Schooling, Learning, and Earnings: Effects of a 3-Year Conditional Cash Transfer Program in Nicaragua After 10 Years

IEN-Lacea, Washington DC Sept 11th, 2014

Tania Barham, University of Colorado-Boulder
Karen Macours, Paris School of Economics and INRA
John A. Maluccio, Middlebury College

IDB financed the program. This research is supported by IDB, NSF, and 3ie.

Motivation

- CCTs popular worldwide (>30 countries)
- Established evidence of short-term effects on education, health, nutrition and poverty
- Little known about longer-term effects
  - But important since long-term poverty reduction through human capital accumulation is a goal of CCTs
  - Mexican CCT:15-21 year old - increase in education, no effect on achievement, decreased labor market participation (Behrman, Parker, Todd 2009, 2011)
- Education policy more generally
  - Does increased schooling lead to increased learning and increased earnings?
    - Millennium Development Goals: led to increases enrollment but concern as to whether students are learning (Beatty & Pritchett, 2012; Filmer & Schady 2009, 2014)

Research Question

Does a CCT that led to increased schooling also lead to improved learning and higher earnings in the longer term?

Context:

- Poor rural Nicaragua
- Very low initial levels of education
- Short duration of program

Preview of Methodology

- Exploit randomized phase in of CCT: “early” and “late” treatment groups
  - Short-term results show significant schooling impact
- Select cohorts more likely to benefit from education component of CCT in early than late treatment group using eligibility rules and enrollment patterns
- Estimate differential effects 10 years after the start of the program
- Strong emphasis on tracking migrants throughout Nicaragua and Costa Rica
  - Reduce bias due to potential selective migration

Nicaraguan CCT program
Red de Protección Social (RPS)

- Fixed 3-year transfer period (no re-certification)
- Two types of transfers to household:
  - Education: children aged 7-13 and < grade 4 completed
    - Enrolled in school and attend 85% of the time
  - Food security transfer: *all* households receive
    - **Children <5:** regular preventative health visits
    - Mothers: attend health education workshops
- Social marketing on nutrition and education
- Transfer given to mothers every other month
- Size of transfer: ~18% pre-program household expenditures
- Conditions were enforced, take-up ~85%

Randomized Design

- Stratified randomized intervention at locality level
  - Stratified on a locality marginality index
    - 7 strata of 6 localities each
  - 42 localities in 6 rural municipalities
- Randomized phase-in of 42 localities (21 each group)
  - Early treatment group 2000-2003, then transfers stop
  - Late treatment group 2003-2005, then program ends

Identification Strategy

- Select cohort of children more likely to benefit from transfers in early treatment group than the late treatment group
- Exploit program/schooling features to determine a cohort with large potential differences in years the education transfers were received
  1. Randomized phase-in (timing)
  2. Age-specific conditionalities (7-13 years old)
  3. Fixed 3-year duration of transfers
  4. Age at which children are at risk of dropout

