*)
   - **DEO calls**: frequency of calls made by DEO to school in the past three months, dichotomous variable 0 = Never, 1 = Ever called in previous three months (Audit variable, *V_deo_ever_call*)
   - **School inspector visits**: number of visits to the school by school inspector in the past three months, as recorded in facility registration book (Audit variable, *V_isp_visit_rec*)
   - **School inspector calls**: frequency of calls made by school inspector to the school in the past three months, categorical variables. 1 = Never, 2 = about once a month, 3 = about once a week, 4 = several times a week, 5 = every day (Audit variable, *V_insp_calls*)
   - **School inspector reports**: Number of reports written by school inspector, count variable. (Administrative variable, *A_Q3_insprep*

   (b) Effort:

   - **Teacher absenteeism**: Number of teachers present over total number of teachers expected present, average over four days: day of the audit, and previous Monday, Wednesday, and Friday. Measured by enumerator using school attendance record book. (Audit variable, *Teacher_Absent*)
   - **Teachers present (day)**: Fraction of teachers present during audit, as measured by enumerator across 3-4 classes observed (Audit variable, *V_present_teach_e*)
   - **Meaningful board**: Extent to which something meaningful is written on the board in observed classrooms (average over classrooms), as measured by enumerator, 0 = nothing meaningful written, 1 = something meaningful written (Audit variable, *V_perc_alotwritten*)
   - **Teacher engaged**: Average across observed classrooms of teacher engagement, as measured by enumerator. 0 = absent, 1 = present and disengaged, 2 = present and engaged (Audit variable, *V_perc_Engaged*) **Only for endline results**
   - **Staff meetings**: Number of staff meetings in past three months, categorical. 1 = None, 2 = between 1 and 3, 3 = more than 3. (Audit variable, *V_school_staff_meet*)

   (c) Inputs:

   - **Number of teachers**: Number of teachers in the school, according to school records (Audit variable, *V_n_teachers*)
   - **Teacher transfers**: Number of teachers transferred to the school, according to school records (Audit variable, *V_teach_transf_to*)
   - **Students per uniform**: Ratio of students to uniforms, observed by enumerator (Audit variable, *V_students_per_supply1*)

- **Students per book**: Ratio of students to books, observed by enumerator (Audit variable, *V_students_per_supply2*)
- **Students per pencil**: Ratio of students to pencils, observed by enumerator (Audit variable, *V_students_per_supply3*)

(d) Outcome:

- **Enrollment**: Total student enrollment in the school (Admin variable, *A_enrollment*)
- **PLE Grade 1**: Fraction of students who scored a 1 (best score) on the primary leaving examination (Admin variable, *A_PLE_Grade1rate*)
- **PLE Grade 2**: Fraction of students who scored a 2 (second best score) on the primary leaving examination (Admin variable, *A_PLE_Grade2rate*)
- **PLE pass rate**: Fraction of students who passed the primary leaving examination, of those who sat for the exam (Admin variable, *A_PLE_passrate*)

3. Water

(a)
- **Parts and Services**: sum of water related parts distributed and services completed (Admin variable, *parts_services_14_16, parts_services_13_14*)
- **Village Requests**: sum of water related requests in villages (Admin variable, *village_requests1_14_16, village_requests_13_14, A2_LC1Request0, A2_LC1Request1, A2_LC1Request2*)

2 Descriptive statistics

In this section we present descriptive statistics of our the outcome variables that enter our indices. Table 1 presents descriptive statistics for education outcomes, Table 2 for health, and Table 3 for water.

TABLE 1: *Education outcomes (descriptive statistics)*

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Monitoring					
DEO calls	0.47	(0.5)	0	1	269
Inspector calls	1.96	(0.88)	1	4	249
DEO visits	0.16	(0.49)	0	5	267
Inspector visits	0.70	(1.02)	0	7	267
Inspector reports	1.93	(1.72)	0	6	258
Effort					
% Teachers present (records)	0.71	(0.18)	0	1	270
% Teachers present (observed)	0.4	(0.29)	0	1	267
Meaningful board	0.26	(0.33)	0	1	267
Teacher engaged	0.49	(0.35)	0	1	255
Staff meetings	1.82	(0.5)	1	3	179
Inputs					
N. teachers employed	13.72	(5.77)	2	34	269
Teachers transferred to school	0.62	(1.11)	0	10	269
Students per uniform	0.57	(0.27)	0	3.05	266
Students per book	0.9	(0.16)	0.01	1.45	266
Students per pencil	0.81	(0.19)	0.06	1.13	266
Performance					
Enrollment	1020.27	(383.42)	352	4086	245
% PLE Grade 1	0.01	(0.03)	0	0.25	144
% PLE Grade 2	0.29	(0.2)	0	0.85	144
PLE pass rate	0.85	(0.15)	0.36	1	144

TABLE 2: *Health outcomes (descriptive statistics)*

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Monitoring					
DHO visits	0.1	(0.3)	0	1	141
DHO calls	1.44	(0.85)	1	5	120
Inspector calls	1.62	(1.08)	0	5	120
Inspector visits	0.61	(1.23)	0	8	140
Inspection reports	3.05	(0.96)	1	5	144
Inspection (yr.)	0.81	(0.63)	0	4	144
Effort					
Health staff present	0.56	(0.23)	0.1	1	94
Unauthorized health staff absence (inverse)	0.92	(0.15)	0.3	1	94
Register book	0.69	(0.46)	0	1	144
Outreach	2.91	(1.76)	0	5	141
Inputs					
Days w/o antimalarials	-6.58	(10.04)	-30	0	137
Days w/o ORS	-7.92	(11.11)	-30	0	136
Antimalaria SO	-9.35	(20.01)	-90	0	144
ORS SO	-10.14	(23.41)	-152	0	144
Total SO	-0.23	(0.46)	-2.98	0	144
Funds received (millions)	3.1	(3.69)	0	30.24	144
Utilization					
Out patient	6706.57	(5672.24)	0	37256	144
OP referral	56.23	(83.37)	0	547	144
New patients attendance	90.63	(54.55)	8.31	337.99	141
OP diagnoses	6032.1	(4532.93)	421	31236	144
Tetanus doses	603.84	(494.93)	0	2821	144
Children immunized	4673.39	(3654.15)	0	22706	144
IPT doses	487.1	(388.79)	0	1879	144
Iron acid	311.72	(239.68)	0	1526	144
Free ITN	111.37	(140.85)	0	759	144
Syphilis test	156.63	(228.82)	0	1265	144
Maternity admission	281.11	(267.56)	0	1346	144
Maternity delivery	243.51	(271.9)	0	2231	144
Vitamin A (mothers)	171.23	(177.29)	0	976	144
Post natal	259.54	(402.88)	0	2451	144
Vitamin A (children)	917.54	(994.34)	0	4502	144
Deworming doses	2138.58	(2873.7)	0	17859	144

TABLE 3: *Water outcomes (descriptive statistics)*

Variable	**Mean**	**(Std. Dev.)**	**Min.**	**Max.**	**N**
Parts and services post-treatment	0.08	(0.51)	0	10	2022
Parts and services baseline	0.05	(0.39)	0	9	2022
Village requests post-treatment	0.06	(0.28)	0	3	2022
Village requests baseline	0.13	(0.42)	0	2	2021
Village requests (2nd round data) baseline	0.12	(0.4)	0	3	331
Village requests (2nd round data) midline	0.2	(0.49)	0	3	331
Village requests (2nd round data) endline	0.2	(0.49)	0	3	331

Table 4 presents a balance test at the village level of the set of covariates on which we collected data. In the analysis, we include only those covariates that are unbalanced at the level of the facility in question (cluster for health centers, and village for schools and water services). The villages in treatment and control are balanced across most covariates. Villages in the treatment group have a population that is slightly older (less than one year), have a slightly larger share of the population that identifies as the major tribe, the Lugbara, are slightly more likely to be literate, and the villages are located slightly closer to Arua town.

TABLE 4: *Balance test (village)*

	Control Mean	Treatment Mean	Difference of Means	p-value for Difference of Means
Adult population (>= 16)	312.920	295.923	16.997	0.472
	(15.764)	(17.208)	(23.618)	
Mean age	20.641	21.137	-0.495	0.003
	(0.124)	(0.107)	(0.163)	
Share Lugbara tribe	0.910	0.970	-0.060	0.009
	(0.024)	(0.007)	(0.023)	
Ethnic polarization	0.480	0.522	-0.042	0.267
	(0.028)	(0.026)	(0.038)	
Ethnic fractionalization (ELF)	0.055	0.048	0.007	0.624
	(0.010)	(0.009)	(0.013)	
Religion fractionalization	0.278	0.284	-0.006	0.777
	(0.018)	(0.015)	(0.023)	
Share literate	0.598	0.642	-0.044	0.017
	(0.013)	(0.013)	(0.018)	
Mean education (0-4 scale)	1.165	1.192	-0.026	0.392
	(0.016)	(0.025)	(0.031)	
Share with secondary education	0.234	0.250	-0.016	0.307
	(0.008)	(0.012)	(0.015)	
Share employed	0.840	0.856	-0.016	0.436
	(0.016)	(0.012)	(0.020)	
Share employed non-agri sectors	0.241	0.263	-0.023	0.416
	(0.019)	(0.020)	(0.028)	
Poverty Index	-0.084	-0.103	0.019	0.526
	(0.018)	(0.023)	(0.030)	
Distance to Arua (kms)	31.840	25.211	6.629	0.002
	(1.592)	(1.417)	(2.124)	
Health center in village	0.205	0.183	0.022	0.665
	(0.038)	(0.034)	(0.051)	
Primary school in village	0.384	0.305	0.079	0.199
	(0.046)	(0.040)	(0.061)	
N	112	131	243	

3 Outcomes at baseline

In Tables 5 and 6 we present the baseline values for outcomes in education and health, respectively. These data were collected prior to the implementation of the U-Bridge program.

TABLE 5: *Education at Baseline*

	C mean	T-C	P-val	N
DEO calls (baseline)	0.22	0.07	0.44	89
Inspector calls (baseline)	2.07	-0.17	0.43	84
DEO visits (baseline)	0.02	0.11	0.08	87
Inspector visits (baseline)	0.45	0.20	0.32	87
Inspector reports (baseline)	1.57	-0.35	0.29	86
% Teachers present (records) (baseline)	0.67	0.03	0.49	90
% Teachers present (observed) (baseline)	0.35	-0.05	0.47	89
Meaningful board (baseline)	0.36	0.13	0.19	89
Teacher engaged (baseline)	0.60	0.01	0.94	77
Staff meetings (baseline)	1.84	0.02	0.89	89
N. teachers employed (baseline)	13.80	0.65	0.67	89
Teachers transferred to school (baseline)	0.53	-0.19	0.48	89
Students per uniform (baseline)	0.70	0.08	0.33	88
Students per book (baseline)	0.92	0.06	0.10	88
Students per pencil (baseline)	0.85	-0.01	0.91	88
Enrollment (baseline)	985.70	19.20	0.82	86
% PLE Grade 1 (baseline)	0.00	0.01	0.13	72
% PLE Grade 2 (baseline)	0.32	0.07	0.26	72
PLE pass rate (baseline)	0.87	0.01	0.72	72

In this table we explore the extent to which outcome variables used to construct summary indices (monitoring, effort and inputs) were balanced at baseline. Estimation results are derived from OLS regressions with standard errors clustered at the cluster-level; p-values are two-sided.

TABLE 6: *Health Outcomes at Baseline*

	C mean	T-C	P-val	N
DHO visits (baseline)	0.08	0.00	0.97	47
DHO calls (baseline)	1.43	-0.32	0.12	40
Inspector calls (baseline)	1.48	0.05	0.88	42
Inspector visits (baseline)	0.21	0.06	0.65	46
Inspection reports (baseline)	2.79	-0.33	0.13	48
Inspection (yr.) (baseline)	1.04	0.00	1.00	48
Register book (baseline)	0.62	0.00	1.00	48
Outreach (baseline)	3.73	-0.62	0.19	47
Days w/o antimalarials (baseline)	-6.82	2.58	0.42	43
Days w/o ORS (baseline)	-10.67	4.76	0.19	42
Antimalaria SO (baseline)	-14.29	5.12	0.31	48
ORS SO (baseline)	-16.04	9.71	0.05	48
Total SO (baseline)	-0.35	0.17	0.05	48
Funds received (millions) (baseline)	1.50	0.50	0.43	48
Out patient (baseline)	5,234.58	-1182.17	0.19	48
OP referral (baseline)	56.58	-23.62	0.32	48
New patients attendance (baseline)	99.09	-24.97	0.10	47
OP diagnoses (baseline)	6,494.92	-2049.88	0.05	48
Tetanus doses (baseline)	482.96	-162.71	0.07	48
Children immunized (baseline)	2,726.21	-124.62	0.82	48
IPT doses (baseline)	339.79	-49.29	0.52	48
Iron acid (baseline)	233.67	-66.88	0.11	48
Free ITN (baseline)	47.38	-11.92	0.46	48
Syphilis test (baseline)	19.25	-12.42	0.33	48
Maternity admission (baseline)	171.79	-1.08	0.98	48
Maternity delivery (baseline)	144.21	-15.79	0.67	48
Vitamin A (mothers) (baseline)	101.92	10.08	0.78	48
Post natal (baseline)	113.25	-27.79	0.45	48
Vitamin A (children) (baseline)	770.58	-206.67	0.31	48
Deworming doses (baseline)	1,583.71	-440.54	0.39	48

In this Table we explore the extent to which outcome variables used to constrcut summary indices (monitoring, effort and inputs) were balanced at baseline. Estimation results are derived from OLS regressions; p-values are two-sided.

4 Full Results

Here we provide results in tabular form the main results presented in the paper, where indices are constructed as non-weighted mean of the same set of standardized outcome variables, following Kling, Liebman, and Katz (2007). Tables 7 and 8 present results for education without and with covariate adjustment, respectively. Tables 9 and 10 present results for health without and with covariates, respectively. Table 11 presents the results for the two outcomes in the water sector, with and without covariates.

