Economics 270B
Ph.D. Development Economics

Professor Ted Miguel
Department of Economics
University of California, Berkeley

Lecture 6 – March 9, 2015

I. Overview of International Economic Development

Lecture 1: Understanding economic growth and development (1/26)

Lecture 1B: Persistence of historical institutions and shocks
(read during holiday week of 2/16)

Lecture 2: The Psychology of Poverty (2/2)

II. Human Capital in Economic Development

Lectures 3-4: Education (2/9, 2/23)

Lectures 5-7: Health and nutrition (3/2, 3/9, 3/16)

III. Political economy

Lectures 8-9: Democracy, Corruption and Development (3/30, 4/6)
(guest lectures by Prof. Fred Finan)

Lecture 10: Ethnic and Social Divisions (4/13)

Lectures 11-12: The Political Economy of Conflict (4/20, 4/27)

I. Overview of International Economic Development
Lecture 1: Understanding economic growth and development (1/26)
Lecture 1B: Persistence of historical institutions and shocks
(read during holiday week of 2/16)

Lecture 2: The Psychology of Poverty (2/2)

II. Human Capital in Economic Development
Lectures 3-4: Education (2/9, 2/23)
Lectures 5-7: Health and nutrition (3/2, 3/9, 3/16)

III. Political economy
Lectures 8-9: Democracy, Corruption and Development (3/30, 4/6)
(guest lectures by Prof. Fred Finan)

Lecture 10: Ethnic and Social Divisions (4/13)
Lectures 11-12: The Political Economy of Conflict (4/20, 4/27)

- Prerequisites: Graduate economic theory, econometrics

- Grading:
  Four referee reports – 40%
  → Report #3 on Morjaria paper due today (3/9)
  → Report #4 on Fetzer paper due next week (3/16)

  Two problem sets – 20%
  Research proposal – 30%
  Class participation – 10%
  No final exam

- All readings are available on bCourses

Any questions?

Lecture 6 outline

(1) Miguel and Kremer (2004) on deworming in children

(2) Kremer and Miguel (2007) on take-up

(3) Baird et al. (2015) on long-run impacts

(1) Miguel and Kremer (2004)

- Educational outcomes: school absenteeism (both from poor attendance and drop outs) fall by roughly 7 to 8 percentage points, or one quarter

  -- One of the most cost-effective ways to boost school participation estimated in less developed countries

- But test scores do not improve in either year 1 or year 2 (or in cognitive tests administered in year 3)

  -- The average test gain from deworming is **zero**. Why?

TABLE X

Academic Examinations, Individual-Level Data[a]

	Dependent variable: ICS Exam Score (normalized by standard)		
	(1)	(2)	(3) Among those who filled in the 1998 pupil survey
Average school participation (during the year of the exam)	0.63***		
	(0.07)		
First year as treatment school (T1)		−0.032	−0.030
		(0.046)	(0.049)
Second year as treatment school (T2)		0.001	0.009
		(0.073)	(0.081)
1996 District exam score, school average	0.74***	0.71***	0.75***
	(0.07)	(0.07)	(0.07)
Grade indicators, school assistance controls, and local pupil density controls	Yes	Yes	Yes
R^2	0.14	0.13	0.15
Root MSE	0.919	0.923	0.916
Number of observations	24958	24958	19072
Mean of dependent variable	0.020	0.020	0.039

(1) Miguel and Kremer (2004)

- Educational outcomes: school absenteeism (both from poor attendance and drop outs) fall by roughly 7 to 8 percentage points, or one quarter

  -- One of the most cost-effective ways to boost school participation estimated in less developed countries

- But test scores do not improve in either year 1 or year 2 (or in cognitive tests administered in year 3)

  -- The average test gain from deworming is **zero**. Why? increased congestion in the classroom; the quality of classroom learning is low; time lags; other explanations?

(1) Cost-benefit calculations

- Cost of this program: US$1.46 per pupil per year
- Cost of a larger-scale program in neighboring Tanzania: only US$0.49 per pupil per year

- Cost of health education component (classroom lessons, teacher training) was US$0.44 per pupil per year

- How do these costs compare to the later labor market effects? Discussed hypothetically in Miguel and Kremer (2004) and using follow-up data in Baird et al (2015).