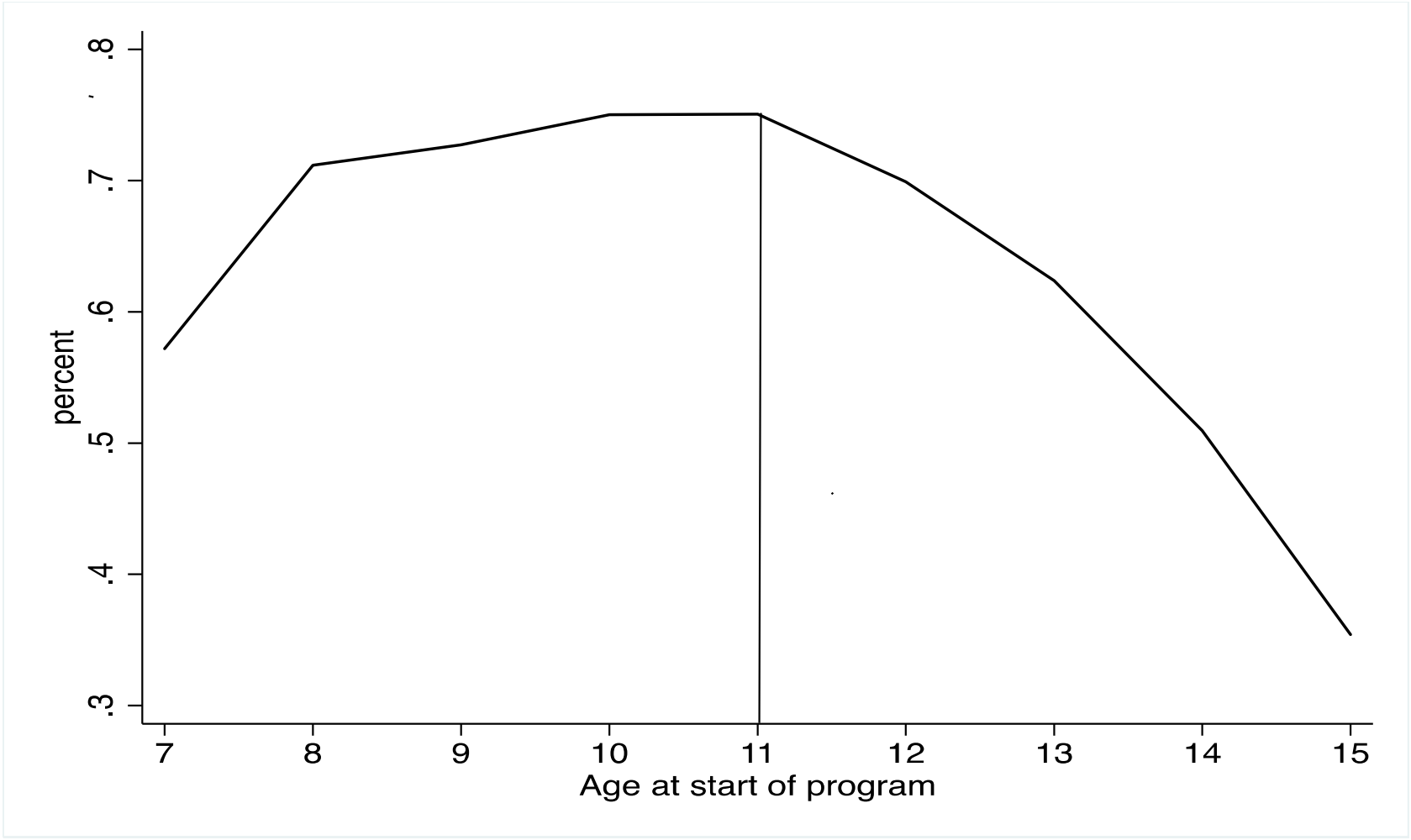
Years Eligible for Education Transfer

Focus on 9-12 year olds

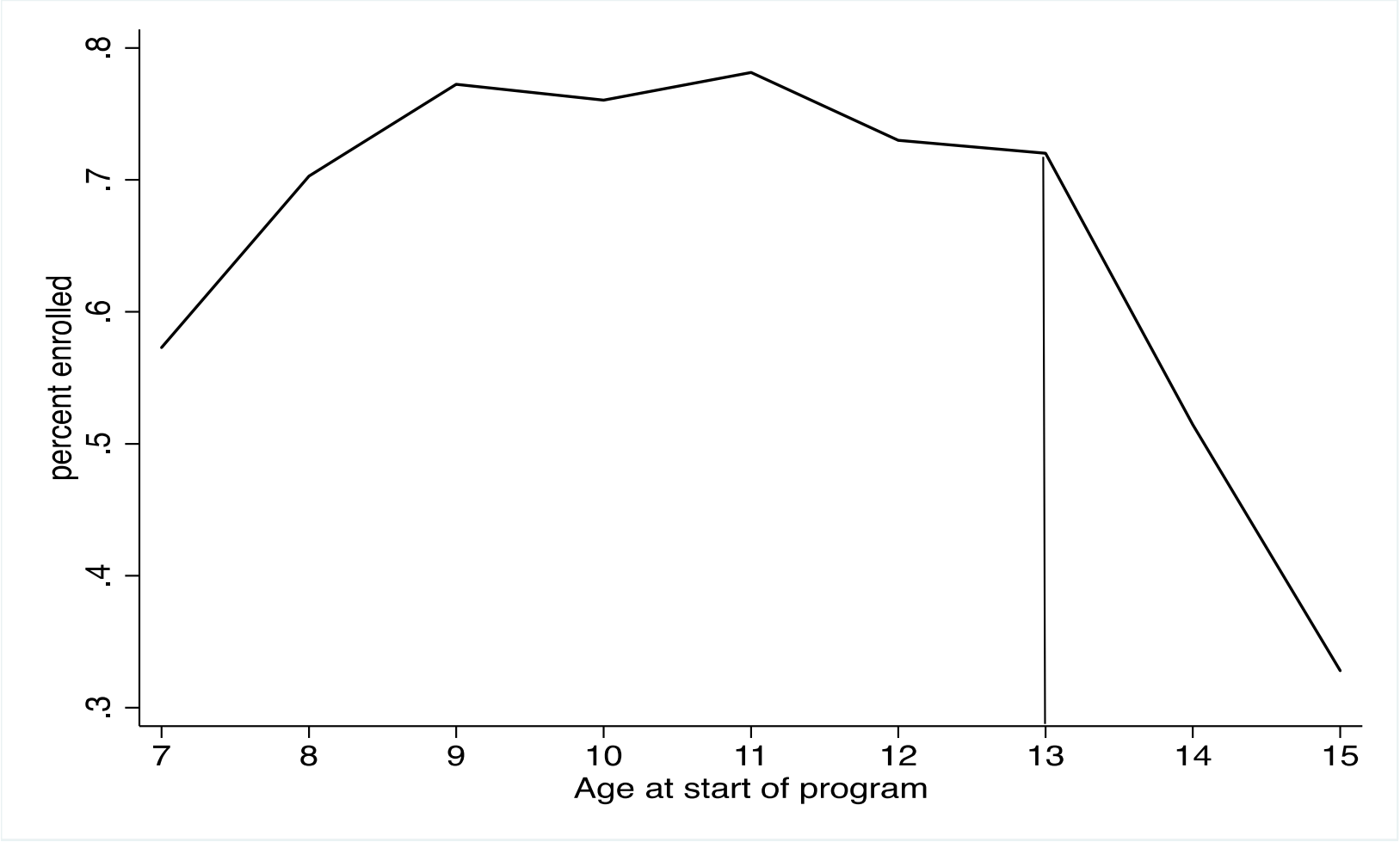
Age at Start of Program	Years of Eligible for Educ. Transfer		Difference
	Early Treat.	Late Treat.	
9	3	2	1
10	3	1	2
11	**3**	**0**	**3**
12	2	0	2
13	1	0	1
14	0	0	0

- Difference based on age eligibility, ignoring grade completed.