TABLE 7: *Education Outcomes Analysis (Kling, no covariates)*

		Short-term				**Long-term**		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	0.190	(0.122)	[-0.048 , 0.429]	0.059	0.050	(0.158)	[-0.260 , 0.361]	0.375
DEO calls	0.331	(0.201)	[-0.063 , 0.726]	0.050	0.025	(0.213)	[-0.393 , 0.443]	0.454
Inspector calls	0.466	(0.232)	[0.011 , 0.921]	0.022	-0.115	(0.198)	[-0.502 , 0.273]	0.719
DEO visits	0.174	(0.186)	[-0.191 , 0.539]	0.175	0.250	(0.250)	[-0.240 , 0.741]	0.159
Inspector visits (AD)	-0.158	(0.191)	[-0.533 , 0.217]	0.795	0.014	(0.215)	[-0.408 , 0.436]	0.475
Effort index	0.153	(0.136)	[-0.113 , 0.419]	0.130	0.106	(0.147)	[-0.182 , 0.393]	0.235
% Teachers present (records)	-0.209	(0.198)	[-0.598 , 0.180]	0.854	0.060	(0.221)	[-0.374 , 0.493]	0.394
% Teachers present (observed)	0.286	(0.211)	[-0.127 , 0.700]	0.087	0.308	(0.218)	[-0.120 , 0.736]	0.080
Meaningful board	0.205	(0.179)	[-0.146 , 0.556]	0.127	-0.084	(0.242)	[-0.558 , 0.389]	0.637
Teacher engaged	0.382	(0.215)	[-0.040 , 0.803]	0.038	0.290	(0.220)	[-0.141 , 0.721]	0.093
Staff meetings					0.025	(0.197)	[-0.361 , 0.411]	0.450
Input index	0.188	(0.132)	[-0.070 , 0.446]	0.077	0.092	(0.141)	[-0.185 , 0.369]	0.258
N. teachers employed	0.253	(0.132)	[-0.006 , 0.512]	0.028	0.131	(0.172)	[-0.205 , 0.468]	0.223
Teachers transferred to school	0.387	(0.291)	[-0.184 , 0.958]	0.092	0.211	(0.213)	[-0.207 , 0.628]	0.161
Students per uniform	0.086	(0.233)	[-0.371 , 0.543]	0.356	-0.156	(0.206)	[-0.559 , 0.247]	0.776
Students per book	0.158	(0.177)	[-0.189 , 0.505]	0.186	0.120	(0.227)	[-0.325 , 0.565]	0.299
Students per pencil	0.076	(0.248)	[-0.410 , 0.562]	0.379	0.235	(0.202)	[-0.160 , 0.630]	0.122
Performance index	-0.155	(0.103)	[-0.357 , 0.047]	0.934				
Enrollment (AD)	0.009	(0.113)	[-0.212 , 0.230]	0.468				
% PLE Grade 1 (AD)	0.194	(0.321)	[-0.434 , 0.823]	0.273				
% PLE Grade 2 (AD)	-0.268	(0.131)	[-0.524 , -0.011]	0.980				
PLE pass rate (AD)	-0.137	(0.171)	[-0.473 , 0.198]	0.788				

Models include a binary indicator of school type and adjust only for the baseline measure of an outcome. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are unweighted, constructed using the approach developed by Kling et al., (2007). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 8: *Education Outcomes Analysis (Kling, with covariates adjustment)*

		Short-term				Long-term		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	0.085	(0.141)	[-0.191 , 0.361]	0.274	-0.117	(0.178)	[-0.465 , 0.232]	0.744
DEO calls	0.254	(0.212)	[-0.162 , 0.670]	0.116	0.130	(0.232)	[-0.324 , 0.584]	0.287
Inspector calls	0.370	(0.244)	[-0.108 , 0.848]	0.065	-0.099	(0.265)	[-0.617 , 0.420]	0.645
DEO visits	-0.231	(0.206)	[-0.634 , 0.171]	0.870	-0.668	(0.671)	[-1.983 , 0.647]	0.841
Inspector visits (AD)	-0.107	(0.191)	[-0.480 , 0.267]	0.713	0.175	(0.323)	[-0.457 , 0.808]	0.293
Effort index	0.247	(0.153)	[-0.052 , 0.546]	0.053	0.140	(0.168)	[-0.189 , 0.469]	0.203
% Teachers present (records)	-0.324	(0.251)	[-0.816 , 0.167]	0.902	0.232	(0.231)	[-0.219 , 0.684]	0.157
% Teachers present (observed)	0.389	(0.205)	[-0.013 , 0.791]	0.029	0.314	(0.274)	[-0.223 , 0.852]	0.126
Meaningful board	0.326	(0.190)	[-0.046 , 0.698]	0.043	-0.061	(0.213)	[-0.480 , 0.357]	0.613
Teacher engaged	0.488	(0.205)	[0.087 , 0.890]	0.009	0.302	(0.263)	[-0.214 , 0.818]	0.126
Staff meetings					-0.006	(0.222)	[-0.441 , 0.429]	0.511
Input index	0.148	(0.122)	[-0.092 , 0.388]	0.113	0.186	(0.161)	[-0.130 , 0.502]	0.124
N. teachers employed	0.356	(0.210)	[-0.056 , 0.768]	0.045	-0.028	(0.383)	[-0.778 , 0.722]	0.529
Teachers transferred to school	0.470	(0.273)	[-0.066 , 1.006]	0.043	-0.030	(0.215)	[-0.451 , 0.392]	0.555
Students per uniform	0.230	(0.225)	[-0.211 , 0.671]	0.153	0.383	(0.202)	[-0.013 , 0.779]	0.029
Students per book	-0.120	(0.207)	[-0.526 , 0.285]	0.720	0.207	(0.251)	[-0.286 , 0.699]	0.205
Students per pencil	-0.240	(0.254)	[-0.738 , 0.258]	0.828	0.313	(0.226)	[-0.130 , 0.757]	0.083
Performance index	-0.246	(0.101)	[-0.444 , -0.049]	0.993				
Enrollment (AD)	0.037	(0.088)	[-0.136 , 0.210]	0.338				
% PLE Grade 1 (AD)	0.016	(0.185)	[-0.346 , 0.378]	0.466				
% PLE Grade 2 (AD)	-0.305	(0.184)	[-0.666 , 0.055]	0.952				
PLE pass rate (AD)	-0.126	(0.195)	[-0.508 , 0.256]	0.741				

Models include a binary indicator of school type and adjust for baseline measure of the outcome as well as for demeaned covariates interacted with a treatment indicator. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are unweighted, constructed using the approach developed by Kling et al., (2007). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 9: *Health Outcomes Analysis (Kling, no covariates)*

		Short-term				Long-term		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	-0.146	(0.127)	[-0.394 , 0.103]	0.875	-0.192	(0.116)	[-0.420 , 0.036]	0.951
DHO visits	-0.122	(0.257)	[-0.626 , 0.381]	0.683	-0.125	(0.239)	[-0.594 , 0.343]	0.700
DHO calls	-0.399	(0.231)	[-0.852 , 0.054]	0.958	-0.381	(0.143)	[-0.661 , -0.101]	0.996
Inspector calls	-0.246	(0.249)	[-0.733 , 0.242]	0.839	-0.120	(0.279)	[-0.667 , 0.427]	0.666
Inspector visits	-0.014	(0.271)	[-0.545 , 0.516]	0.522	-0.144	(0.273)	[-0.679 , 0.391]	0.701
Inspection reports (AD)	-0.030	(0.050)	[-0.128 , 0.067]	0.728	-0.052	(0.086)	[-0.220 , 0.116]	0.728
Effort index	-0.183	(0.165)	[-0.506 , 0.141]	0.866	-0.064	(0.137)	[-0.333 , 0.205]	0.680
% Staff Present	0.063	(0.279)	[-0.484 , 0.610]	0.410	0.298	(0.279)	[-0.248 , 0.845]	0.142
% unauthorized absent	-0.014	(0.267)	[-0.537 , 0.510]	0.520	0.185	(0.241)	[-0.287 , 0.658]	0.221
Register book	-0.301	(0.283)	[-0.856 , 0.253]	0.857	-0.301	(0.276)	[-0.841 , 0.239]	0.863
N. Outreach events	-0.570	(0.274)	[-1.107 , -0.033]	0.981	-0.395	(0.317)	[-1.015 , 0.226]	0.894
Input index	0.053	(0.153)	[-0.247 , 0.353]	0.365	0.052	(0.137)	[-0.216 , 0.321]	0.351
Days w/o antimalarials	0.437	(0.223)	[0.001 , 0.873]	0.025	1.056	(0.195)	[0.674 , 1.437]	0.000
Days w/o ORS	0.189	(0.235)	[-0.271 , 0.649]	0.210	0.291	(0.260)	[-0.218 , 0.800]	0.131
Funds received (millions) (AD)	-0.085	(0.303)	[-0.679 , 0.509]	0.611	-0.004	(0.329)	[-0.649 , 0.640]	0.506
Antimalaria SO (AD)					0.055	(0.311)	[-0.555 , 0.664]	0.430
ORS SO (AD)					-0.145	(0.383)	[-0.896 , 0.605]	0.647
Total SO (AD)					-0.215	(0.321)	[-0.844 , 0.414]	0.748
Utilization index	-0.002	(0.126)	[-0.248 , 0.244]	0.508	0.014	(0.097)	[-0.178 , 0.205]	0.445
Out patients (AD)	0.328	(0.230)	[-0.122 , 0.778]	0.077	-0.264	(0.260)	[-0.773 , 0.245]	0.846
N. patients visiting clinic (AD)	-0.137	(0.097)	[-0.328 , 0.054]	0.919	0.156	(0.140)	[-0.117 , 0.430]	0.132
OP referrals (AD)	-0.029	(0.228)	[-0.477 , 0.418]	0.551	-0.216	(0.241)	[-0.689 , 0.257]	0.815
OP diagnoses (AD)	-0.002	(0.116)	[-0.230 , 0.225]	0.508	0.133	(0.156)	[-0.173 , 0.438]	0.197
Tetanus doses (AD)	0.087	(0.222)	[-0.348 , 0.522]	0.348	-0.086	(0.252)	[-0.580 , 0.407]	0.634
Children immunized (AD)	0.423	(0.323)	[-0.210 , 1.055]	0.096	-0.110	(0.207)	[-0.516 , 0.296]	0.702
IPT doses (AD)	0.115	(0.227)	[-0.331 , 0.560]	0.307	-0.046	(0.166)	[-0.371 , 0.279]	0.609
Iron acid (AD)	-0.049	(0.245)	[-0.530 , 0.431]	0.580	0.001	(0.251)	[-0.491 , 0.492]	0.499
Free ITN (AD)	-0.018	(0.236)	[-0.482 , 0.445]	0.531	-0.472	(0.196)	[-0.856 , -0.087]	0.992
Syphilis test (AD)	-0.336	(0.199)	[-0.725 , 0.054]	0.955	-0.270	(0.230)	[-0.721 , 0.181]	0.880
Maternity admission (AD)	-0.180	(0.192)	[-0.555 , 0.196]	0.826	-0.144	(0.137)	[-0.412 , 0.125]	0.853
Maternity delivery (AD)	-0.250	(0.174)	[-0.590 , 0.090]	0.925	0.160	(0.325)	[-0.477 , 0.797]	0.312
Vitamin A (mothers) (AD)	-0.386	(0.155)	[-0.690 , -0.082]	0.994	-0.226	(0.184)	[-0.587 , 0.135]	0.890
Post natal (AD)	-0.174	(0.133)	[-0.436 , 0.087]	0.904	0.081	(0.273)	[-0.454 , 0.617]	0.383
Vitamin A (children) (AD)	0.120	(0.280)	[-0.429 , 0.669]	0.334	0.319	(0.312)	[-0.292 , 0.931]	0.153
Deworming doses (AD)	0.230	(0.362)	[-0.479 , 0.940]	0.262	-0.244	(0.202)	[-0.640 , 0.153]	0.886

Models include a binary indicator of clinic type (blocking variable) and adjust only to the baseline measure of an outcome. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are unweighted, constructed using the approach developed by Kling et al., (2007). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 10: *Health Outcomes Analysis (Kling, with covariates adjustment)*

		Short-term				**Long-term**		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	-0.152	(0.158)	[-0.463 , 0.158]	0.832	-0.162	(0.145)	[-0.446 , 0.121]	0.869
DHO visits	-0.113	(0.293)	[-0.687 , 0.461]	0.649	0.007	(0.296)	[-0.573 , 0.588]	0.490
DHO calls	-0.393	(0.290)	[-0.962 , 0.175]	0.912	-0.250	(0.159)	[-0.562 , 0.063]	0.942
Inspector calls	-0.097	(0.364)	[-0.810 , 0.616]	0.605	-0.141	(0.405)	[-0.935 , 0.653]	0.636
Inspector visits	-0.148	(0.316)	[-0.767 , 0.472]	0.680	0.006	(0.345)	[-0.670 , 0.681]	0.493
Inspection reports (AD)	0.056	(0.052)	[-0.046 , 0.158]	0.140	0.097	(0.089)	[-0.078 , 0.271]	0.140
Effort index	-0.188	(0.207)	[-0.593 , 0.217]	0.818	0.142	(0.150)	[-0.153 , 0.437]	0.172
% Staff Present	0.028	(0.341)	[-0.640 , 0.696]	0.468	0.968	(0.343)	[0.295 , 1.641]	0.003
% unauthorized absent	0.032	(0.335)	[-0.625 , 0.688]	0.463	0.460	(0.234)	[0.002 , 0.918]	0.025
Register book	-0.117	(0.362)	[-0.826 , 0.592]	0.627	0.032	(0.309)	[-0.575 , 0.639]	0.459
N. Outreach events	-1.049	(0.340)	[-1.715 , -0.382]	0.999	-1.062	(0.412)	[-1.869 , -0.255]	0.995
Input index	0.094	(0.201)	[-0.300 , 0.489]	0.319	0.127	(0.156)	[-0.178 , 0.433]	0.207
Days w/o antimalarials	0.449	(0.214)	[0.030 , 0.868]	0.018	1.042	(0.219)	[0.612 , 1.471]	0.000
Days w/o ORS	-0.052	(0.285)	[-0.611 , 0.506]	0.573	0.258	(0.272)	[-0.275 , 0.791]	0.172
Funds received (millions) (AD)	0.441	(0.426)	[-0.394 , 1.276]	0.150	0.454	(0.472)	[-0.470 , 1.378]	0.168
Antimalaria SO (AD)					0.125	(0.369)	[-0.599 , 0.849]	0.367
ORS SO (AD)					-0.027	(0.304)	[-0.622 , 0.568]	0.535
Total SO (AD)					-0.215	(0.327)	[-0.856 , 0.426]	0.744
Utilization index	-0.057	(0.135)	[-0.322 , 0.208]	0.664	-0.043	(0.106)	[-0.251 , 0.166]	0.656
Out patients (AD)	0.488	(0.223)	[0.051 , 0.925]	0.015	-0.422	(0.336)	[-1.081 , 0.237]	0.895
N. patients visiting clinic (AD)	-0.228	(0.107)	[-0.437 , -0.019]	0.984	0.174	(0.161)	[-0.142 , 0.491]	0.141
OP referrals (AD)	-0.122	(0.194)	[-0.503 , 0.258]	0.736	-0.658	(0.282)	[-1.211 , -0.106]	0.991
OP diagnoses (AD)	-0.006	(0.135)	[-0.271 , 0.260]	0.518	0.201	(0.214)	[-0.219 , 0.621]	0.174
Tetanus doses (AD)	-0.190	(0.313)	[-0.803 , 0.423]	0.728	0.036	(0.286)	[-0.525 , 0.597]	0.451
Children immunized (AD)	0.307	(0.352)	[-0.384 , 0.997]	0.192	0.348	(0.170)	[0.014 , 0.682]	0.021
IPT doses (AD)	-0.090	(0.223)	[-0.527 , 0.347]	0.657	-0.187	(0.171)	[-0.521 , 0.147]	0.863
Iron acid (AD)	-0.339	(0.267)	[-0.863 , 0.185]	0.897	-0.019	(0.268)	[-0.545 , 0.507]	0.528
Free ITN (AD)	-0.364	(0.271)	[-0.896 , 0.168]	0.910	-0.371	(0.250)	[-0.860 , 0.118]	0.931
Syphilis test (AD)	-0.104	(0.236)	[-0.566 , 0.359]	0.670	-0.435	(0.343)	[-1.107 , 0.237]	0.898
Maternity admission (AD)	-0.217	(0.246)	[-0.699 , 0.265]	0.811	-0.057	(0.139)	[-0.328 , 0.215]	0.659
Maternity delivery (AD)	-0.376	(0.178)	[-0.724 , -0.027]	0.983	0.089	(0.365)	[-0.625 , 0.804]	0.404
Vitamin A (mothers) (AD)	-0.565	(0.220)	[-0.996 , -0.133]	0.995	-0.213	(0.163)	[-0.533 , 0.107]	0.904
Post natal (AD)	-0.182	(0.141)	[-0.458 , 0.094]	0.902	-0.350	(0.231)	[-0.803 , 0.102]	0.935
Vitamin A (children) (AD)	-0.137	(0.281)	[-0.687 , 0.413]	0.688	0.375	(0.271)	[-0.156 , 0.905]	0.083
Deworming doses (AD)	0.384	(0.352)	[-0.307 , 1.074]	0.138	-0.236	(0.225)	[-0.676 , 0.205]	0.853