(2) The Impact of Higher Drug Costs

- In 1998, 1999, 2000 deworming was given for free
- In 2001, parents in 25 randomly chosen Group 1 and Group 2 schools paid US$0.10-0.30 per child

(2) The Impact of Higher Drug Costs

- In 1998, 1999, 2000 deworming was given for free
- In 2001, parents in 25 randomly chosen Group 1 and Group 2 schools paid US$0.10-0.30 per child

- 2001 deworming take-up (Kremer and Miguel 2007):

  Free-treatment schools: 75%

  Cost-sharing schools: 18%

TABLE VII
The Impact of Cost-Sharing

	Dependent variable: Child took deworming drugs in 2001		
	(1)	(2)	(3)
Explanatory variables:			
Cost-sharing school indicator	−0.580***	−0.459***	−0.572***
	(0.054)	(0.122)	(0.080)
Cost-sharing *Respondent years of education		0.002	
		(0.007)	
Cost-sharing *Community group member		0.021	
		(0.072)	
Cost-sharing *Total number of children		−0.021	
		(0.016)	
Cost-sharing *Iron roof at home		−0.047	
		(0.064)	
Effective price of deworming per child(= cost/# household children in that school)			−0.001
			(0.002)
1/(# household children in that school)			−0.348***
			(0.066)
Social links, other controls	Yes	Yes	Yes
Number of observations (parents)	1,678	1,678	1,678
Mean of dependent variable	0.61	0.61	0.61

(2) The Impact of Higher Drug Costs

- In 1998, 1999, 2000 deworming was given for free
- In 2001, parents in 25 randomly chosen Group 1 and Group 2 schools paid US$0.10-0.30 per child

- 2001 deworming take-up (Kremer and Miguel 2007):

  Free-treatment schools: 75%

  Cost-sharing schools: 18%

  → Average household valuation for deworming drugs appears very low if few are willing to pay even these small amounts. Low valuation of child health? Or something else? (More on this next lecture…)

(2) Given returns, why is take-up not 100%?

- Possible explanations:

  (1) Low demand for better (child) health:

  -- Socio-cultural explanations / resistance to new technologies. Evidence from anthropologist Wenzel Geissler: “worms are our life”

  -- Side effects minor but salient (12% report vomiting or stomach ache). Little empirical support for this, though

  -- Agency issues within the household

(2) Given returns, why is take-up not 100%?

- **(2) Externalities / Free-riding**

  -- Private benefits are much smaller than social benefits

  -- Strong evidence people learned through their social network that the drugs were “not effective”

  → Households with more social contacts in “early treatment” schools were actually somewhat **less** likely to take deworming drugs. People learned to “free ride”

- Continued high levels of subsidies may be necessary to induce socially optimal levels of deworming

TABLE VI

DEWORMING HEALTH EXTERNALITIES WITHIN SCHOOLS, JANUARY TO MARCH 1999[a]

	Group 1, Treated in 1998	Group 1, Untreated in 1998	Group 2, Treated in 1999	Group 2, Untreated in 1999	(Group 1, Treated 1998) – (Group 2, Treated 1999)	(Group 1, Untreated 1998) – (Group 2, Untreated 1999)
Panel A: Selection into Treatment						
Any moderate-heavy infection, 1998	0.39	0.44	–	–	–	–
Proportion of 1998 parasitological sample tracked to 1999 sample[b]	0.36	0.36	–	–	–	–
Access to latrine at home, 1998	0.84	0.80	0.81	0.86	0.03	–0.06
					(0.04)	(0.05)
Grade progression (= Grade – (Age – 6)), 1998	–2.0	–1.8	–1.8	–1.8	-0.2^{**}	–0.0
					(0.1)	(0.2)
Weight-for-age (Z-score), 1998 (low scores denote undernutrition)	–1.58	–1.52	–1.57	–1.46	–0.01	–0.06
					(0.06)	(0.11)
Malaria/fever in past week (self-reported), 1998	0.37	0.41	0.40	0.39	–0.03	–0.01
					(0.04)	(0.06)
Clean (observed by field worker), 1998	0.53	0.59	0.60	0.66	–0.07	–0.07
					(0.05)	(0.10)
Panel B: Health Outcomes						
Girls <13 years, and all boys						
Any moderate-heavy infection, 1999	0.24	0.34	0.51	0.55	-0.27^{***}	-0.21^{**}
					(0.06)	(0.10)

(2) Estimating social effects (Kremer and Miguel 2007)

- Why do people take-up deworming?
- Cross-sectional correlations of social contacts and deworming take-up are potentially biased, if (unobservably) similar types of individuals are members of the same networks

  -- **Experimental variation** is induced here by the staggered phase-in of schools into deworming: “early treatment” (groups 1 and 2, receiving treatment starting in 1998 and 1999) and “late treatment” (group 3, 2001)

- Large differences between experimental and non-experimental estimates here, suggesting bias.