Mean Enrollment Rate in 2000 Boys



Mean Enrollment Rate in 2000 Girls



Data: 2010 Follow-up Survey

- Survey:
  - Follow-up of earlier rounds between 2000-2004
  - Add more 11 yr olds at program start to sample
  - Household and individual surveys (incl. labor market info)
  - Educational attainment collected in both
  - Cognitive and achievement tests done in the household
    - **Only for <13 at the start of the program** (< 23 in 2010)
- Extensive tracking: Nicaragua and Costa Rica
  - Attrition:
    - Household < 7%;
    - Education <10% - **Full sample**
    - Tests - 22% - **Tracked sample**
  - No significant difference in attrition rate between groups
    - For those with tests: Coef. 0.015, P-value 0.6

Comparison of Baseline Characteristics

	Boys 9-12		Girls 9-12	
Characteristic	**Diff**	**t-stat**	**Diff**	**t-stat**
Age in months	-0.08	-1.22	0.09	1.01
Highest grade attained	0.12	0.63	-0.05	-0.27
Log predicted PCE	0.02	0.52	-0.04	-1.16
Distance to school (min)	5.27	1.02	5.20	0.94
Child of head (=1)	-0.01	-0.54	0.01	0.36
Father not present (=1)	0.03	0.90	0.00	0.05
Mother not present (=1)	0.01	0.36	0.00	-0.24
Child worked last week (=1)	-0.01	-0.17	0.01	0.4
Number of rooms in house	0.06	0.72	-0.07	-0.82
Family size	-0.29	-1.01	-0.01	-0.02
Log of size of landholdings	0.07	0.16	0.31	0.71
Mothers high grade	0.56	2.62***	-0.22	-0.88
Number children 0-8	-0.15	-0.98	-0.08	-0.47
Number children 9-12	-0.06	-0.81	-0.04	-0.66

Notes: Sample used is the tracked sample. Sample sizes for most variables: Early treatment boys=507 (girls=438) and late treatment boys =473 (girls=429).

Differential Treatment Effect

Individual outcomes

$$Y_k = \alpha_k T + \beta_k X + \varepsilon_k$$

Y : outcomes – some internally standardized z-scores

T : Intent-to-treat indicator=1 if early treatment group

X : basic controls (strata dummies, 3 month date of birth dummies, **baseline education level dummies**, region dummies), individual and household level baseline

Standard errors clustered at the locality level

Note: Likely an under-estimate of the absolute effect

Family of outcomes (SURE)

$$\bar{\alpha} = \frac{1}{K} \sum_{k=1}^{K} \hat{\alpha}_k$$

Kling, Liebman and Katz (2007)

Young Men - Learning

Education Results

Boys 9-12

	Grades Attained				Grade 4 (=1)	
	2004	2010			2004	2010
	0.45***	0.27*	0.30*	0.29*	0.07**	0.05**
	(0.01)	(0.16)	(0.16)	(0.16)	(0.03)	(0.02)
N	458	1074	977	977	458	1074
Mean	3.6	5.5	5.5	5.5	0.36	0.74
Sample		Full	Tracked	Tracked		Full
Basic		Y	Y	Y		Y
Extended		N	N	Y		Y

Notes: Standard errors are clustered at the locality level and in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

2010 Test Results
Boys 9-12

	Read. fluency	Spelling	Word Ident.	Math fluency	Math probs	Recept. vocab.	Mem. math	Cog. Raven
Panel A: Basic controls								
T	0.24***	0.18***	0.16***	0.17**	0.11*	0.13*	0.04	0.01
	(0.07)	(0.06)	(0.06)	(0.08)	(0.06)	(0.07)	(0.05)	(0.07)
Panel B: Extended controls								
T	0.24***	0.18***	0.16***	0.17**	0.10*	0.13**	0.04	0.02
	(0.07)	(0.06)	(0.06)	(0.08)	(0.06)	(0.06)	(0.05)	(0.06)
N	898	905	899	904	904	906	902	906

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group.

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

2010 Test Results
Boys 9-12

	Read. fluency	Spelling	Word Ident.	Math fluency	Math probs	Recept. vocab.	Mem. math	Cog. Raven
Panel A: Basic controls								
T	0.24***	0.18***	0.16***	0.17**	0.11*	0.13*	0.04	0.01
	(0.07)	(0.06)	(0.06)	(0.08)	(0.06)	(0.07)	(0.05)	(0.07)
Panel B: Extended controls								
T	0.24***	0.18***	0.16***	0.17**	0.10*	0.13**	0.04	0.02
	(0.07)	(0.06)	(0.06)	(0.08)	(0.06)	(0.06)	(0.05)	(0.06)
N	898	905	899	904	904	906	902	906

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group.

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

2010 Tests Results Combined
Boys 9-12

Achievement			Mixed Cognition and Achievement	Cognition (Raven)
All	Language	Math		
Panel A: 9-12 year olds, extended controls				
0.17***	0.19***	0.13***	0.08**	0.02
(0.06)	(0.06)	(0.06)	(0.05)	(0.06)
Panel B: 9-12 year olds, extended and interviewer fixed-effects				
0.19***	0.21***	0.15**	0.10*	0.03
(0.06)	(0.06)	(0.07)	(0.05)	(0.07)
Panel C: Only 11 year olds				
0.28***	0.25***	0.30***	0.10*	0.12
(0.08)	(0.08)	(0.08)	(0.05)	(0.07)

Notes: S.e. clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group. *** p<0.01, ** p<0.05, * p<0.1