Models include a binary indicator of clinic type (blocking variable) as well as adjust to baseline measure of the outcome as well as demeaned covariates interacted with a treatment indicator. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are unweighted, constructed using the approach developed by Kling et al., (2007). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 11: *Water Outcomes Analysis*

	Parts and services		**Village requests**	
	(1)	(2)	(3)	(4)
Treatment	0.386	0.345	0.079	0.111
	(0.318)	(0.280)	(0.107)	(0.113)
Constant	0.000	-0.016	-0.000	-0.016
	(0.083)	(0.079)	(0.080)	(0.083)
Cov. adjustment	No	Yes	No	Yes
R2	0	0	0	0
N	243.00	243.00	243.00	243.00

4.1 Robustness Checks: Weighted Indices

Here we present results for education and health using the weighted indices, following Anderson (2008). Tables 12 and 13 present results for education without and with covariate adjustment, respectively. Tables 14 and 15 present results for health without and with covariate adjustment, respectively.

TABLE 12: *Education Outcomes Analysis (Anderson, no covariates)*

	Short-term				Long-term			
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	0.249	(0.202)	[-0.148 , 0.646]	0.110	0.027	(0.235)	[-0.434 , 0.489]	0.454
DEO calls	0.331	(0.201)	[-0.063 , 0.726]	0.050	0.025	(0.213)	[-0.393 , 0.443]	0.454
Inspector calls	0.466	(0.232)	[0.011 , 0.921]	0.022	-0.115	(0.198)	[-0.502 , 0.273]	0.719
DEO visits	0.174	(0.186)	[-0.191 , 0.539]	0.175	0.250	(0.250)	[-0.240 , 0.741]	0.159
Inspector visits (AD)	-0.158	(0.191)	[-0.533 , 0.217]	0.795	0.014	(0.215)	[-0.408 , 0.436]	0.475
Effort index	0.019	(0.179)	[-0.332 , 0.371]	0.457	0.094	(0.259)	[-0.413 , 0.601]	0.358
% Teachers present (records)	-0.209	(0.198)	[-0.598 , 0.180]	0.854	0.060	(0.221)	[-0.374 , 0.493]	0.394
% Teachers present (observed)	0.286	(0.211)	[-0.127 , 0.700]	0.087	0.308	(0.218)	[-0.120 , 0.736]	0.080
Meaningful board	0.205	(0.179)	[-0.146 , 0.556]	0.127	-0.084	(0.242)	[-0.558 , 0.389]	0.637
Teacher engaged	0.382	(0.215)	[-0.040 , 0.803]	0.038	0.290	(0.220)	[-0.141 , 0.721]	0.093
Staff meetings					0.025	(0.197)	[-0.361 , 0.411]	0.450
Input index	0.388	(0.265)	[-0.132 , 0.908]	0.072	0.214	(0.208)	[-0.194 , 0.622]	0.152
N. teachers employed	0.253	(0.132)	[-0.006 , 0.512]	0.028	0.131	(0.172)	[-0.205 , 0.468]	0.223
Teachers transferred to school	0.387	(0.291)	[-0.184 , 0.958]	0.092	0.211	(0.213)	[-0.207 , 0.628]	0.161
Students per uniform	0.086	(0.233)	[-0.371 , 0.543]	0.356	-0.156	(0.206)	[-0.559 , 0.247]	0.776
Students per book	0.158	(0.177)	[-0.189 , 0.505]	0.186	0.120	(0.227)	[-0.325 , 0.565]	0.299
Students per pencil	0.076	(0.248)	[-0.410 , 0.562]	0.379	0.235	(0.202)	[-0.160 , 0.630]	0.122
Performance index	-0.810	(0.312)	[-1.421 , -0.199]	0.996				
Enrollment (AD)	0.009	(0.113)	[-0.212 , 0.230]	0.468				
% PLE Grade 1 (AD)	0.194	(0.321)	[-0.434 , 0.823]	0.273				
% PLE Grade 2 (AD)	-0.268	(0.131)	[-0.524 , -0.011]	0.980				
PLE pass rate (AD)	-0.137	(0.171)	[-0.473 , 0.198]	0.788				

Models include a binary indicator of school type and adjust only for the baseline measure of an outcome. (AD) indicates variables collected from administrative data. All other variables collected through unannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are weighted, constructed using the approach developed by Anderson (2008). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 13: *Education Outcomes Analysis (Anderson, with covariates adjustment)*

		Short-term				Long-term		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	0.164	(0.201)	[-0.229 , 0.557]	0.207	0.058	(0.283)	[-0.497 , 0.614]	0.418
DEO calls	0.254	(0.212)	[-0.162 , 0.670]	0.116	0.130	(0.232)	[-0.324 , 0.584]	0.287
Inspector calls	0.370	(0.244)	[-0.108 , 0.848]	0.065	-0.099	(0.265)	[-0.617 , 0.420]	0.645
DEO visits	-0.231	(0.206)	[-0.634 , 0.171]	0.870	-0.668	(0.671)	[-1.983 , 0.647]	0.841
Inspector visits (AD)	-0.107	(0.191)	[-0.480 , 0.267]	0.713	0.175	(0.323)	[-0.457 , 0.808]	0.293
Effort index	0.135	(0.238)	[-0.332 , 0.603]	0.285	0.189	(0.279)	[-0.357 , 0.735]	0.248
% Teachers present (records)	-0.324	(0.251)	[-0.816 , 0.167]	0.902	0.232	(0.231)	[-0.219 , 0.684]	0.157
% Teachers present (observed)	0.389	(0.205)	[-0.013 , 0.791]	0.029	0.314	(0.274)	[-0.223 , 0.852]	0.126
Meaningful board	0.326	(0.190)	[-0.046 , 0.698]	0.043	-0.061	(0.213)	[-0.480 , 0.357]	0.613
Teacher engaged	0.488	(0.205)	[0.087 , 0.890]	0.009	0.302	(0.263)	[-0.214 , 0.818]	0.126
Staff meetings					-0.006	(0.222)	[-0.441 , 0.429]	0.511
Input index	0.257	(0.258)	[-0.249 , 0.763]	0.160	0.234	(0.212)	[-0.182 , 0.650]	0.136
N. teachers employed	0.356	(0.210)	[-0.056 , 0.768]	0.045	-0.028	(0.383)	[-0.778 , 0.722]	0.529
Teachers transferred to school	0.470	(0.273)	[-0.066 , 1.006]	0.043	-0.030	(0.215)	[-0.451 , 0.392]	0.555
Students per uniform	0.230	(0.225)	[-0.211 , 0.671]	0.153	0.383	(0.202)	[-0.013 , 0.779]	0.029
Students per book	-0.120	(0.207)	[-0.526 , 0.285]	0.720	0.207	(0.251)	[-0.286 , 0.699]	0.205
Students per pencil	-0.240	(0.254)	[-0.738 , 0.258]	0.828	0.313	(0.226)	[-0.130 , 0.757]	0.083
Performance index	-0.760	(0.362)	[-1.469 , -0.050]	0.982				
Enrollment (AD)	0.037	(0.088)	[-0.136 , 0.210]	0.338				
% PLE Grade 1 (AD)	0.016	(0.185)	[-0.346 , 0.378]	0.466				
% PLE Grade 2 (AD)	-0.305	(0.184)	[-0.666 , 0.055]	0.952				
PLE pass rate (AD)	-0.126	(0.195)	[-0.508 , 0.256]	0.741				

Models include a binary indicator of school type and adjust for baseline measure of the outcome as well as for demeaned covariates interacted with a treatment indicator. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are weighted, constructed using the approach developed by Anderson (2008). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 14: *Health Outcomes Analysis (Anderson, no covariates)*

		Short-term				Long-term		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	-0.301	(0.247)	[-0.784 , 0.183]	0.888	-0.380	(0.207)	[-0.785 , 0.025]	0.967
DHO visits	-0.122	(0.257)	[-0.626 , 0.381]	0.683	-0.125	(0.239)	[-0.594 , 0.343]	0.700
DHO calls	-0.399	(0.231)	[-0.852 , 0.054]	0.958	-0.381	(0.143)	[-0.661 , -0.101]	0.996
Inspector calls	-0.246	(0.249)	[-0.733 , 0.242]	0.839	-0.120	(0.279)	[-0.667 , 0.427]	0.666
Inspector visits	-0.014	(0.271)	[-0.545 , 0.516]	0.522	-0.144	(0.273)	[-0.679 , 0.391]	0.701
Inspection reports (AD)	-0.030	(0.050)	[-0.128 , 0.067]	0.728	-0.052	(0.086)	[-0.220 , 0.116]	0.728
Effort index	-0.311	(0.287)	[-0.874 , 0.251]	0.861	-0.148	(0.286)	[-0.708 , 0.412]	0.698
% Staff Present	0.063	(0.279)	[-0.484 , 0.610]	0.410	0.298	(0.279)	[-0.248 , 0.845]	0.142
% unauthorized absent	-0.014	(0.267)	[-0.537 , 0.510]	0.520	0.185	(0.241)	[-0.287 , 0.658]	0.221
Register book	-0.301	(0.283)	[-0.856 , 0.253]	0.857	-0.301	(0.276)	[-0.841 , 0.239]	0.863
N. Outreach events	-0.570	(0.274)	[-1.107 , -0.033]	0.981	-0.395	(0.317)	[-1.015 , 0.226]	0.894
Input index	0.133	(0.284)	[-0.424 , 0.689]	0.320	0.258	(0.270)	[-0.272 , 0.788]	0.170
Days w/o antimalarials	0.437	(0.223)	[0.001 , 0.873]	0.025	1.056	(0.195)	[0.674 , 1.437]	0.000
Days w/o ORS	0.189	(0.235)	[-0.271 , 0.649]	0.210	0.291	(0.260)	[-0.218 , 0.800]	0.131
Funds received (millions) (AD)	-0.085	(0.303)	[-0.679 , 0.509]	0.611	-0.004	(0.329)	[-0.649 , 0.640]	0.506
Antimalaria SO (AD)					0.055	(0.311)	[-0.555 , 0.664]	0.430
ORS SO (AD)					-0.145	(0.383)	[-0.896 , 0.605]	0.647
Total SO (AD)					-0.215	(0.321)	[-0.844 , 0.414]	0.748
Utilization index	-0.331	(0.295)	[-0.909 , 0.247]	0.869				
Out patients (AD)	0.328	(0.230)	[-0.122 , 0.778]	0.077				
N. patients visiting clinic (AD)	-0.137	(0.097)	[-0.328 , 0.054]	0.919				
OP referrals (AD)	-0.029	(0.228)	[-0.477 , 0.418]	0.551				
OP diagnoses (AD)	-0.002	(0.116)	[-0.230 , 0.225]	0.508				
Tetanus doses (AD)	0.087	(0.222)	[-0.348 , 0.522]	0.348				
Children immunized (AD)	0.423	(0.323)	[-0.210 , 1.055]	0.096				
IPT doses (AD)	0.115	(0.227)	[-0.331 , 0.560]	0.307				
Iron acid (AD)	-0.049	(0.245)	[-0.530 , 0.431]	0.580				
Free ITN (AD)	-0.018	(0.236)	[-0.482 , 0.445]	0.531				
Syphilis test (AD)	-0.336	(0.199)	[-0.725 , 0.054]	0.955				
Maternity admission (AD)	-0.180	(0.192)	[-0.555 , 0.196]	0.826				
Maternity delivery (AD)	-0.250	(0.174)	[-0.590 , 0.090]	0.925				
Vitamin A (mothers) (AD)	-0.386	(0.155)	[-0.690 , -0.082]	0.994				
Post natal (AD)	-0.174	(0.133)	[-0.436 , 0.087]	0.904				
Vitamin A (children) (AD)	0.120	(0.280)	[-0.429 , 0.669]	0.334				
Deworming doses (AD)	0.230	(0.362)	[-0.479 , 0.940]	0.262				

Models include a binary indicator of clinic type (blocking variable) and adjust only to the baseline measure of an outcome. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are weighted, constructed using the approach developed by Anderson (2008). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