(2) Types of social effects (Kremer and Miguel 2007)

- Why might additional social contacts in early treatment schools affect deworming take-up?

  -- Learning about benefits (positive or **negative** effect)

  -- Learning by doing (positive)

  -- Infection externalities (**negative**, small empirically among social contacts)

  -- Imitation effects (positive)

  -- Others?

(2) Types of social effects (Kremer and Miguel 2007)

- Why might additional social contacts in early treatment schools affect deworming take-up?

  -- Learning about benefits (positive or negative effect)

  -- Learning by doing (positive)

  -- Infection externalities (negative, small empirically among social contacts)

  -- Imitation effects (positive)

  -- Others?

(2) Types of social effects (Kremer and Miguel 2007)

- Why might additional social contacts in early treatment schools affect deworming take-up?

  -- Learning about benefits (positive or negative effect)

  -- Learning by doing (positive)

  -- Infection externalities (negative, small empirically among social contacts)

  -- Imitation effects (positive)

  -- Others?

- We develop a stylized model to describes these effects

  -- A negative empirical effect seems most likely due to learning about benefits. Those with the **highest priors** about positive impacts might update downward the most.

TABLE I
Summary Statistics

	Mean	Std dev.	Obs.
Panel A: Parent social links (Round 1 and Round 2 data)			
Total direct (first-order) links	10.2	3.4	1,678
With children in own school	4.4	2.8	1,678
With children not in Group 1, 2, or 3 schools	3.0	2.4	1,678
With children in Group 1, 2, 3 schools—not own school	2.8	2.4	1,678
With children in Group 1, 2 schools—not own school ("early treatment")	1.9	2.0	1,678
With children in Group 1 schools—not own school	0.9	1.4	1,678
Proportion with children in early treatment schools	0.66	0.37	1,358

TABLE III

NONEXPERIMENTAL SOCIAL EFFECT ESTIMATES (GROUPS 2 AND 3)

	Dependent variable: Child took deworming drugs in 2001		
	(1)	(2)	(3)
Explanatory variables:			
Proportion deworming drug take-up in 2001, respondent's own school (not including respondent)	0.852*** (0.107)		
# parent links with children in respondent's own school whose children received deworming		0.016 (0.011)	
# parent links with children in early treatment schools whose children received deworming and had "good effects"			0.004 (0.025)
# parent links with children in early treatment schools whose children received deworming and had "side effects"			−0.152* (0.080)
# parent links with children in early treatment schools whose children received deworming and respondent does not know effects			0.003 (0.049)
# parent links with children in early treatment schools whose children did not receive deworming			−0.006 (0.055)
# parent links with children in early treatment schools, respondent does not know whether they received deworming			−0.010
Total social link controls, socio-economic controls	Yes	Yes	Yes
Number of observations (parents)	1,678	886	886
Mean of dependent variable	0.61	0.56	0.56

TABLE IV

EXPERIMENTAL SOCIAL EFFECT ESTIMATES

	Dependent variable: Child took deworming drugs in 2001				
	(1)	(2)	(3)	(4)	(5)
Explanatory variables:					
# parent links with children in early treatment schools (Groups 1 and 2, not own school)	−0.031**	−0.040**			−0.002
	(0.014)	(0.017)			(0.018)
# parent links with children in early treatment schools * Group 2 school indicator		0.017			
		(0.029)			
Proportion direct (first-order) parent links with children in early treatment schools			−0.098**		
			(0.045)		
# parent links with children in early treatment schools, with whom respondent speaks at least twice/week				−0.030**	
				(0.016)	
# parent links with children in early treatment schools, with whom respondent speaks less than twice/week				−0.033	
				(0.033)	
# parent links with children in Group 1, 2, or 3 schools, not own school, with whom respondent speaks at least twice/week				0.008	
				(0.012)	
# parent links with children in Group 1, 2, or 3 schools, not own school, with whom respondent speaks less than twice/week				0.026	
				(0.027)	
# parent links with children in early treatment schools * Respondent years of education					−0.0062*
					(0.0032)
# parent links with children in Group 1, 2, or 3 schools, not own school	0.013	0.012	−0.006		−0.014
	(0.011)	(0.017)	(0.009)		(0.014)
# parent links with children not in Group 1, 2, or 3 schools	−0.007	−0.008	−0.005	−0.007	−0.008
	(0.007)	(0.009)	(0.007)	(0.007)	(0.011)
# parent links, total	0.019***	0.029***	0.021***	0.018***	0.013
	(0.005)	(0.007)	(0.007)	(0.005)	(0.008)