2010 Tests Results Combined: Disadvantaged Boys 9-12

Achievement			Mixed Cognition and Achievement	Cognition (Raven)
All	Language	Math		
Panel A: 0 grades attained at baseline				
0.19***	0.26***	0.072	0.189***	-0.040
(0.09)	(0.09)	(0.09)	(0.07)	(0.11)
Panel B: mothers with 0 grades attained				
0.33***	0.36***	0.27***	0.25***	0.093
(0.07)	(0.07)	(0.08)	(0.06)	(0.10)
Panel C: poorest 3 strata				
0.28***	0.28***	0.27***	0.20***	-0.010
(0.09)	(0.09)	(0.10)	(0.05)	(0.09)

Notes: S.e. clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group. *** p<0.01, ** p<0.05, * p<0.1

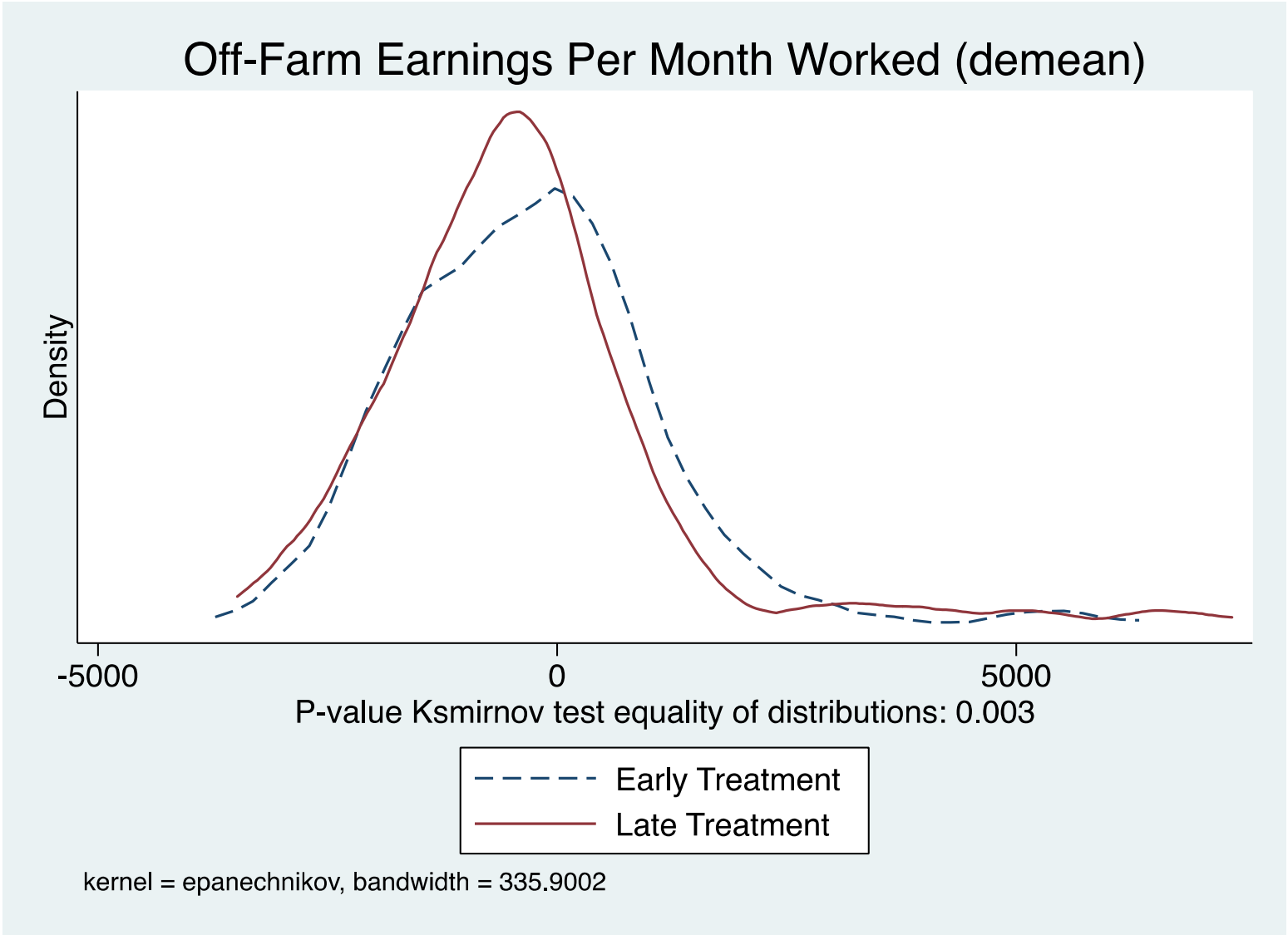
2010 Attitudes & Pro-social Behavior
Boys 9-12

	Positive attitudes	Pro-Social Behavior
T	0.15***	0.18**
	(0.05)	(0.05)
N	902	903

Notes: Standard errors clustered at the locality level and in parentheses. Extended controls included. Z-scores standardized using late treatment group. *** p<0.01, ** p<0.05, * p<0.1

Young Men – Earnings 2010

Earnings Per Month Worked
Boys 9-12



Participation in Economic Activities
Boys 9-12 (Past 12 months)

	Work	On HH farm	Off HH farm	Off HH farm	
				Non-skilled	Skilled
T	-0.002	0.010	0.048**	0.054	-0.012
	(0.007)	(0.027)	(0.023)	(0.034)	(0.015)
Mean	0.98	0.89	0.83	0.76	0.07
N=1,006					

Notes: Standard errors are clustered at the locality level and in parentheses. Extended controls included. Mean is for late treatment group. HH refers to household.