TABLE 15: *Health Outcomes Analysis (Anderson, with covariates adjustment)*

		Short-term				Long-term		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	-0.309	(0.268)	[-0.835 , 0.216]	0.875	-0.346	(0.242)	[-0.820 , 0.128]	0.923
DHO visits	-0.113	(0.293)	[-0.687 , 0.461]	0.649	0.007	(0.296)	[-0.573 , 0.588]	0.490
DHO calls	-0.393	(0.290)	[-0.962 , 0.175]	0.912	-0.250	(0.159)	[-0.562 , 0.063]	0.942
Inspector calls	-0.097	(0.364)	[-0.810 , 0.616]	0.605	-0.141	(0.405)	[-0.935 , 0.653]	0.636
Inspector visits	-0.148	(0.316)	[-0.767 , 0.472]	0.680	0.006	(0.345)	[-0.670 , 0.681]	0.493
Inspection reports (AD)	0.056	(0.052)	[-0.046 , 0.158]	0.140	0.097	(0.089)	[-0.078 , 0.271]	0.140
Effort index	-0.354	(0.358)	[-1.055 , 0.348]	0.839	0.244	(0.324)	[-0.392 , 0.879]	0.226
% Staff Present	0.028	(0.341)	[-0.640 , 0.696]	0.468	0.968	(0.343)	[0.295 , 1.641]	0.003
% unauthorized absent	0.032	(0.335)	[-0.625 , 0.688]	0.463	0.460	(0.234)	[0.002 , 0.918]	0.025
Register book	-0.117	(0.362)	[-0.826 , 0.592]	0.627	0.032	(0.309)	[-0.575 , 0.639]	0.459
N. Outreach events	-1.049	(0.340)	[-1.715 , -0.382]	0.999	-1.062	(0.412)	[-1.869 , -0.255]	0.995
Input index	0.116	(0.296)	[-0.465 , 0.696]	0.348	0.434	(0.278)	[-0.110 , 0.979]	0.059
Days w/o antimalarials	0.449	(0.214)	[0.030 , 0.868]	0.018	1.042	(0.219)	[0.612 , 1.471]	0.000
Days w/o ORS	-0.052	(0.285)	[-0.611 , 0.506]	0.573	0.258	(0.272)	[-0.275 , 0.791]	0.172
Funds received (millions) (AD)	0.441	(0.426)	[-0.394 , 1.276]	0.150	0.454	(0.472)	[-0.470 , 1.378]	0.168
Antimalaria SO (AD)					0.125	(0.369)	[-0.599 , 0.849]	0.367
ORS SO (AD)					-0.027	(0.304)	[-0.622 , 0.568]	0.535
Total SO (AD)					-0.215	(0.327)	[-0.856 , 0.426]	0.744
Utilization index	-0.572	(0.337)	[-1.233 , 0.089]	0.955				
Out patients (AD)	0.488	(0.223)	[0.051 , 0.925]	0.015				
N. patients visiting clinic (AD)	-0.228	(0.107)	[-0.437 , -0.019]	0.984				
OP referrals (AD)	-0.122	(0.194)	[-0.503 , 0.258]	0.736				
OP diagnoses (AD)	-0.006	(0.135)	[-0.271 , 0.260]	0.518				
Tetanus doses (AD)	-0.190	(0.313)	[-0.803 , 0.423]	0.728				
Children immunized (AD)	0.307	(0.352)	[-0.384 , 0.997]	0.192				
IPT doses (AD)	-0.090	(0.223)	[-0.527 , 0.347]	0.657				
Iron acid (AD)	-0.339	(0.267)	[-0.863 , 0.185]	0.897				
Free ITN (AD)	-0.364	(0.271)	[-0.896 , 0.168]	0.910				
Syphilis test (AD)	-0.104	(0.236)	[-0.566 , 0.359]	0.670				
Maternity admission (AD)	-0.180	(0.192)	[-0.555 , 0.196]	0.826				
Maternity delivery (AD)	-0.376	(0.178)	[-0.724 , -0.027]	0.983				
Vitamin A (mothers) (AD)	-0.565	(0.220)	[-0.996 , -0.133]	0.995				
Post natal (AD)	-0.182	(0.141)	[-0.458 , 0.094]	0.902				
Vitamin A (children) (AD)	-0.137	(0.281)	[-0.687 , 0.413]	0.688				
Deworming doses (AD)	0.384	(0.352)	[-0.307 , 1.074]	0.138				

Models adjust to baseline measure of the outcome as well as demeaned covariates interacted with a treatment indicator. (AD) indicates variables collected from administrative data. All other variables collected through unnannounced audits of facilities. In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices are weighted, constructed using the approach developed by Anderson (2008). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are one-tailed.

4.2 Robustness Checks: Randomization inference

In this subsection, we provide a graphical representation of the results using randomization inference. As discussed in the paper, when there is a small number of observations, standard errors can be unreliable. Since we have only 48 clusters in total, we conduct randomization inference (RI) as an additional robustness check. Figures 1 and 2 present the results using RI for education with the indices contructed as per Kling and Anderson, respectively. Figures 3 and 4 present the results using RI for health with the indices contructed as per Kling and Anderson, respectively. Figure 5 presents the results using RI for the two water outcomes. Together, these results support the main interpretation presented in the paper, which is that there is suggestive evidence of a positive short-term effect in education that deteriorates over time, and no evidence of a treatment effect on health outcomes. The evidence for an effect on water is even weaker than that in education.

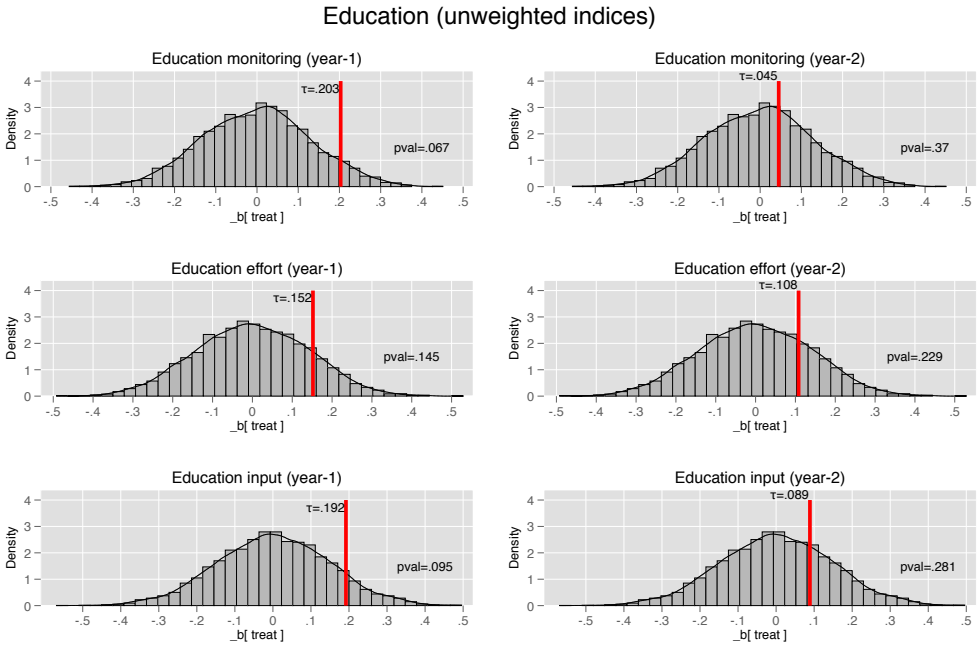

Figure 1: **Randomization inference**: Education indices (Kling), no covariates

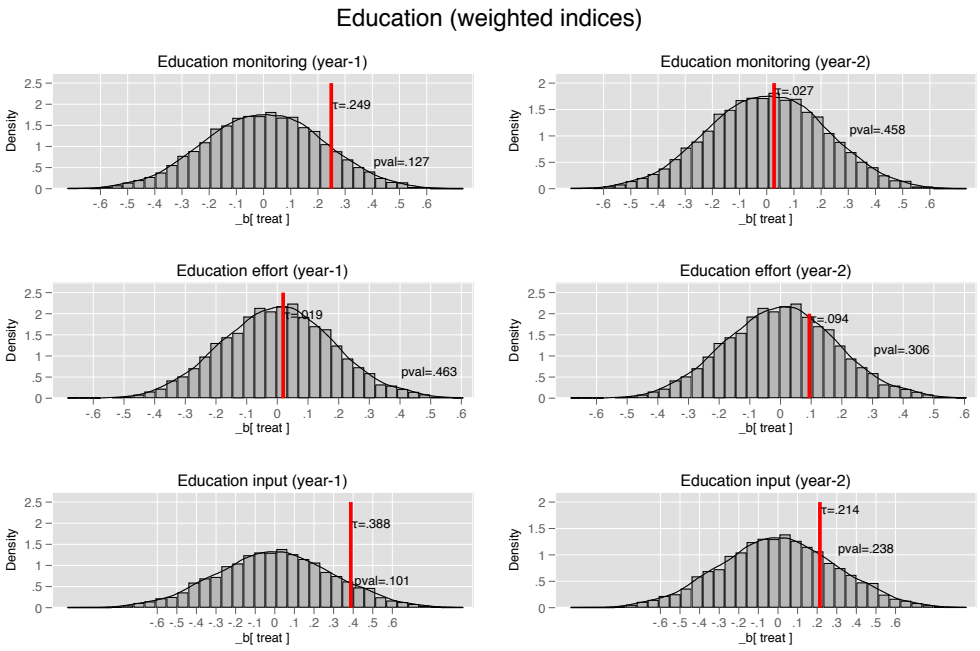

Figure 2: **Randomization inference**: Education indices (Anderson), no covariates

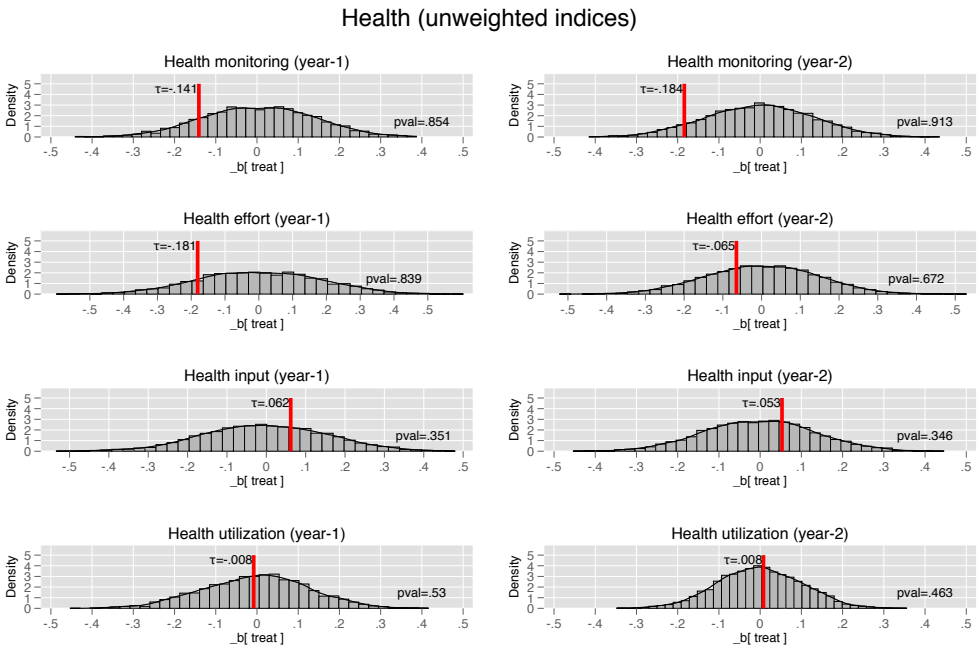

Figure 3: **Randomization inference**: Health indices (Kling), no covariates

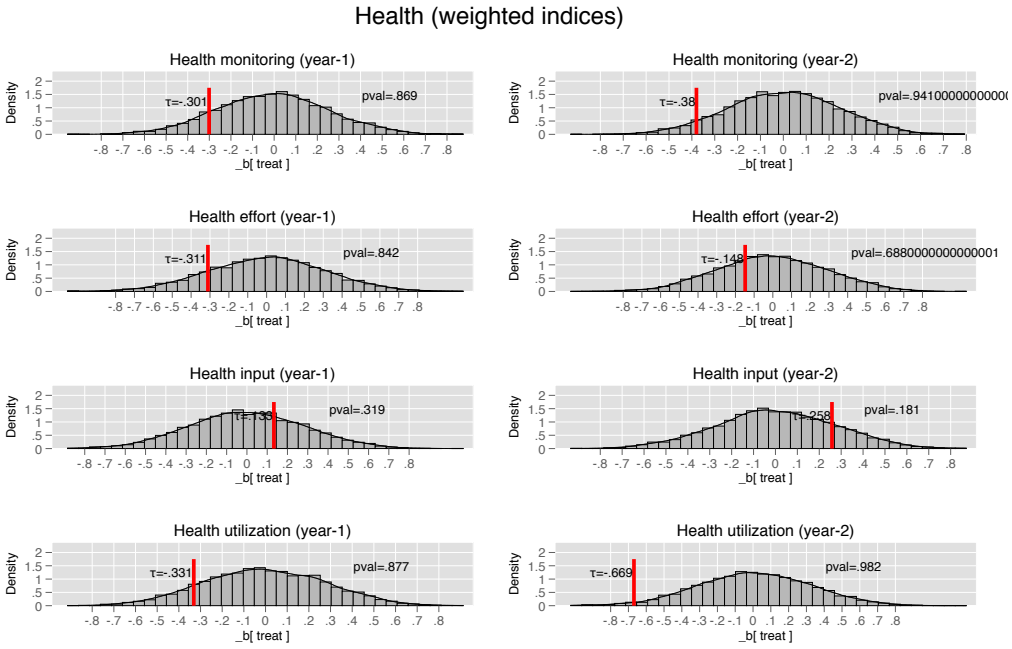

Figure 4: **Randomization inference**: Health indices (Anderson), no covariates

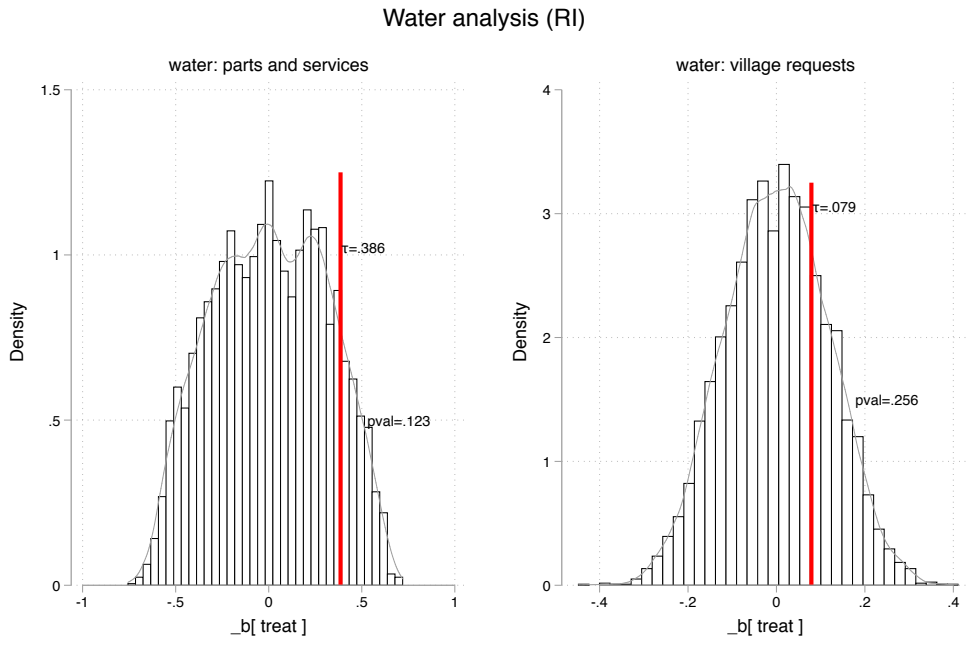

Figure 5: **Randomization inference**: Water outcomes, no covariates

4.3 Multiple Hypotheses

While creating indices reduces dramatically the number of tests (one test per family of outcomes), we are still left with a large number of regressions: 3 primary indices in education (times 2 for short- and longer-term); 4 primary indices in health (times 2 for short- and longer-term); and 2 outcomes in water (one period covering the two years), for a total of 16 tests.