TABLE VI

EFFECTS ON DEWORMING ATTITUDES AND KNOWLEDGE

	Estimate on # parent links with children in early treatment schools	Estimate on # parent links with children in early treatment schools whose children received deworming	Estimate on # parent links with children in early treatment schools with whom respondent spoke about deworming	Mean dep. var.
	Experimental	Nonexperimental	Nonexperimental	
Dependent variable:				
Panel A: attitudes				
Parent thinks deworming drugs "not effective"	0.017**	0.009	0.009**	0.12
	(0.007)	(0.009)	(0.004)	
Parent thinks deworming drugs "very effective"	−0.007	0.042**	0.040***	0.43
	(0.010)	(0.013)	(0.007)	
Parent thinks deworming drugs have "side effects"	0.000	0.004	0.003*	0.04
	(0.003)	(0.003)	(0.002)	
Parent thinks worms and schisto. "very bad" for child health	−0.001	0.001	−0.006*	0.92
	(0.006)	(0.008)	(0.003)	
Panel B: knowledge				
Parent "knows about ICS deworming program"	0.004	0.054***	0.055***	0.70
	(0.011)	(0.014)	(0.011)	
Parent "knows about the effects of worms and schistosomiasis"	−0.001	0.055***	0.039***	0.68
	(0.013)	(0.014)	(0.009)	
Number of infection symptoms parents able to name (0–10)	−0.029	0.078***	0.076***	1.8
	(0.025)	(0.029)	(0.015)	

(2) Boosting take-up of a new health technology

- Learning through social networks alone will *not* lead this technology to spread widely: people learn not to adopt

  -- Cost-sharing massively dampens demand

  -- In other results, neither an “encouragement” / commitment intervention nor health education lead to higher take-up of deworming or other changes in worm prevention behavior (e.g., cleanliness, wearing sandals)

(2) Boosting take-up of a new health technology

- Learning through social networks alone will *not* lead this technology to spread widely: people learn not to adopt

  -- Cost-sharing massively dampens demand

  -- In other results, neither an “encouragement” / commitment intervention nor health education lead to higher take-up of deworming or other changes in worm prevention behavior (e.g., cleanliness, wearing sandals)

- The punchline: multiple approaches to achieve low-cost “sustainable” increases in deworming take-up failed in rural Kenya. **Continued full subsidies may be necessary** to boost take-up in the presence of large externalities, as implied by public economics theory

(3) Baird et al. (2015)

- What are the long-run impacts of child health gains?
- Use deworming in Kenya as a useful study setting

- Challenging issue to explore empirically due to limited examples of experimental or quasi-experimental variation in health status, AND extended longitudinal / panel datasets following children into adulthood

- Important intellectual issue across many disciplines, and key for public spending allocations

(3) Deworming and schooling

- **Other work** shows large deworming impacts.
- Bleakley (2007, 2010): deworming in the 1910-1920's U.S. South increased school enrollment (6 to 10 pp), attendance (13 to 16 pp), adult income (17%).

  → Estimates deworming would boost income 24% at current African infection levels.

- Broader externalities in the Kenyan study area: Ozier (2014) finds cognitive test gains of 0.3 s.d. (equivalent to half a school grade) on achievement tests and Ravens matrices ten years later, for those who were infants in the deworming treatment communities.
- Croke (2014) finds impacts 7-8 years later in Uganda

(3) Baird et al. (2015)

- Grossman (1972): seminal model of health capital. Health investments expand endowment of “healthy time”

- Bleakley (2010): health investments expand education (work) if they increase relative return to education (work)

(3) Baird et al. (2015)

- Grossman (1972): seminal model of health capital. Health investments expand endowment of “healthy time”

- Bleakley (2010): health investments expand education (work) if they increase relative return to education (work)
- **Pitt, Rosenzweig, Hassan (2012)**: in “brawn-based” economies, health investment has gendered effects:
  - Men specialize in occupations requiring brawn and therefore increase education less than females
  - Women specialize in other occupations that require increased educational investment
- This may be relevant: there are large gender differences in labor market and family circumstances in our setting

(3) Assessing long-run impacts

- **Kenya Life Panel Survey (1998-2009), KLPS**
- 7,530 (of roughly 33,000) pupils tracked. By 2007-2009 survey round, most 19-26 years old.
- Two-phase (regular, intensive) tracking, like MTO:

  Effective tracking rate (ETR) =RTR + (1–RTR)*ITR

  =0.65 + (1–0.65)*0.62=**0.86**

- Groups 1 and 2 are defined as "treatment"
  - Measure the impact of 2-3 years additional treatment
  - Groups are well-balanced along baseline demographic and educational characteristics. Survey tracking rates also not significantly different across treatment, control.