*** p<0.01, ** p<0.05, * p<0.1

Participation in Economic Activities
Boys 9-12 (Past 12 months)

	Work	On HH farm	Off HH farm	Off HH farm	
				Non-skilled	Skilled
T	-0.002	0.010	0.048**	0.054	-0.012
	(0.007)	(0.027)	(0.023)	(0.034)	(0.015)
Mean	0.98	0.89	0.83	0.76	0.07
N=1006					

Notes: Standard errors are clustered at the locality level and in parentheses. Extended controls included. Mean is for late treatment group.
*** p<0.01, ** p<0.05, * p<0.1

Temporary Migration
Boys 9-12

	Migrated for work part of the year	# months temporary migration
T	0.09***	0.33**
	(0.03)	(0.14)
Mean	0.32	1.00
N	1007	1006

Notes: 9–12 year olds. Standard errors are clustered at the locality level and in parentheses. Extended controls included. Mean is for late treatment group.
*** p<0.01, ** p<0.05, * p<0.1

- Possible link between achievement and migration

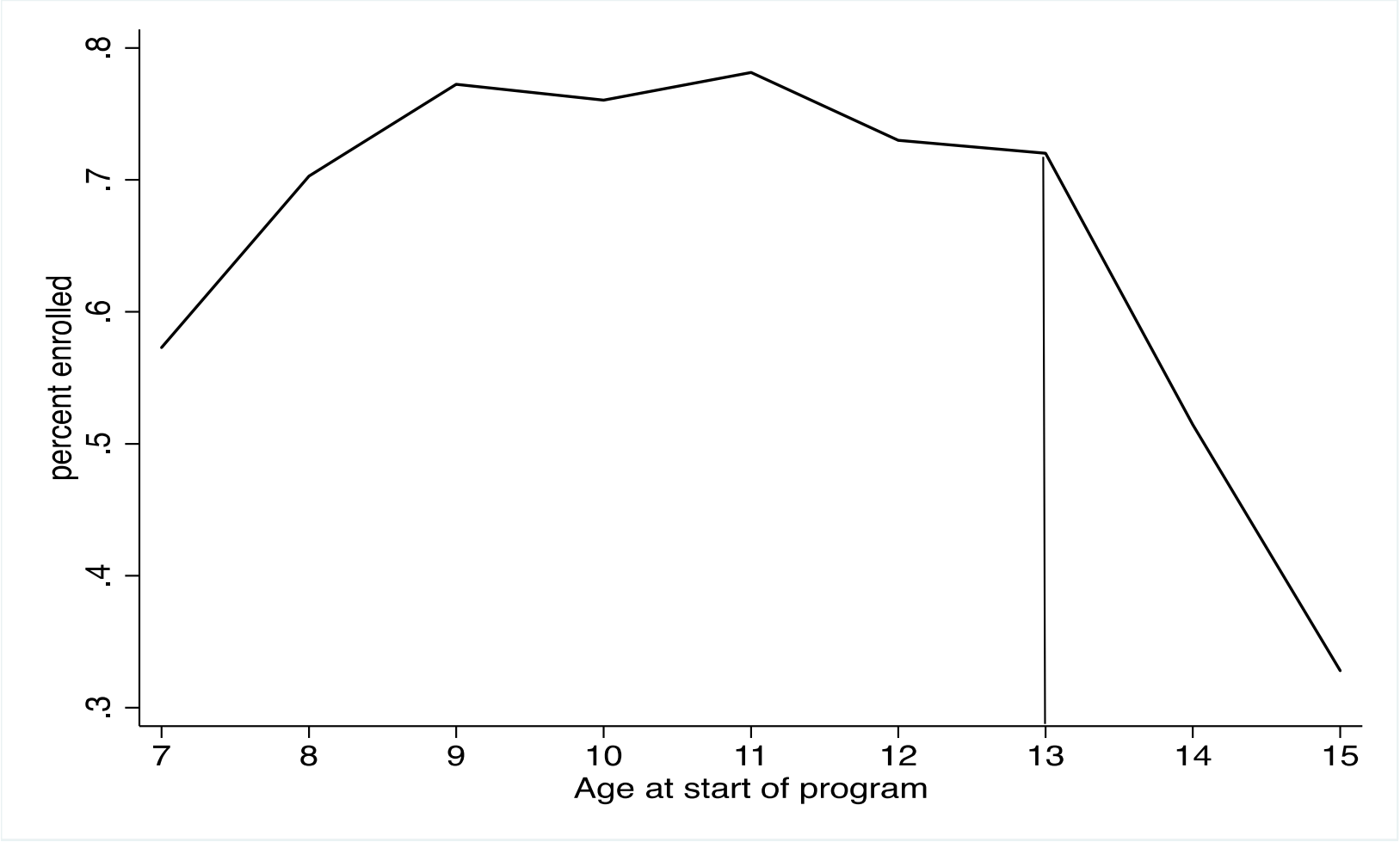
Earnings Per Month Worked Off-farm
Boys 9-12

	Tracked sample		Without richest strata	
	ITT	Removing 5% outliers	**ITT**	Removing 5% outliers
ITT Results				
T	584.3*	118.1**	630.1*	146.6**
	(345.3)	(54.9)	(371.4)	(56.2)
Mean	1930	1499	1881	1485
N	989	947	840	806
Quantile regression: N=840				
	25%	**50%**	**75%**	**90%**
T	61.5	154.2**	247.5**	549.9**
	(112.1)	(84.5)	(109.9)	(240.9)