We first order the vector of p-values from low to high, and then use the Benjamini-Hochberg (BH) method that allows controlling for the false discovery rate (FDR). The FDR It is the expected proportion of false discoveries among all discoveries. As Table 16 shows, once we control for the FDR, non of the p-values is significant.

	var	sector	year	pval	pvalBH
1	Monitoring index	Edu	1	0.046	0.560
2	Input index	Edu	1	0.070	0.560
3	Effort index	Edu	1	0.133	0.673
4	Parts & services	Water	2	0.232	0.673
5	Effort index	Edu	2	0.232	0.673
6	Input index	Edu	2	0.267	0.673
7	Input index	Health	2	0.351	0.673
8	Input index	Health	1	0.365	0.673
9	Monitoring index	Edu	2	0.389	0.673
10	Utilization index	Health	2	0.445	0.673
11	Village requests	Water	2	0.462	0.673
12	Utilization index	Health	1	0.508	0.677
13	Effort index	Health	2	0.680	0.837
14	Effort index	Health	1	0.866	0.933
15	Monitoring index	Health	1	0.875	0.933
16	Monitoring index	Health	2	0.951	0.951

TABLE 16: *Table shows both uncorrected p-values as well as p-values accounting for multiple testing using the Benjamini-Hochberg control for the FDR. In column 4, p-values are one-tailed and derived from our base ANCOVA models: unweighted indices with no covariate adjustment.*

5 Quasi-Control Estimation

In this section, we report results from the analysis comparing treatment facilities to what we term quasi-control facilities – that is, facilities located at the border with Arua district but under the management of neighboring districts. As discussed in the main paper, we conduct this analysis to investigate whether there is evidence of either SUTVA violations or spillover from treatment to control within Arua district. All analyses are conducted without covariates, as we were unable to collect data on covariates from neighboring districts. Table 17 presents results using unweighted indices, while Table 18 presents results using weighted indices. We find fairly large and significant positive treatment effects on the monitoring and input indices in education in year 1, which deteriorate over time, providing more suggestive evidence that there was a short-term effect of the U-Bridge program on outcomes the education sector. Figure 6 presents the results for the education indices (Kling) graphically.

TABLE 17: *Education Outcomes Quasi-Control Analysis (Kling, no covariates)*

		Short-term				**Long-term**		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring index	0.365	(0.219)	[-0.064 , 0.794]	0.048	-0.179	(0.187)	[-0.545 , 0.187]	0.832
DEO calls	0.534	(0.503)	[-0.452 , 1.521]	0.144	-0.494	(0.334)	[-1.148 , 0.160]	0.931
Inspector calls	1.065	(0.296)	[0.485 , 1.645]	0.000	-0.485	(0.295)	[-1.063 , 0.093]	0.950
DEO visits	0.208	(0.289)	[-0.359 , 0.775]	0.236	0.304	(0.149)	[0.012 , 0.596]	0.021
Inspector visits (AD)	-0.386	(0.399)	[-1.169 , 0.396]	0.834	-0.034	(0.392)	[-0.802 , 0.733]	0.535
Effort index	0.271	(0.316)	[-0.348 , 0.889]	0.196	-0.170	(0.213)	[-0.587 , 0.248]	0.787
% Teachers present (records)	-0.339	(0.215)	[-0.760 , 0.082]	0.943	-0.838	(0.264)	[-1.356 , -0.320]	0.999
% Teachers present (observed)	0.551	(0.516)	[-0.461 , 1.562]	0.143	0.346	(0.330)	[-0.300 , 0.992]	0.147
Meaningful board	0.503	(0.205)	[0.101 , 0.904]	0.007	-0.455	(0.340)	[-1.121 , 0.211]	0.909
Teacher engaged	0.543	(0.502)	[-0.440 , 1.526]	0.140	0.243	(0.339)	[-0.421 , 0.906]	0.237
Staff meetings					-0.516	(0.178)	[-0.865 , -0.167]	0.998
Input index	0.639	(0.218)	[0.212 , 1.067]	0.002	0.261	(0.300)	[-0.328 , 0.849]	0.193
N. teachers employed	0.228	(0.190)	[-0.145 , 0.601]	0.116	0.503	(0.366)	[-0.213 , 1.220]	0.085
Teachers transferred to school	0.992	(0.225)	[0.551 , 1.433]	0.000	0.043	(0.358)	[-0.658 , 0.744]	0.452
Students per uniform	0.630	(0.239)	[0.162 , 1.098]	0.004	0.217	(0.305)	[-0.381 , 0.815]	0.238
Students per book	0.785	(0.506)	[-0.207 , 1.777]	0.060	0.284	(0.512)	[-0.719 , 1.287]	0.289
Students per pencil	0.438	(0.378)	[-0.302 , 1.178]	0.123	0.291	(0.556)	[-0.798 , 1.380]	0.300

In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices (unweighted) are constructed using the approach developed by Kling et al., (2007). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are two-sided.

TABLE 18: *Education Outcomes Quasi-Control Analysis (Anderson, no covariates)*

		Short-term				**Long-term**		
Variable	Coef	SE	CI	P-val	Coef	SE	CI	P-val
Monitoring weighted index	0.405	(0.327)	[-0.236 , 1.045]	0.108	-0.244	(0.255)	[-0.744 , 0.255]	0.831
DEO calls	0.534	(0.503)	[-0.452 , 1.521]	0.144	-0.494	(0.334)	[-1.148 , 0.160]	0.931
Inspector calls	1.065	(0.296)	[0.485 , 1.645]	0.000	-0.485	(0.295)	[-1.063 , 0.093]	0.950
DEO visits	0.208	(0.289)	[-0.359 , 0.775]	0.236	0.304	(0.149)	[0.012 , 0.596]	0.021
Inspector visits (AD)	-0.386	(0.399)	[-1.169 , 0.396]	0.834	-0.034	(0.392)	[-0.802 , 0.733]	0.535
Effort weighted index	0.205	(0.299)	[-0.380 , 0.790]	0.246	-0.801	(0.288)	[-1.366 , -0.237]	0.998
% Teachers present (records)	-0.339	(0.215)	[-0.760 , 0.082]	0.943	-0.838	(0.264)	[-1.356 , -0.320]	0.999
% Teachers present (observed)	0.551	(0.516)	[-0.461 , 1.562]	0.143	0.346	(0.330)	[-0.300 , 0.992]	0.147
Meaningful board	0.503	(0.205)	[0.101 , 0.904]	0.007	-0.455	(0.340)	[-1.121 , 0.211]	0.909
Teacher engaged	0.543	(0.502)	[-0.440 , 1.526]	0.140	0.243	(0.339)	[-0.421 , 0.906]	0.237
Staff meetings					-0.516	(0.178)	[-0.865 , -0.167]	0.998
Input weighted index	1.299	(0.380)	[0.554 , 2.044]	0.001	0.544	(0.452)	[-0.342 , 1.429]	0.115
N. teachers employed	0.228	(0.190)	[-0.145 , 0.601]	0.116	0.503	(0.366)	[-0.213 , 1.220]	0.085
Teachers transferred to school	0.992	(0.225)	[0.551 , 1.433]	0.000	0.043	(0.358)	[-0.658 , 0.744]	0.452
Students per uniform	0.630	(0.239)	[0.162 , 1.098]	0.004	0.217	(0.305)	[-0.381 , 0.815]	0.238
Students per book	0.785	(0.506)	[-0.207 , 1.777]	0.060	0.284	(0.512)	[-0.719 , 1.287]	0.289
Students per pencil	0.438	(0.378)	[-0.302 , 1.178]	0.123	0.291	(0.556)	[-0.798 , 1.380]	0.300

In columns 2-5 we report short-term effects (1 year), and in columns 6-9, long-term effects (year 2). Indices (weighted) are constructed using the approach developed by Anderson (2008). Standard errors are corrected by combining estimation results using Seemingly Unrelated Regression (SUR) estimation; p-values are two-sided.

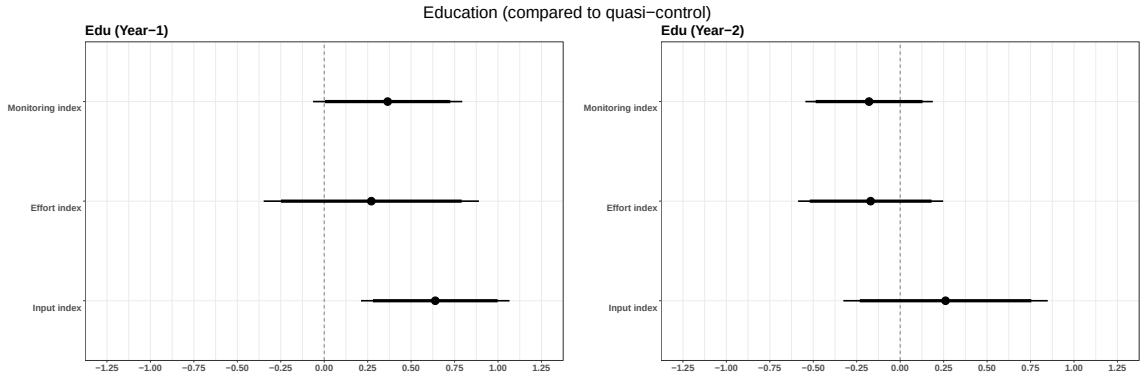

Figure 6: Treatment effect on education indices (unweighted) compared to quasi-control , no covariates

6 Change in outcome variables overtime

In this section we present graphically the change in the raw values for outcome variables over time for each component of the indices in education and health. Figures 7-9 present the raw values in monitoring, effort, and inputs for the education sector. Figures 10-12 present the raw values in health for monitoring, effort, and inputs. Figure 13 presents the raw values for the two outcome variables for water, parts and services and village requests, at the baseline and endline.