(3) Estimation Strategy

- Following Miguel and Kremer (2004):

$$Y_{ij,2007\text{-}09} = a + bT_j + c_1 P_j^T + c_2 N_j + X_{ij,0}'d + e_{ij,2007\text{-}09}$$

Y: outcome (e.g., hours worked); T: treatment indicator
X: variables in randomization, stratification, survey waves
P^T: proportion of treatment pupils within 6 km

N: total number of primary school pupils within 6 km

- Following Pitt, Rosenzweig and Hassan (2012), we also examine impacts separately by gender

(3) Impacts on Health

- Better self-reported health, 4.0 pp (s.e. 1.8)
  - Lower miscarriage rate among females ($P<0.05$)
  - No miscarriage effect for the female partners of sample males, suggesting effects are driven by health gains and not income gains alone

(3) Baird et al. (2015)

Table 1: Deworming impacts on health

	Coefficient estimate (s.e.) on deworming treatment indicator		
	All	Male	Female
Moderate-heavy worm infections in 2001	-0.166***	-0.191***	-0.144***
	(0.026)	(0.028)	(0.032)
Self-reported health "very good" indicator at KLPS-2	0.040**	0.023	0.051**
	(0.018)	(0.025)	(0.025)
Height at KLPS-2	-0.109	0.072	-0.301
	(0.271)	(0.382)	(0.387)
Body mass index (BMI) at KLPS-2	0.022	-0.012	0.058
	(0.045)	(0.060)	(0.066)
Miscarriage indicator (obs. at pregnancy level) at KLPS-2 (for females – themselves; for males – their partners)	-0.015*	0.000	-0.028**
	(0.008)	(0.004)	(0.013)

(3) Impacts on Education

- Moderate overall gains, but concentrated among females:
  - Females are enrolled in school more years, and **more likely to attend secondary school** (9.0 pp, s.e. 3.8)
  - Females more likely to pass the secondary school entrance exam (KCPE), reduce the gender gap with males by half
  - Primary school gains among males, and positive but smaller secondary school estimated effects

(3) Baird et al. (2015)

Table 2: Deworming impacts on education

	Coefficient estimate (s.e.) on deworming treatment indicator		
	All	Male	Female
Total years enrolled in school, 1998-2007	0.294**	0.150	0.354**
	(0.145)	(0.166)	(0.179)
Total years enrolled in primary school, 1998-2007	0.155**	0.238**	0.026
	(0.075)	(0.102)	(0.098)
Repetition of at least one grade (1998-2007) indicator	0.063***	0.072***	0.053*
	(0.018)	(0.025)	(0.030)
Grades of schooling attained by 2007	0.150	-0.030	0.261
	(0.143)	(0.148)	(0.171)
Attended secondary school indicator	0.030	-0.035	0.090**
	(0.035)	(0.038)	(0.038)
Passed secondary school entrance exam during 1998-2007 indicator	0.050	0.004	0.096**
	(0.031)	(0.030)	(0.040)
Out-of-school (at 2007-09 survey) indicator	-0.006	0.022	-0.029
	(0.022)	(0.030)	(0.026)

(3) Impacts on labor hours and occupation

- Among males, **deworming increased hours worked** (in the last week) by 3.5 hours, or 17% (P<0.05)
  - Work hours effects for women are smaller and not significant, more pronounced for out-of-school females