Notes: Standard errors are clustered at the locality level and in parentheses. Extended controls included. Quantile regressions with riches strata removed. Mean is for late treatment group.
*** p<0.01, ** p<0.05, * p<0.1

Young Women - Learning

Mean Enrollment Rate in 2000 Girls



Education Results

Girls 9-12

	Grades Attained					Grade 4 (=1)	
	2004	2010				2004	2010
T	0.46***	0.18	0.08	0.12	0.43**	0.068**	0.07**
	(0.01)	(0.12)	(0.13)	(0.12)	(0.17)	(0.029)	(0.02)
N	394	998	865	865	453	394	998
Mean	4.4	6.8	6.7	6.7	7.0	0.54	0.74
Sample		Full	Tracked	Tracked	Restrict	Full	Full
Basic		Y	Y	Y	Y	Y	Y
Extended		N	N	Y	Y	Y	Y

Notes: Standard errors are clustered at the locality level and in parentheses. The restricted group excludes strata 7 and the municipality of Tuma. *** p<0.01, ** p<0.05, * p<0.1.

2010 Test Results Combined

Girls 9-12 - Selected

Achievement			Mixed Cognition and Achievement	Cognition (Raven)
All	Language	Math		
Panel A: 9-12 year olds, extended controls				
0.15***	0.17***	0.11***	0.01	0.05
(0.05)	(0.06)	(0.06)	(0.05)	(0.07)
Panel B: 9-12 year olds, extended and interviewer fixed-effects				
0.17***	0.20***	0.12**	0.06*	0.05
(0.06)	(0.07)	(0.08)	(0.07)	(0.07)

Notes: S.e. clustered at the locality level and in parentheses. Z-scores standardized using late treatment group. *** p<0.01, ** p<0.05, * p<0.1

Sample size too small for 11 year old only

2010 Education Results

Girls 13-14

	Grades Attained	Grade 4 (=1)
T	0.69**	0.09**
	(0.28)	(0.03)
N	439	439
Mean	5.7	0.63
Sample	Full	Full

Notes: Standard errors are clustered at the locality level and in parentheses. Controls include basic and regional controls *** p<0.01, ** p<0.05, * p<0.1.

Summary of Findings

- Differential not absolute effects
- Boys 9-12 at program start
  - Grades attained increased ~0.3 years
  - Gains in learning: language and math (~0.2 SD)
- Boys 9-12 at program start
  - Increased earnings from seasonal migration
  - Overall ~10-30% increase in monthly off-farm income
  - Impact consistent with gains through schooling
- Girls 9-12 at program start (restricted)
  - Grades attained increased 0.4 years
  - Gains in learning: language and math (~0.15 SD)

Potential Pathways for Earning Gains

- Increase in earning consistent with improvements in learning and non-cognitive skills
- Other potential mechanisms
  - Migration networks/information
    - Presence of 13-16 yrs olds in school may have helped
  - Health
    - treatment group not healthier in 2010
  - Early entry in labor market
    - Didn't migrate or work more by 2004, aspiration for university not higher
  - Others ?

Implications

- CCTs can increase learning and earning in a population with low levels of education
- Longer-term gains in learning and labor market outcomes are feasible, even in the presence of other constraints
- Young men may be on a different labor market trajectory

Thank you!

ADDITIONAL SLIDES

Other Findings: 9-12 boys

- Consumption: No overall impact
  - Only one household member, few are household heads

Girls Short-term Education Results 2002, 2004

	Grades Attained		Grade 4	
	2002	2004	2002	2004
Girls 9-12				
T	0.194***	0.46***	-0.003	0.068**
	(0.066)	(0.01)	(0.017)	(0.029)
N	450	394	450	394
Mean	3.013	4.395	0.260	0.538
Girls 13-14				
T	0.521***	-	0.078**	-
	(0.140)		(0.041)	
N	183		183	
Mean	4.063		0.484	

Notes: Standard errors clustered at locality level in parentheses. Extended controls included (see Table 1). Mean is for late treatment group. *** p<0.01, ** p<0.05, * p<0.1.

Boys Short-term Education Results 2002, 2004

	Grades Attained		Grade 4	
	2002	2004	2002	2004
Boys 9-12				
T	0.337***	0.45***	0.009	0.071**
	(0.077)	(0.01)	(0.023)	(0.029)
N	475	458	475	458
Mean	2.441	3.636	0.181	0.355
Boys 13-14				
T	0.351***	-	0.084**	-
	(0.121)		(0.032)	
N	226		226	
Mean	3.333		0.297	

Notes: Standard errors clustered at locality level in parentheses. Extended controls included (see Table 1). Mean is for late treatment group. *** p<0.01, ** p<0.05, * p<0.1.

Short-term Labor and Migration Results 2004

	Worked past week (=1)	Temp migration past 12 months (=1)
		2004
Boys 9-12		
T	-0.013	0.006
	(0.052)	(0.025)
N	458	458
Mean LT	0.668	0.042
Girls 9-12		
T	0.057*	-0.011
	(0.032)	(0.015)
N	394	394
Mean LT	0.108	0.021

Notes: Standard errors clustered at locality level in parentheses. Extended controls included (see Table 1). Mean is for late treatment group. *** p<0.01, ** p<0.05, * p<0.1.

