Advanced Econometrics II

Assignment 1

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March 19, 2023

Part 1: Design and Methods

A. Describe the specific experimental design. On what level is the treatment assigned? Who serves as a control/comparison group?

The experiment was conducted in southern Busia in western Kenya. The whole project included 75 project schools consisting of nearly all rural primary schools in this area and almost 30,000 pupils between the ages of six to eighteen.
In 1988, the schools were divided into three groups of twenty-five schools each randomly. Group 1 received deworming treatment in both 1998 and 1999; Group 2 received treatment in 1999, and Group 3 did not receive treatment until 2001.
The treatment is assigned on the school level.
In 1998, Group 1 schools were treatment schools, while Group 2 and 3 were control schools. In 1999, Group 1 and Group 2 were treatment schools, and Group 3 schools were control schools.

B. How does the paper estimate the between-school externalities?

To compare the treatment and comparison group, the paper can estimate the overall effect of the deworming treatment. The overall effect includes the direct effect, the within-school externality, and the cross-school externality. Because the randomization, there is variation in the local density of treatment schools. Thus, the paper uses the local density of treatment schools and pupils as variables to estimate the cross-school externality.

C. Why can't the authors examine the within-school externalities causally? How do they measure the effects of within-school externalities instead?

Because the treatment assignment is on school level, and thus it is impossible to decompose the direct effect and within-school externality experimentally.
They measure the within-school externality with the data of the pupils who did not attend school when conducting treatment. The group of pupils who did not attend school in G1 and G2 have similar background variables, and the difference is that the former received the within-school externality between 1998 and 1999. Thus the within-school externality can be estimated by comparing such two groups of pupils i 1999.

D. Explain how the models in equation (1) and (3) (pages 175 and 182, respectively) help us to estimate the desired effects of the deworming program on the 1) treated pupils, 2) non-treated pupils within the same school, and 3) non-treated pupils in surrounding schools. Explain briefly how to read the respective coefficients.

Equation (1) decomposes the direct effect, within-school externality, and cross-school externality.β_1 and β_2 captures the direct effect plus within-school externality of the first and the second year $\sum(\gamma_d \bar{N}^T_{dit})$captures the cross-school externality.u_i is the school effects.
Equation (3) further decomposes the within-school externality and the direct effect. the β_1 captures the with-school externality and $b_1 + b_2$ captures the direct effects.

Part 2: Data Analysis

Subpart 1: Replicating part of Table I

Subpart 2: Replicating Table V

Table 1: 1998 VERAGE PUPIL AND SCHOOL CHARACTERISTICS, PRE-TREATMENT

	Group 1	Group 2	Group 3	Group 1 - Group 3	Group 2 - Group 3
Panel A: Pre-school to Grade 8					
Male	0.53	0.51	0.52	0.01	-0.01
				(0.01)	(0.02)
Proportion girls 13 years, and all boys	0.83	0.84	0.83	0.00	0.01
				(0.01)	(0.01)
Grade proression (= Grade - (Age -6))	-1.98	-1.84	-1.99	0.01	0.16
				(0.08)	(0.10)
Year of birth	1986.20	1986.61	1985.80	0.40**	0.81***
				(0.16)	(0.17)
Panel B: Grades 3 to 8					
Attendance recorded in school registers (during the four weeks prior to the pupil survey)	0.97	0.96	0.97	0.00	-0.01**
				(0.00)	(0.00)
Blood in stool (self-reported)	0.26	0.23	0.19	0.07**	0.04
				(0.03)	(0.03)
Sick often (self-reported)	0.07	0.06	0.06	0.01	0.01
				(0.01)	(0.01)
Clean (observed by field workers)	0.41	0.43	0.47	-0.06**	-0.04
				(0.03)	(0.04)
Panel C: School characteristics					
Distance to Lake Victoria	10.03	9.92	9.46	0.89	-0.46
				(1.68)	(2.03)
Pupil population	392.72	403.80	375.88	17.92	148.32*
				(43.70)	(75.51)
School latrines per pupil	0.01	0.01	0.01	0.00	0.00
				(0.00)	(0.00)
Proportion moderate-heavy infections in zone	0.37	0.37	0.36	0.01	0.01
				(0.03)	(0.03)
Group 1 pupils within 3 km	461.06	408.29	344.51	116.55	63.78
				(119.47)	(114.00)
Group 1 pupils within 3-6 km	844.52	652.03	869.65	-25.14	-217.62*
				(155.50)	(124.85)
Total primary school pupils within 3 km	1229.06	1364.26	1151.87	77.19	212.39
				(202.17)	(201.07)
Total primary school pupils within 3-6 km	2370.65	2324.16	2401.75	-31.10	-77.59
				(215.77)	(197.48)

Table 2: JANUARY TO MARCH 1999, HEALTH AND HEALTH BEHAVIOR DIFFERENCES BETWEEN GROUP 1 (1998 TREATMENT) AND GROUP 2 (1998 COMPARISON) SCHOOLS

	Group 1	Group 2	Group 1 - Group 2
Panel A: Helminth Infection Rates			
Any moderate-heavy infection, January-March 1998	0.38	-	-
Any moderate-heavy infection, 1999	0.27	0.52	-0.25*** (0.06)
Panel B: Other Nutritional and heath Outcomes			
Propotion anemic, 1999	0.02	0.04	-0.02** (0.01)
Panel C: Worm Prevention Behaviors			
Clean (observed by field worker), 1999	0.62	0.66	-0.04*** (0.01)
Wears shoes (observed by field worker), 1999	0.25	0.29	-0.04*** (0.01)
Days contact with fresh water in past week (self-reported), 1999	2.40	2.35	0.04 (0.08)