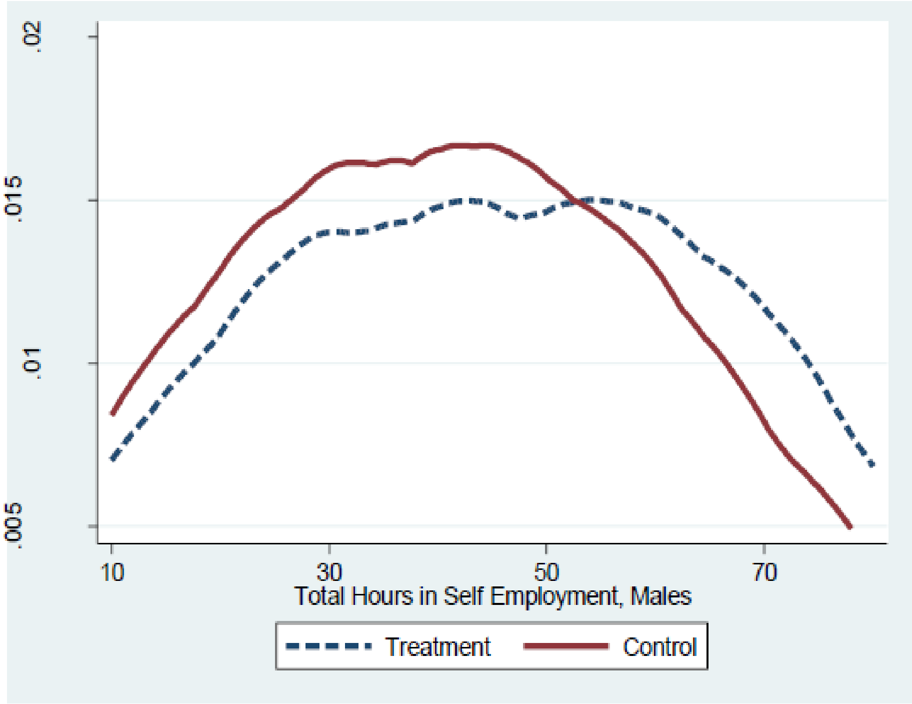
- Shift into higher paid, more physically demanding jobs.
  - **Men triple manufacturing employment** (P<0.01), from a low base of roughly 1% of the sample, and casual labor drops (P<0.05)
  - Both men and women significantly increase self-employment hours, 1.52 hours (s.e. 0.55)
  - Women reduce agricultural work hours, and shift to cash crops by 3.1 pp (s.e. 1.4) on a base of 1%

(3) Baird et al. (2015)

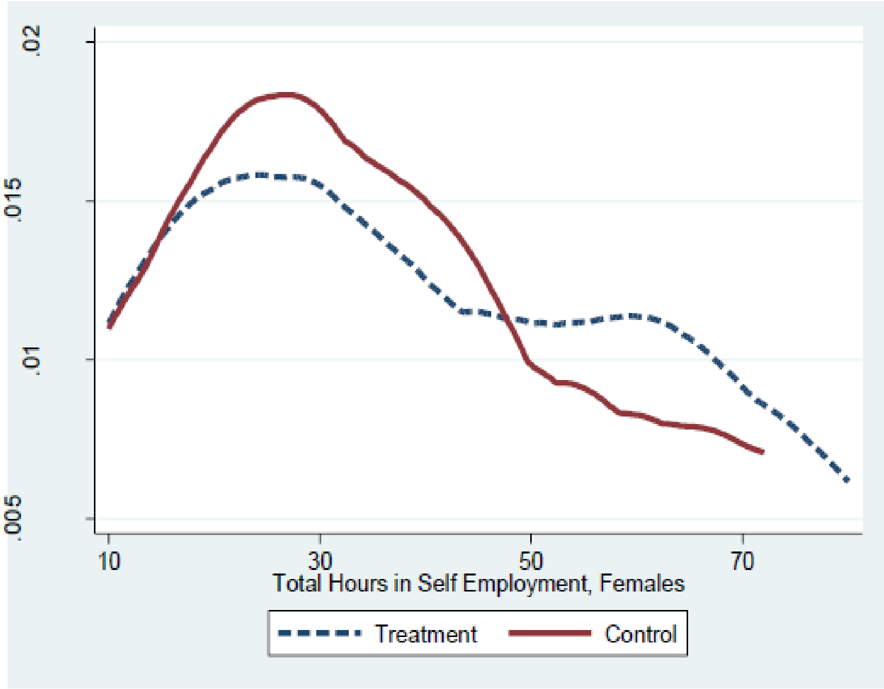
Table 3: Deworming impacts on labor hours and occupational choice

	Coefficient estimate (s.e.) on deworming treatment indicator			Coeff. est. (s.e.) externality term
	All	Male	Female	All
Panel A: Hours worked				
Hours worked in all sectors in last week, full sample	1.58 (1.04)	3.49** (1.42)	0.32 (1.36)	10.20 (7.80)
Hours worked in all sectors in last week, out-of-school sample	2.93** (1.29)	4.55** (1.95)	2.14 (1.49)	14.61 (9.16)
Panel B: Sectoral time allocation				
Hours worked in non-agricultural self-employment in last week, full sample	1.51*** (0.55)	1.35* (0.73)	1.86** (0.81)	6.00* (3.23)
Hours worked in agriculture in last week, full sample	-0.07 (0.42)	1.03* (0.55)	-1.27** (0.56)	-0.55 (3.41)
Hours worked in wage earning in last week, full sample	0.14 (0.84)	1.11 (1.32)	-0.27 (1.08)	4.74 (5.07)
Panel C: Occupational choice (full sample)				
Manufacturing job indicator	0.0110*** (0.0040)	0.0192** (0.0077)	0.0050 (0.0035)	0.0531** (0.0250)
Construction/casual labor job indicator	-0.0053** (0.0026)	-0.0031 (0.0030)	-0.0073 (0.0045)	-0.0196 (0.0154)
Domestic service job indicator	-0.0050 (0.0061)	0.0016 (0.0038)	-0.0134 (0.0129)	-0.0097 (0.0322)
Grows cash crop indicator	0.0104** (0.0051)	0.0032 (0.0044)	0.0187** (0.0090)	-0.0171 (0.0228)