Long-term Education Results 2010
Girls 9-12: Selected Group

	Read. fluency	Spelling	Word Ident.	Math fluency	Math probs	Recept. vocab.	Mem. math	Cog. Raven
Panel A: Basic controls								
T	0.14*	0.18**	0.17**	0.09	0.10*	0.05	-0.05	0.04
	(0.07)	(0.09)	(0.08)	(0.08)	(0.05)	(0.06)	(0.11)	(0.08)
N	437	436	436	438	436	438	437	438
Panel B: Extended controls								
T	0.15***	0.15**	0.20**	0.10	0.12*	0.05	-0.04	0.05
	(0.05)	(0.06)	(0.08)	(0.08)	(0.05)	(0.06)	(0.10)	(0.07)
N	437	436	436	438	436	438	437	438

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group. The selected group excludes the wealthiest stratum and the Tuma region where tracking was limited because of security. *** p<0.01, ** p<0.05, * p<0.1

Long-term Education Results 2010
Boys 13-14

	Grades Attained (in years)	Grade 4 (=1)
T	0.30	0.05
	(0.16)	(0.02)
N	431	431
Mean	5.0	0.64
Sample	Full	Full
Basic	Y	Y

Notes: Standard errors are clustered at the locality level and in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Data: Tests in 2010 Survey

- International achievement tests
  - Not testing exactly what is being taught
  - **Spelling, reading fluency, word identification**
  - **Math problems, math fluency**
- Mixed Cognitive and Achievement Tests
  - TVIP (PPVT) – **receptive vocabulary**
  - Digit Span (backwards & forwards) – **memory math**
- Cognitive Tests: Raven Colored Progressive Matrices
- All converted to z-scores (internally standardized on late treatment for across test comparison)

Results 2010 – For Not Enrolled

	Enrolled	Years of Education
T	0.04**	0.340**
	(0.02)	(0.151)
N	1005	760

	Read. fluency	Spelling	Word Ident.	Math fluency	Math probs	Recept. vocab.	Mem. math	Cog. Raven
T	0.25***	0.24***	0.21***	0.20**	0.14**	0.16**	0.13*	0.03
	(0.08)	(0.07)	(0.07)	(0.09)	(0.07)	(0.08)	(0.07)	(0.09)
N	689	696	692	695	696	697	693	697

Notes: 9–11 year olds. Standard errors are clustered at the locality level and in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.Controls included.

Correcting for Attrition

- Estimates on learning are sizable and precise
- Bounding Methods
  - Horowitz and Manski 2000: uninformative as are too wide.
  - Lee (2009): similar results – not much differential attrition between group.
    - Deals with differential attrition due to treatment.
- Weighting by inverse of probability to attrite shows similar results

ITT Results 2002 and 2004

Girls 9-12

	Worked last week		Hours worked		Migrated temporarily
	2002	2004	2002	2004	2004
T	-0.03*	0.05	-1.24***	1.26	-0.02
	(0.02)	(0.03)	(0.41)	(1.52)	(0.04)
N	448	392	448	392	392
Mean	0.05	0.11	1.50	4.11	0.02

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Mean is for late treatment group.

*** p<0.01, ** p<0.05, * p<0.1

Controls (all measured at baseline 2000)

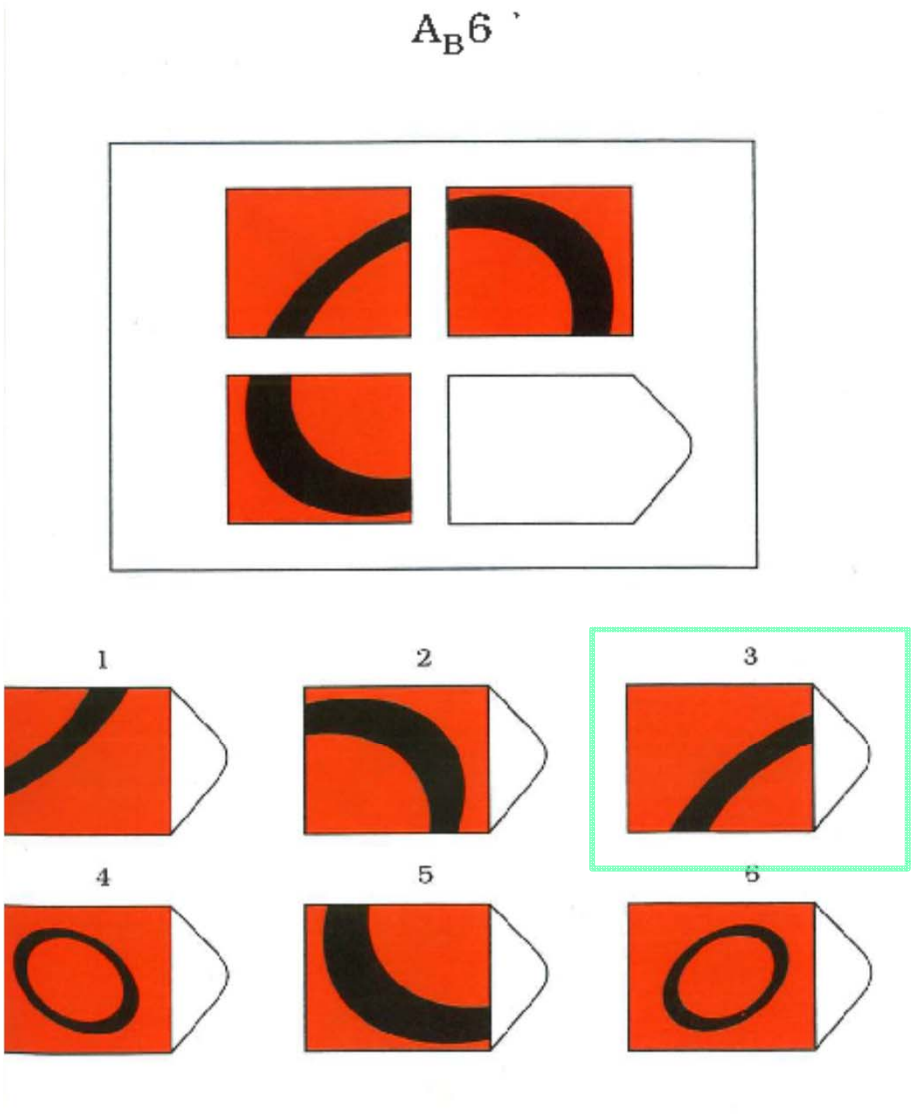
- Years of completed education
  - dummy for no education
- Predicted log of per capita expenditures
- Distance to school
- Whether the household is active in agriculture
- Whether respondent is child of household head
- Whether mother and father live in the house