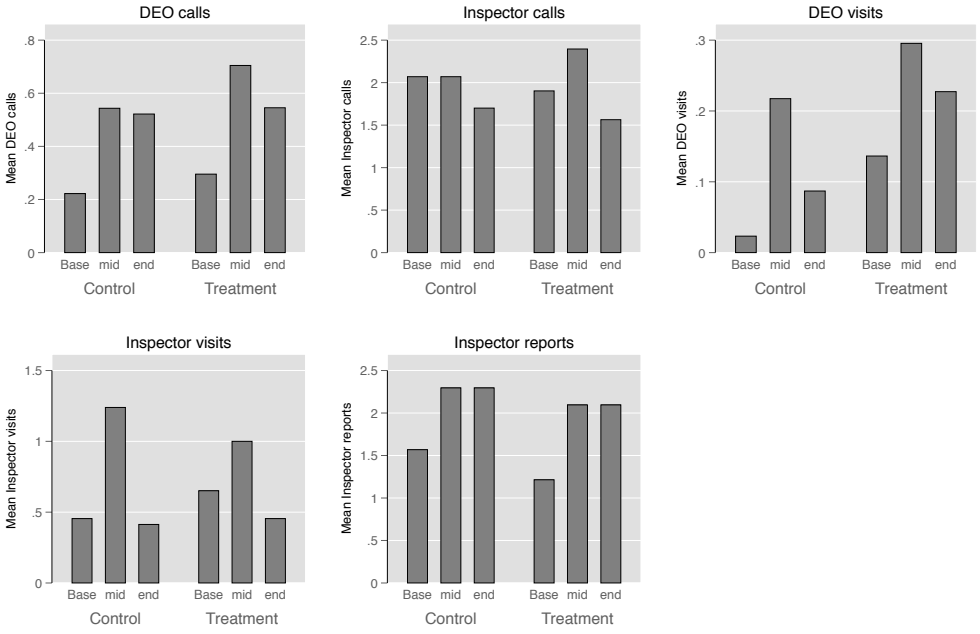

Figure 7: **School monitoring**: bar plots of outcome variables overtime

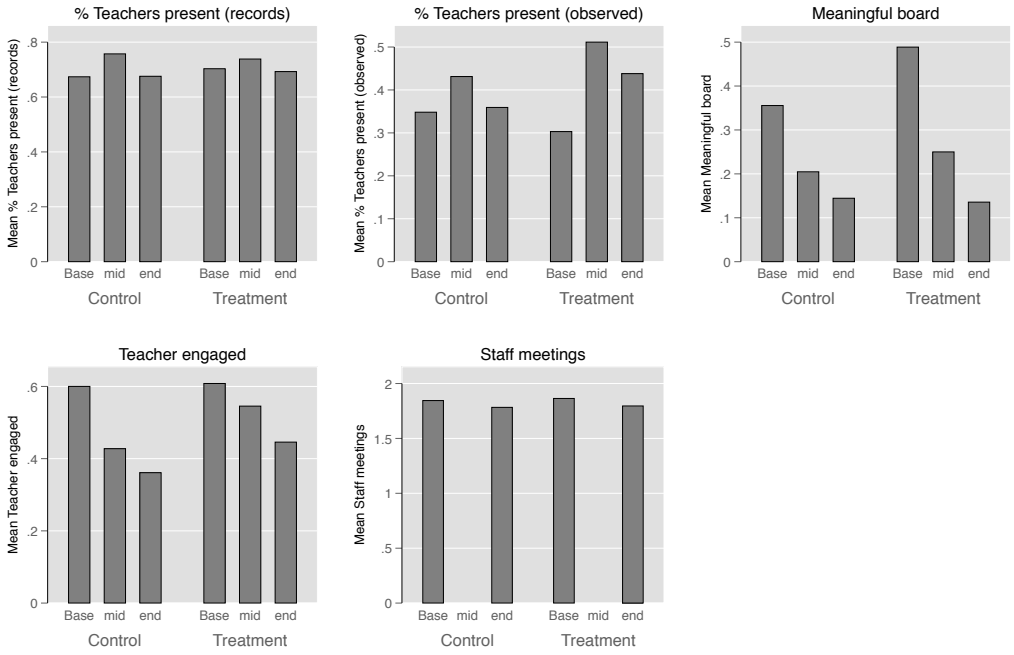

Figure 8: **School effort**: bar plots of outcome variables overtime

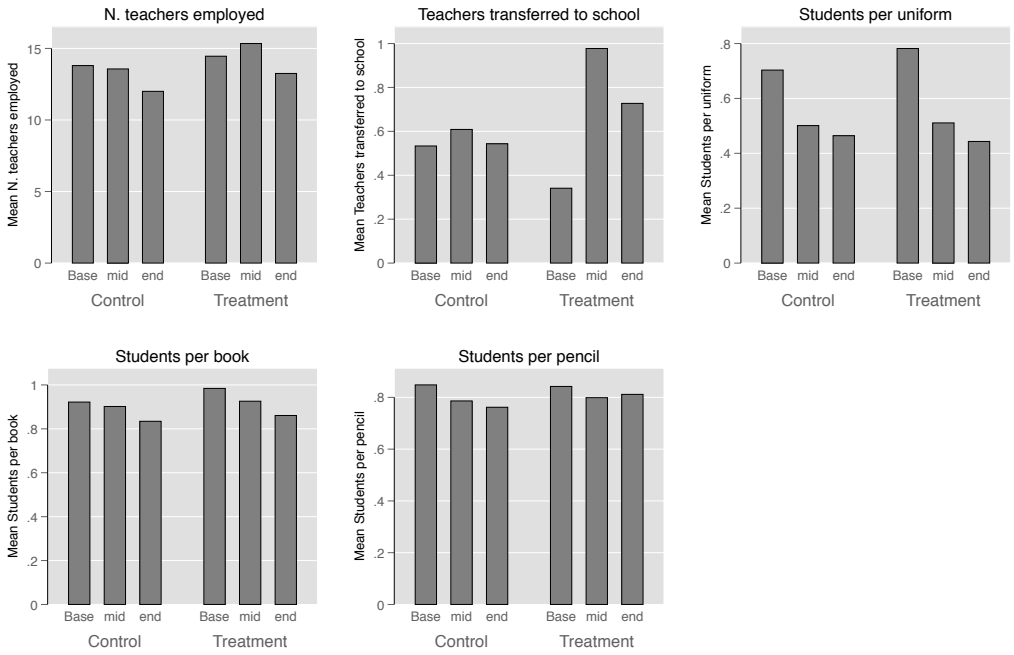

Figure 9: **School inputs**: bar plots of outcome variables overtime

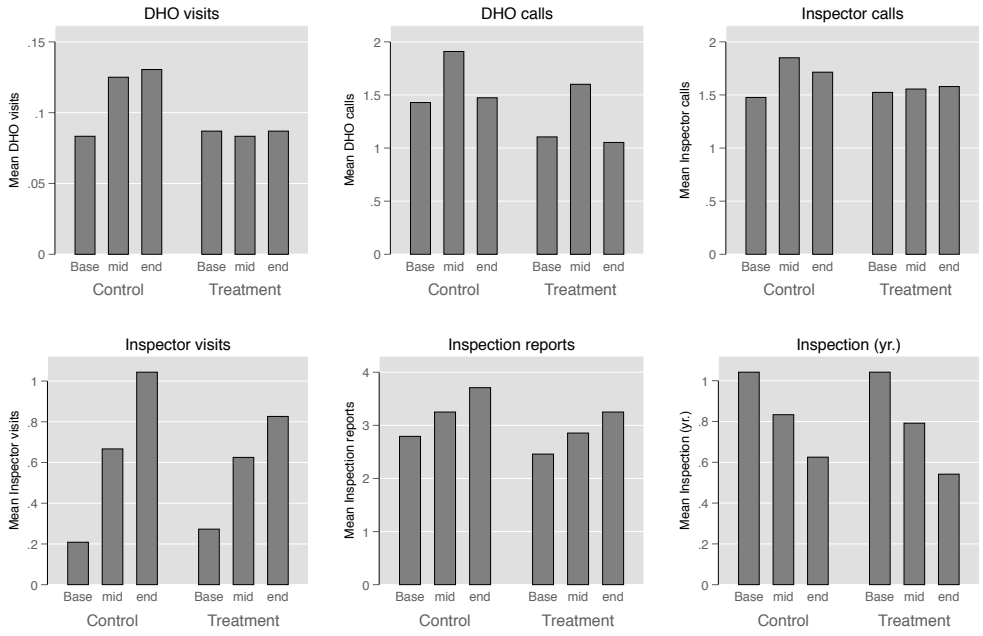

Figure 10: **Health monitoring**: bar plots of outcome variables overtime

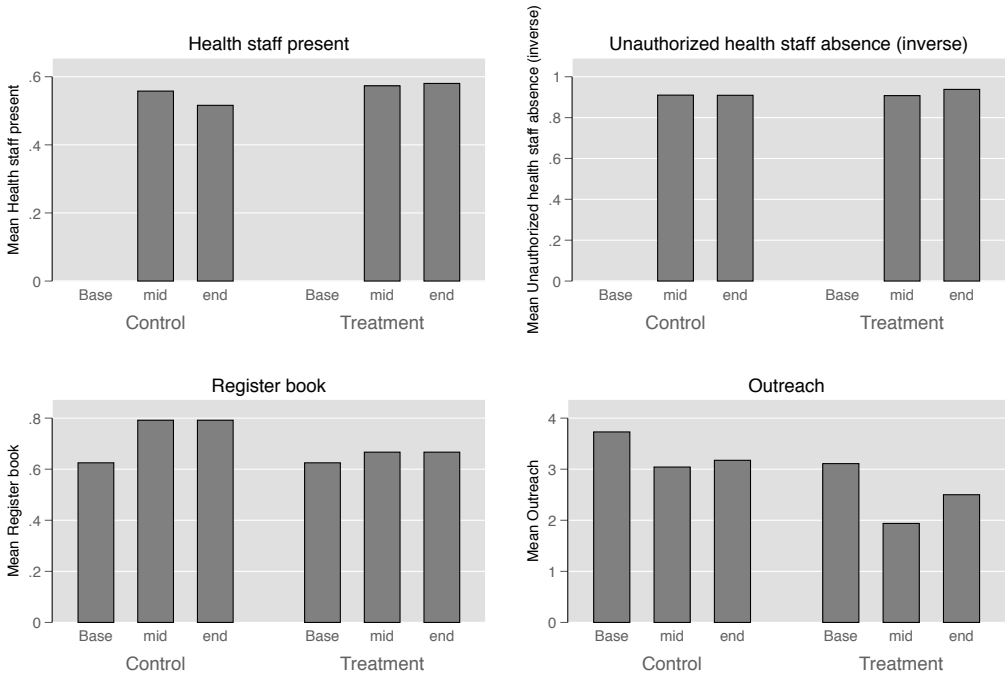

Figure 11: **Health effort**: bar plots of outcome variables overtime

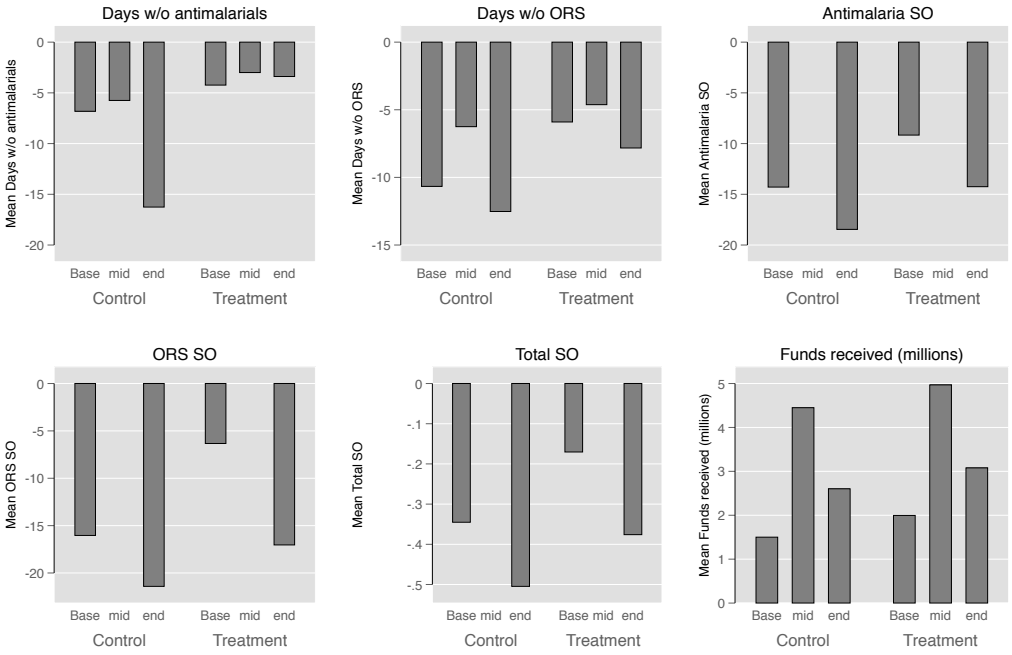

Figure 12: **Health inputs**: bar plots of outcome variables overtime

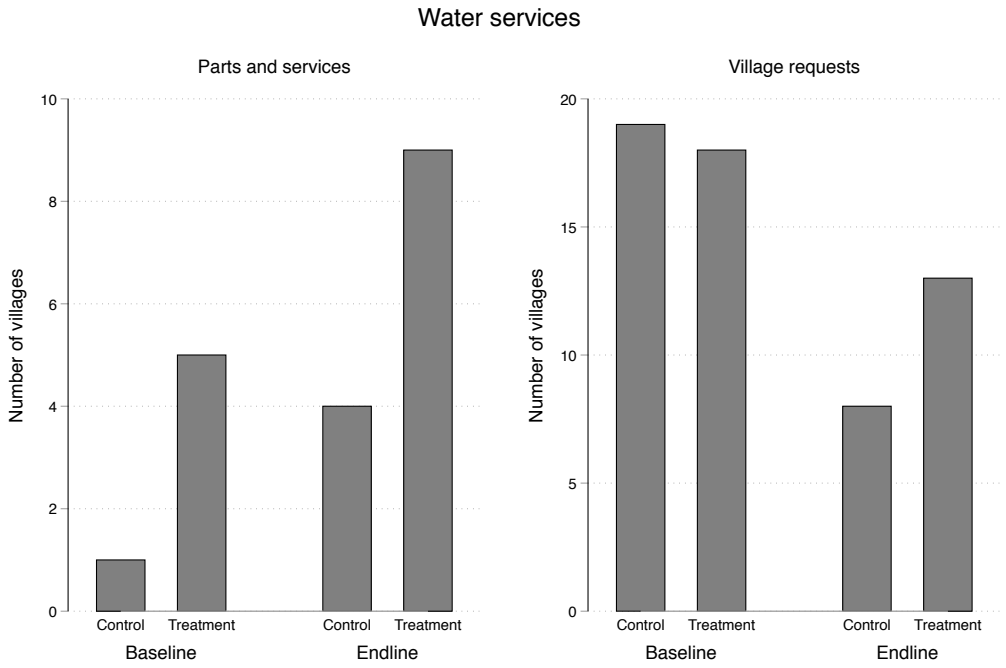

Figure 13: **Water**: bar plots of outcome variables overtime

7 Treatment effects and messaging intensity

Here, we investigate possible mechanisms that might explain both the difference in treatment effects between health and education, as well as the deterioration of the treatment effect in education over time. In particular, we examine whether there is a relationship between the number of messages sent by sector and the change in the outcome variables by index (unweighted, as per Kling, Liebman, and Katz (2007)) and sector from baseline to midline, shown for education in Figure 14 and health in Figure 15. We find little evidence of a relationship between the number of messages sent and the change in outcomes. We also examine the relationship between the number of messages sent by sector in each cluster/facility and outcome indices at baseline (Figure 16 for education and Figure 17 for health), to examine whether there were more messages sent about facilities with relatively poor performance at baseline, and find that this does not appear to be the case.

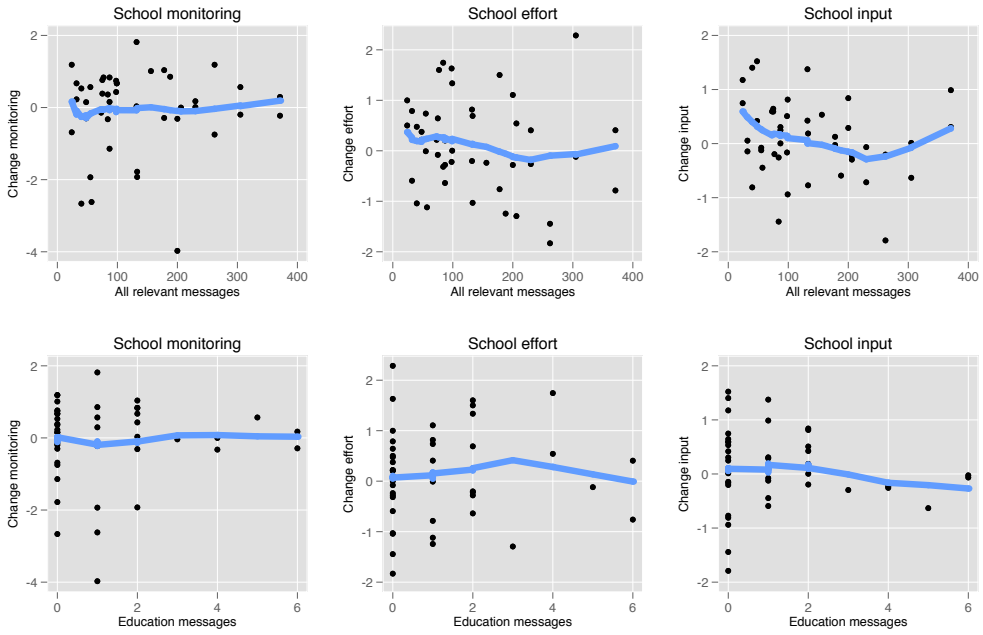

Figure 14: **Education**: change from baseline to midline (short-term) against messages sent