(3) Baird et al. (2015)



(B)



M

F

(3) Impacts on other labor outcomes

- Treatment individuals eat **0.1 more meals** per day (P<0.01), and larger effects for males (nearly one more meal per week)
  - Evidence of positive externalities

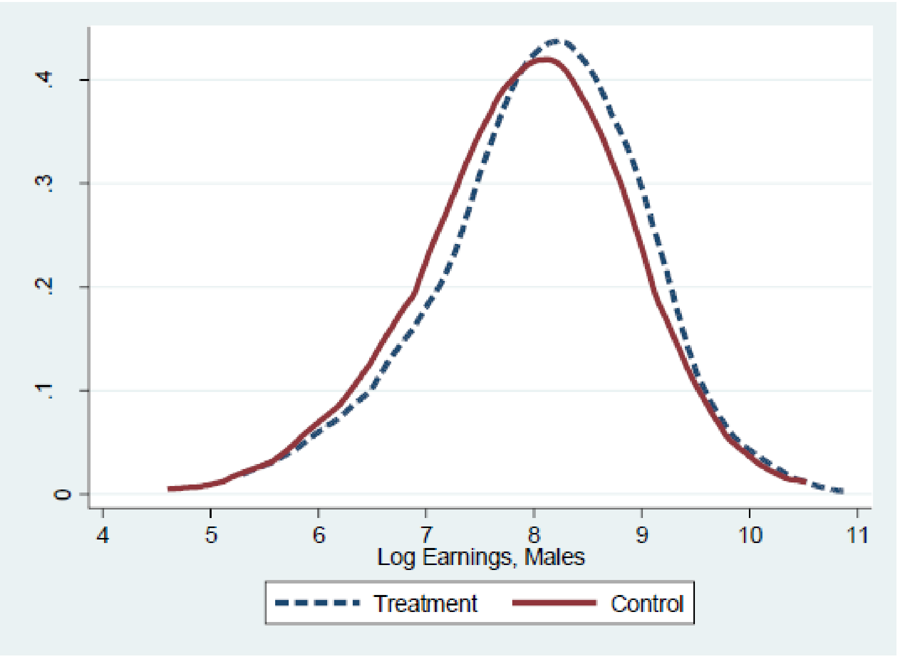
- Deworming led to **higher incomes** among wage earners.
  - Total earnings last month rise 27 log points (P<0.01).
  - Among those working regularly (with >10 hours per week), wages rise (P<0.10)
  - Oaxaca decomposition: occupational shifts (i.e., into manufacturing and out of casual labor) account for 75% of the earnings gains, a third of work hours gain
  - Some evidence of increases in self-employed profits

(3) Baird et al. (2015)

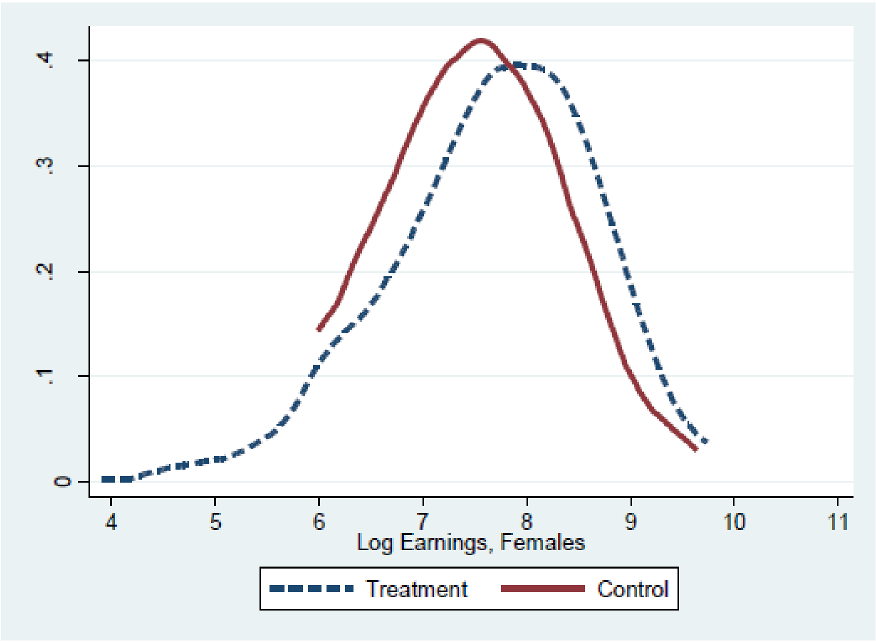
Table 4: Deworming impacts on living standards and labor earnings

	Coefficient estimate (s.e.) on deworming treatment indicator			Coeff. est. (s.e.) externality term
Panel A: Consumption	All	Male	Female	All
Number of meals eaten yesterday, full sample	0.095*** (0.029)	0.125*** (0.041)	0.051 (0.043)	0.415*** (0.124)
Number of meals eaten yesterday, out-of-school sample	0.102*** (0.029)	0.158*** (0.046)	0.037 (0.044)	0.542*** (0.168)
Panel B: Wage earnings (among wage earners)				
Ln(Total labor earnings), past month	0.269*** (0.085)	0.244** (0.109)	0.165 (0.175)	1.141 (0.869)
Ln(Wage = Total labor earnings / hours), past month, if ≥10 hours per week of work	0.197* (0.102)	0.181 (0.128)	0.225 (0.194)	0.378 (0.898)
Ln(Total labor earnings), most recent month worked since 2007	0.225*** (0.070)	0.221** (0.097)	0.178* (0.104)	0.941 (0.597)
Panel C: Non-agricultural self-employment outcomes (among non-agricultural self-employed)				
Total self-employed profits (self-reported) past month	384 (308)	111 (465)	250 (265)	-77 (1,646)
Total self-employed profits past month, top 5% trimmed	341* (177)	259 (309)	80 (219)	440 (1,256)
Total employees hired (excluding self)	0.416 (0.361)	0.245 (0.403)	0.603 (1.275)	-0.886 (2.547)

(3) Baird et al. (2015)



(D)



M

F

(3) Discussion of Baird et al (2015)

- Other estimation issues:
- **Multiple testing adjustment** (among variables in each "domain" of outcomes, i.e., by table) → most effects remain significant at 95% confidence, some at 90%
  - False discovery rate (FDR) (Anderson 2008)
- Exploit variation in exposure to deworming due to cost-sharing, cross-school externalities
  - Signs are as predicted (i.e., externalities same direction as direct effect, cost-sharing opposite) in nearly all cases (i.e., 24 of 28 for cost-sharing)
  - Pooled SUR analysis rejects the null of no effect

(3) Discussion of Baird et al (2015)

- **Childhood deworming in Kenya had large impacts** on adult hours worked, meal consumption, occupation and labor earnings a full decade after treatment.
  - Even if they occur after the “critical window” of early childhood and do not affect height (as in our case), health investments for children older than age 0-3 can still have large impacts on future living standards.

- Evidence that labor supply is often relatively low in poor economies (i.e., Fafchamps 1992)
  - Poor child health may explain some of the pattern

(3) Discussion of Baird et al (2015)

- Deworming subsidies have a high long-run social return
  - Social **internal rate of return** (IRR) a very high 32% (51% with externalities), annualized
  - Conservative in ignoring inherent value of health
  - Strong rationale for national school deworming campaigns like those carried out in Kenya since 2009
  - Other work examines public finance implications in terms of future tax revenue increases → deworming appears to “pay for itself” by a ratio of 12 to 1

- Similar effects may be relevant for other health interventions that have large labor supply impacts


RUSSIA
CANADA
KAZAKHSTAN
MONGOLIA
U.S.A.
PACIFIC OCEAN
ATLANTIC OCEAN
TURKEY
IRAN
CHINA
JAPAN
ALGERIA
LIBYA
EGYPT
SAUDI ARABIA
INDIA
MEXICO
SUDAN
NIGER
MALI
CHAD
NIGERIA
ETHIOPIA
COLOMBIA
KIRIBATI
INDIAN OCEAN
INDONESIA
PAPUA NEW GUINEA
BRAZIL
PERU
ANGOLA
ZAMBIA
BOLIVIA
AUSTRALIA
SOUTH AFRICA
ARGENTINA
The Hobo-Dyer Equal Area Projection
NEW ZEALAND
SOUTHERN OCEAN
ANTARCTICA

Next week

- For next week's lecture, please focus on Dupas (2014), Gong (2013) and Greenstone and Jack (2015).

- The fourth referee report is due next week (March 16th), on the Fetzer article.