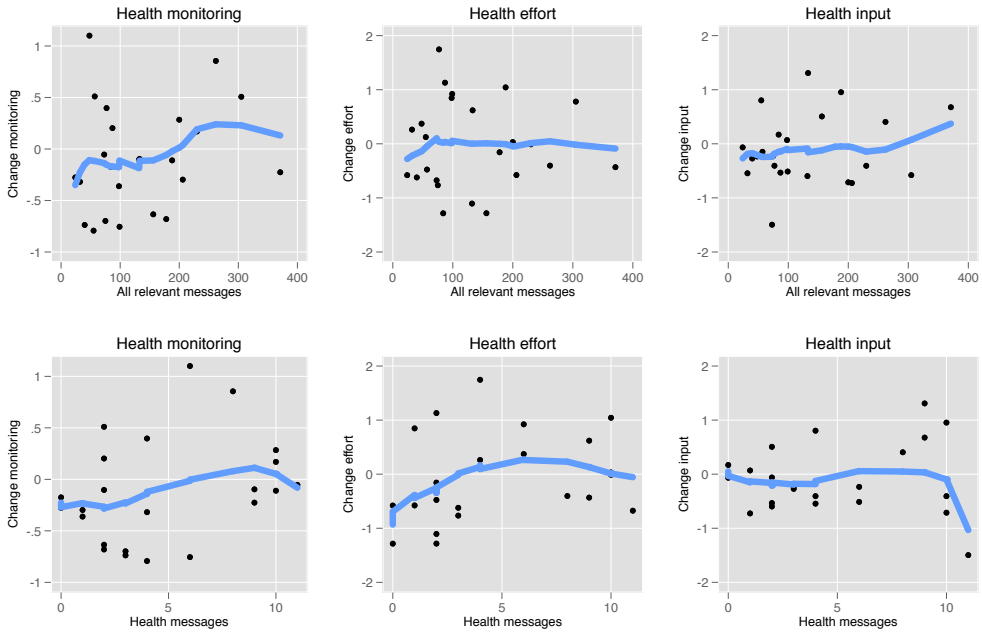

Figure 15: **Health**: change from baseline to midline (short-term) against messages sent

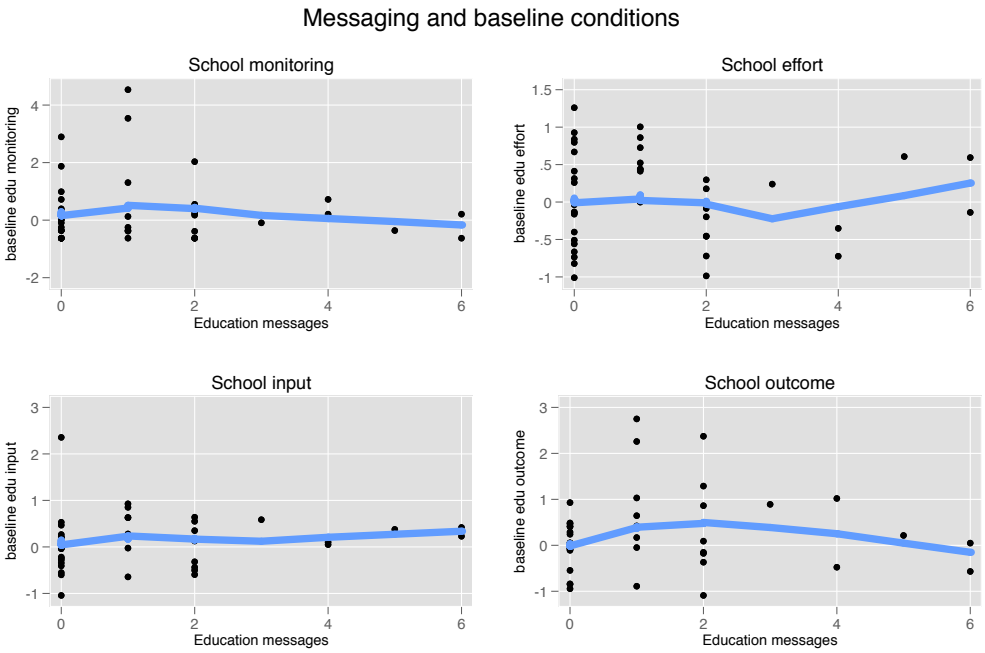

Figure 16: **Education**: outcome indices at baseline against messages sent. Figure shows that places that were worse off to begin with did not necessarily send a larger number of messages via U-Bridge.

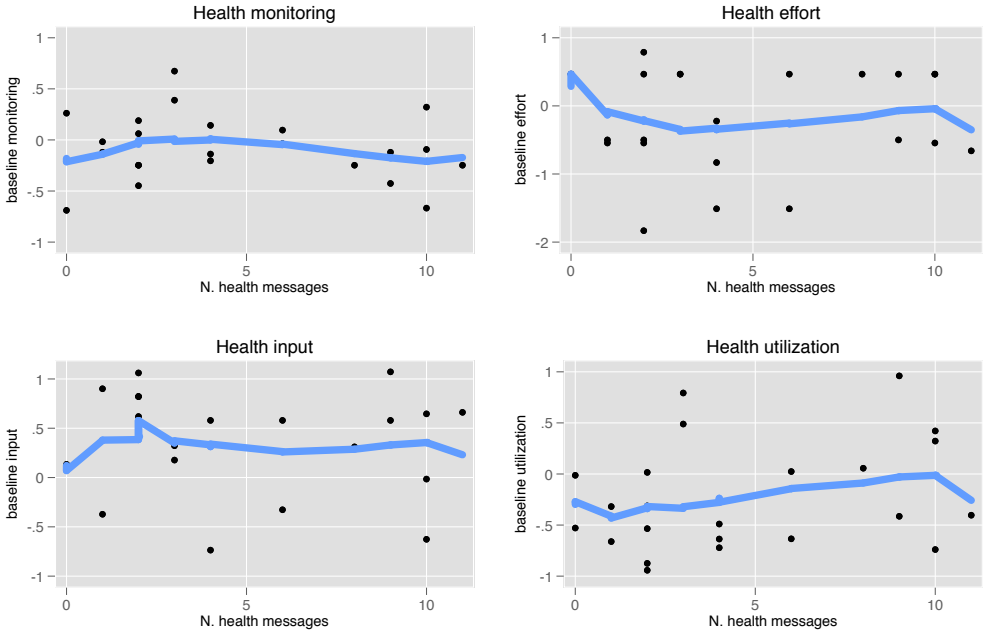

Figure 17: **Health**: outcome indices at baseline against messages sent. Figure shows that places that were worse off to begin with did not necessarily send a larger number of messages via U-Bridge

8 Heterogenous effects by distance to district HQs

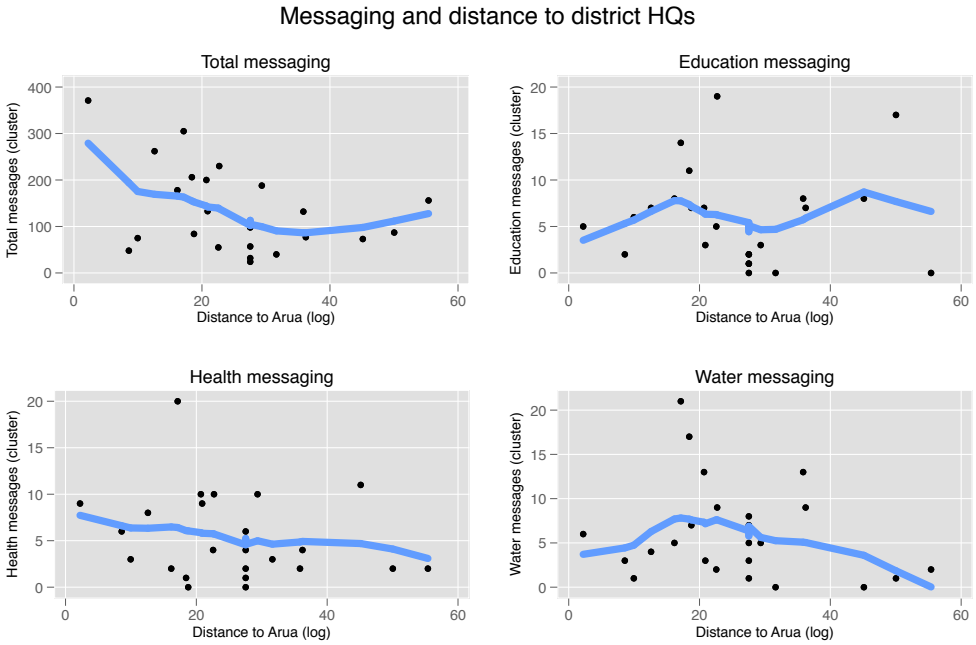

Figure 18: **Cluster-level:** SMS messaging by distance to Arua

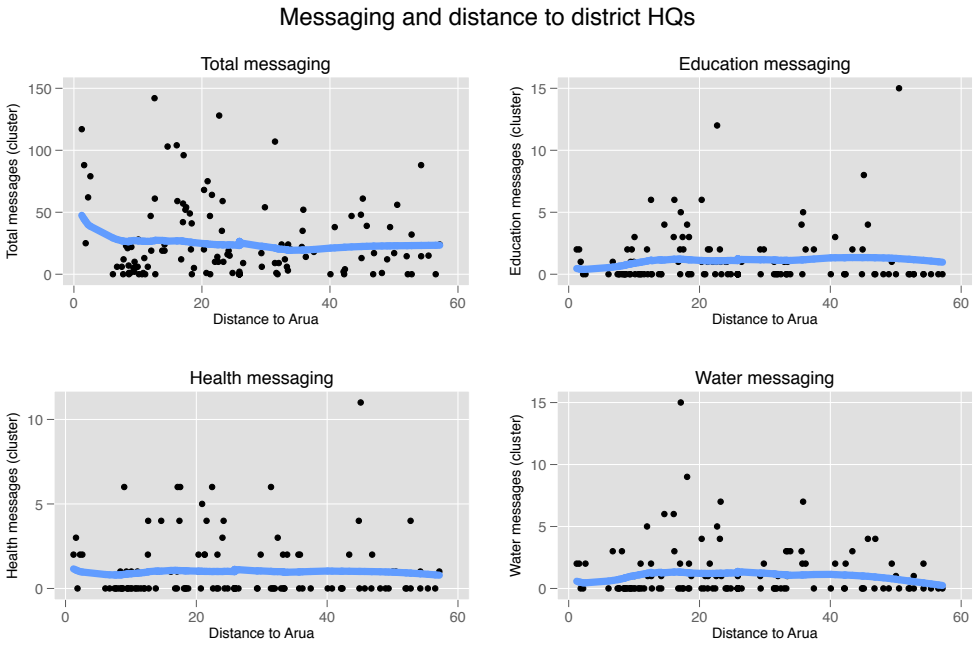

Figure 19: **Village-level:** SMS messaging by distance to Arua

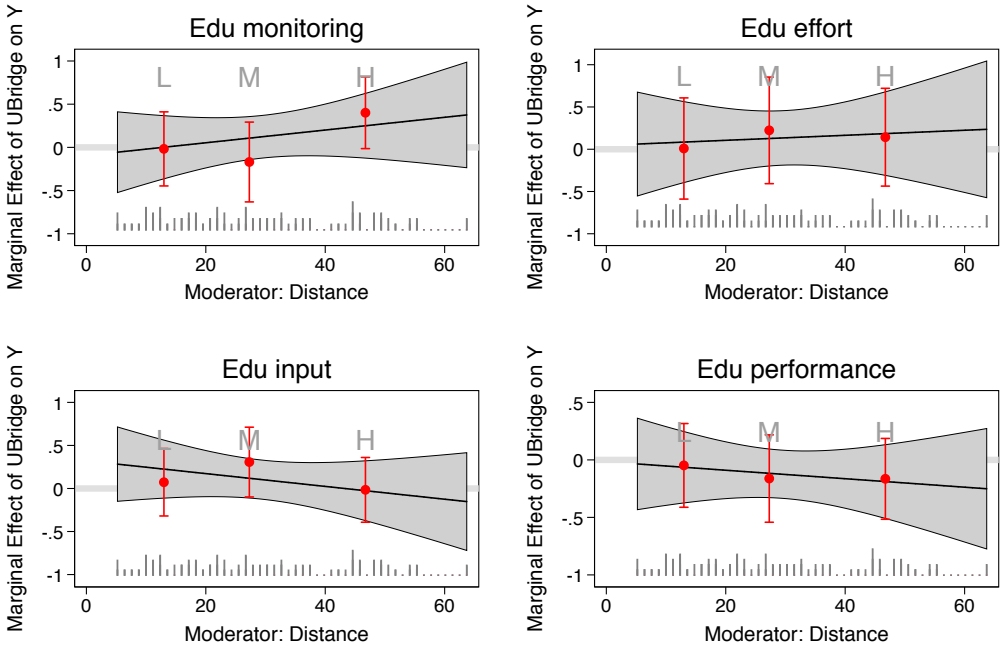

Figure 20: **Education services**: Heterogenous treatment effect by distance to Arua

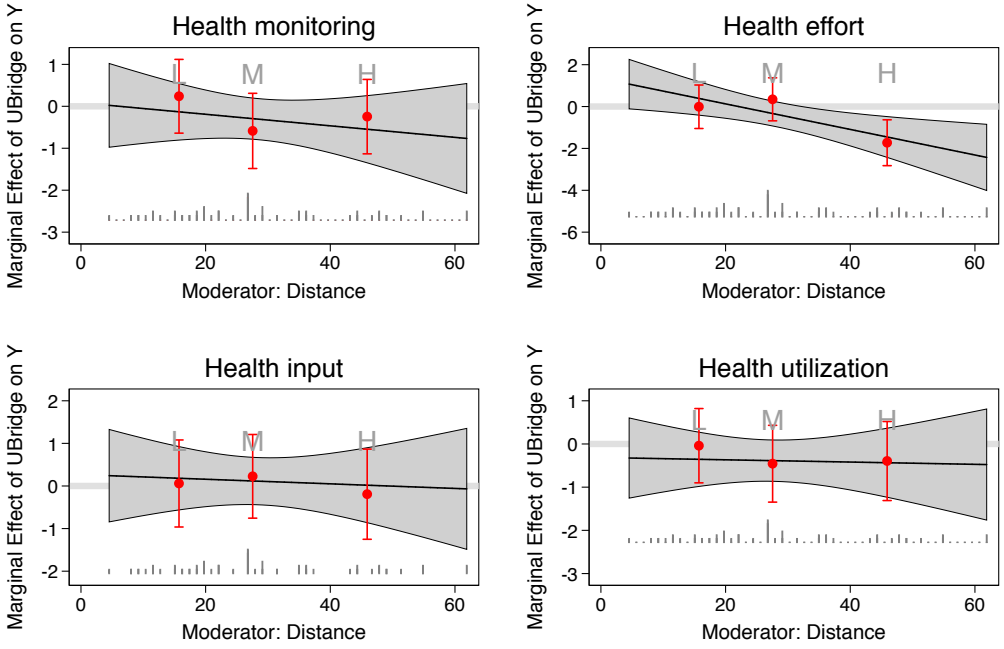

Figure 21: **Health services**: Heterogenous treatment effect by distance to Arua

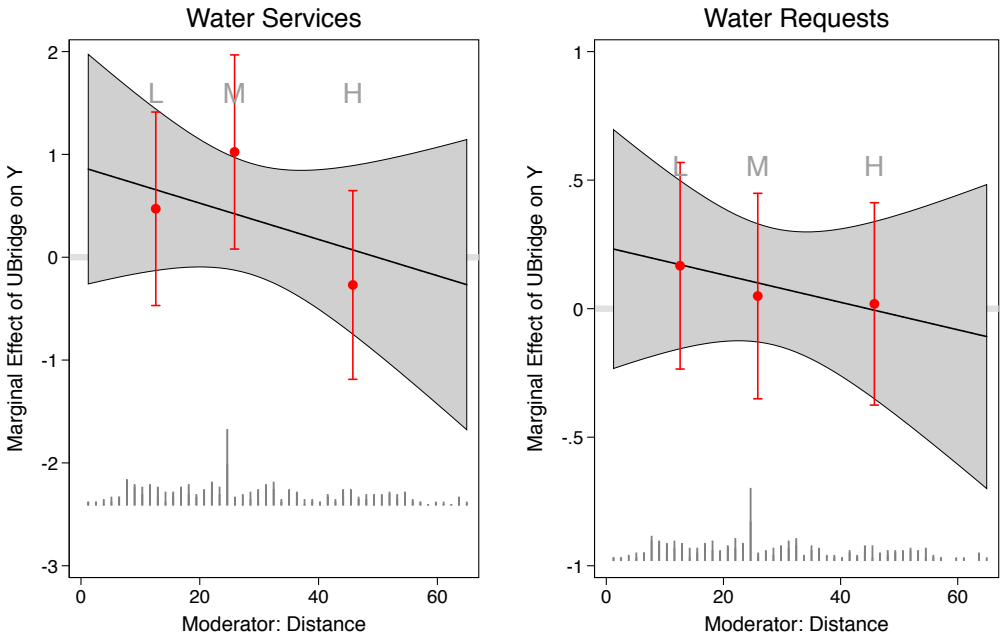

Figure 22: **Water parts & services:** Heterogenous treatment effect by distance to Arua

9 Heterogenous effects by community's wealth

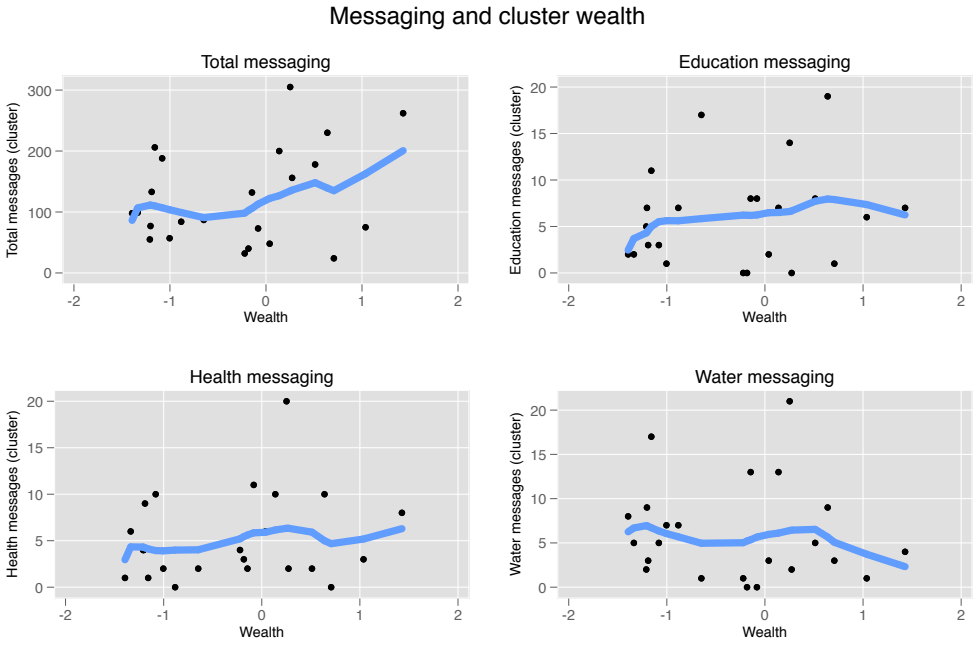

Figure 23: **Cluster-level:** SMS messaging by community's wealth

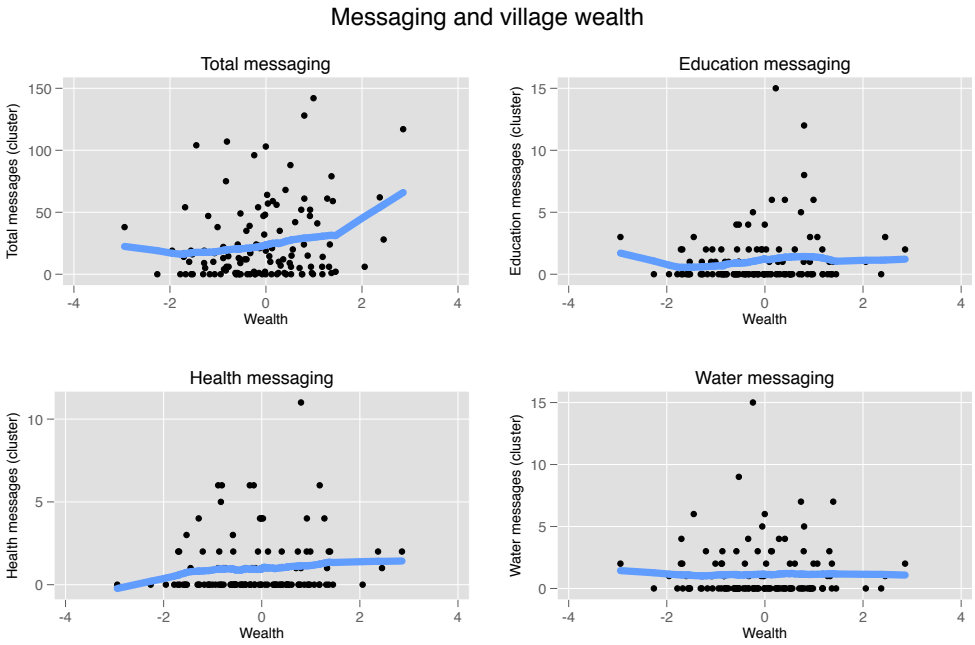

Figure 24: **Cluster-level:** SMS messaging by community's wealth

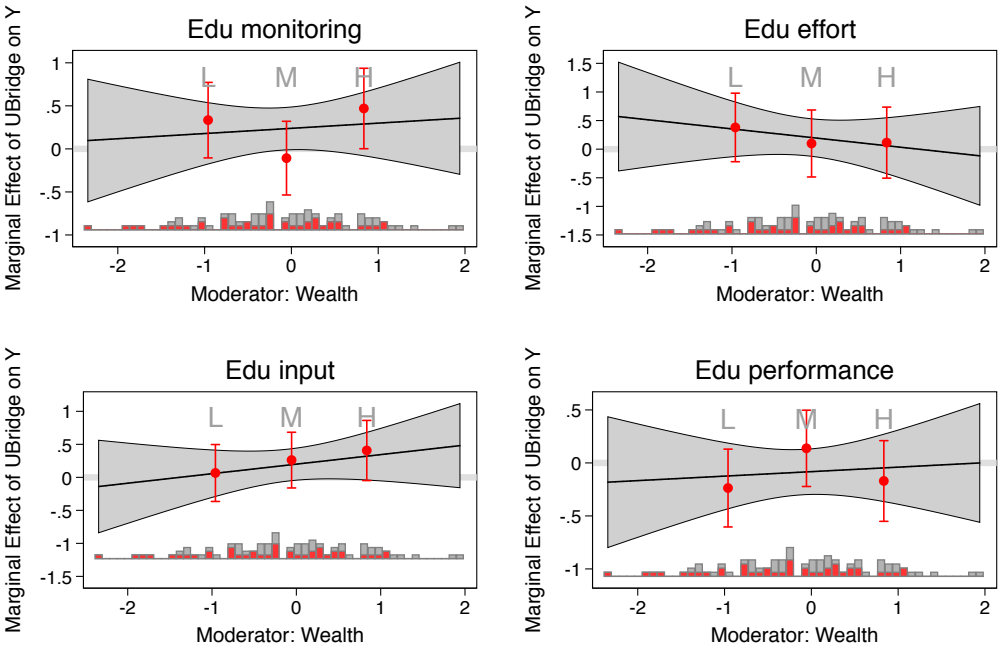

Figure 25: **Education services**: Heterogenous treatment effect by village wealth; lower values are poorer villages

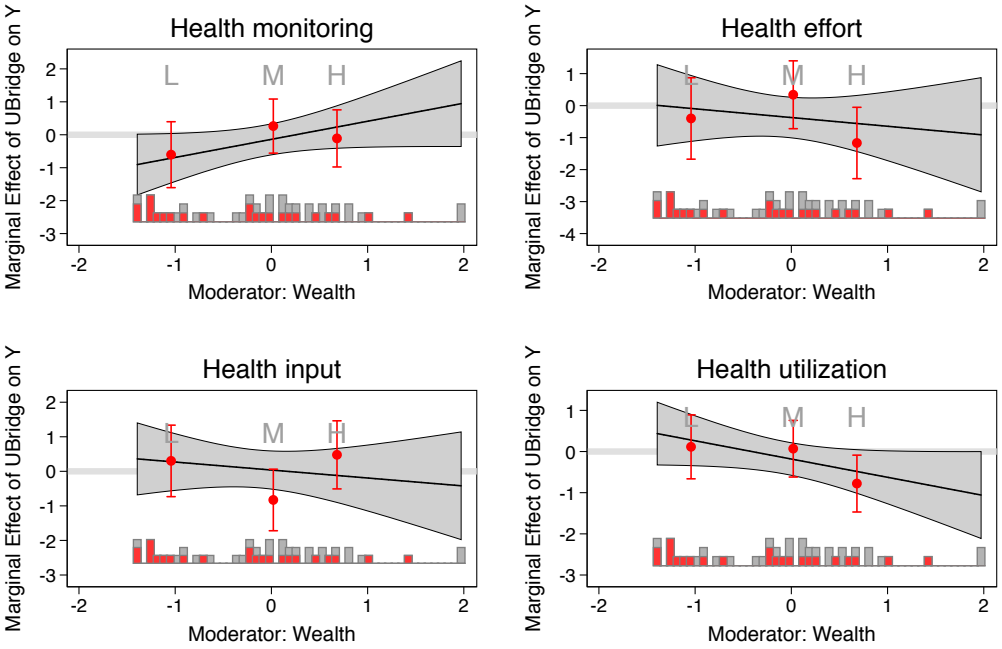

Figure 26: **Health services**: Heterogenous treatment effect by cluster wealth; lower values are poorer clusters

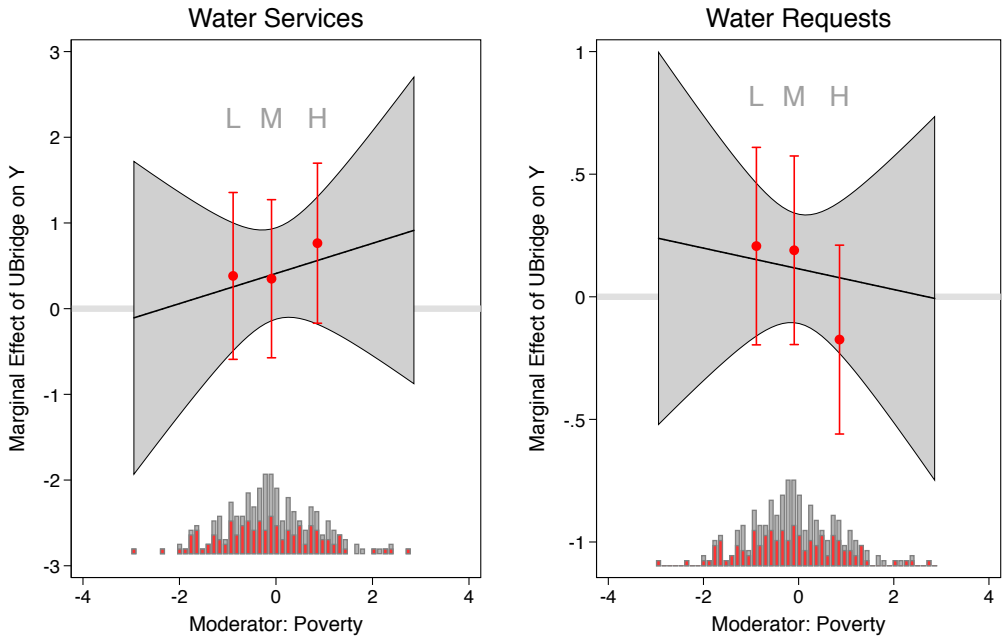

Figure 27: **Water village requests:** Heterogenous treatment effect by poverty

10 Effects on Elections

Finally, we investigate whether the U-Bridge program affected election outcomes. Specifically, this analysis explores the possibility of adverse effects due to the relatively low satisfaction that U-Bridge generated. The program was conducted in the two-year period leading up to the 2016 general elections in Uganda. We examine three sets of outcomes. First, the vote share of the incumbent district chairperson, who is the highest-level elected political leader in the district local government. Second, the margin of victory of the incumbent over the challenger with the second largest vote share. Third, turnout in the elections for local government. As shown in Table 19, we do not find the program had a significant effect on any of the three election outcomes we examine.

TABLE 19: *Treatment effect on election outcomes*

	Incumbent vote share		Margin of victory		Turnout	
	(1)	(2)	(3)	(4)	(5)	(6)
	1	2	1	2	1	2
Treatment	0.036	0.040	0.071	0.080	-0.025	-0.023
	(0.047)	(0.048)	(0.091)	(0.093)	(0.030)	(0.032)
Constant	0.557***	0.556***	0.209*	0.202*	0.323***	0.324***
	(0.043)	(0.045)	(0.089)	(0.092)	(0.031)	(0.028)
Controls		X		X		X
N	237	237	237	237	237	237

Standard errors in parentheses. Models with controls include only unbalanced covariates.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

References

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103 (484): 1481–1495.

Kling, Jeffrey R, Jeffrey B Liebman, and Lawrence F Katz. 2007. "Experimental Analysis of Neighborhood Effects." *Econometrica* 75 (1): 83–119.