- And, test administrator fixed effects as robustness

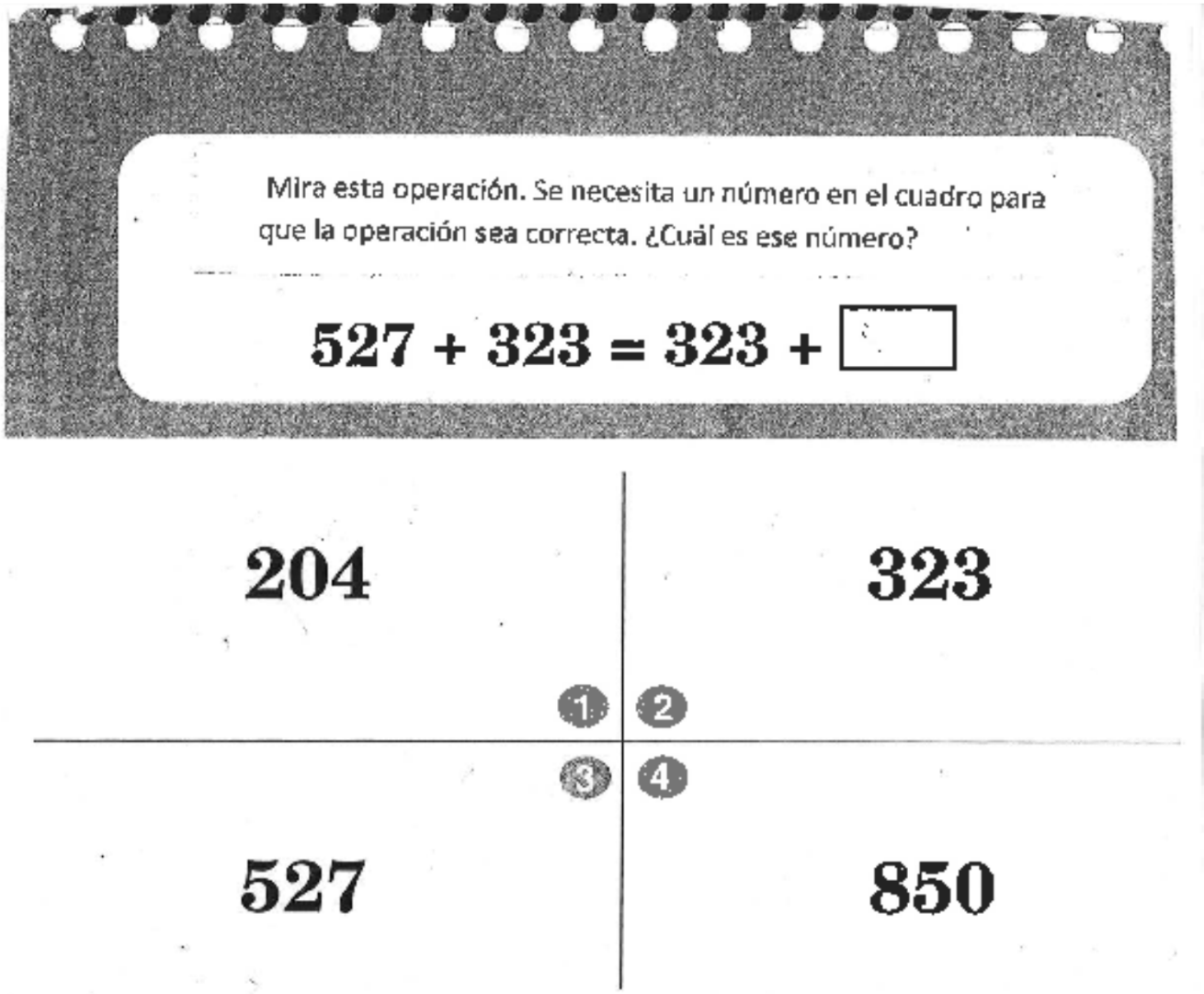
Test Outcomes Raw Statistics

Outcome	Early Treatment		Late Treatment		Differences in Means
	Mean	SD	Mean	SD	
Year of ed.	6.1	3.1	5.5	3.1	0.5
Reading fluency	27.9	12.4	23.8	12.7	4.2
Word identification	50.4	15.1	45.9	18.1	4.5
Spelling	31.3	7.8	28.8	9.8	2.5
Math fluency	50.1	24.9	43.4	24.4	6.7
Math problems	35.7	14.3	32.9	14.7	2.8
Receptive vocabulary	71.6	21.4	67.1	22.9	4.5
Memory math	10.3	2.9	9.9	3.3	0.4
Cognition	16.7	6.4	16.2	6.0	0.5

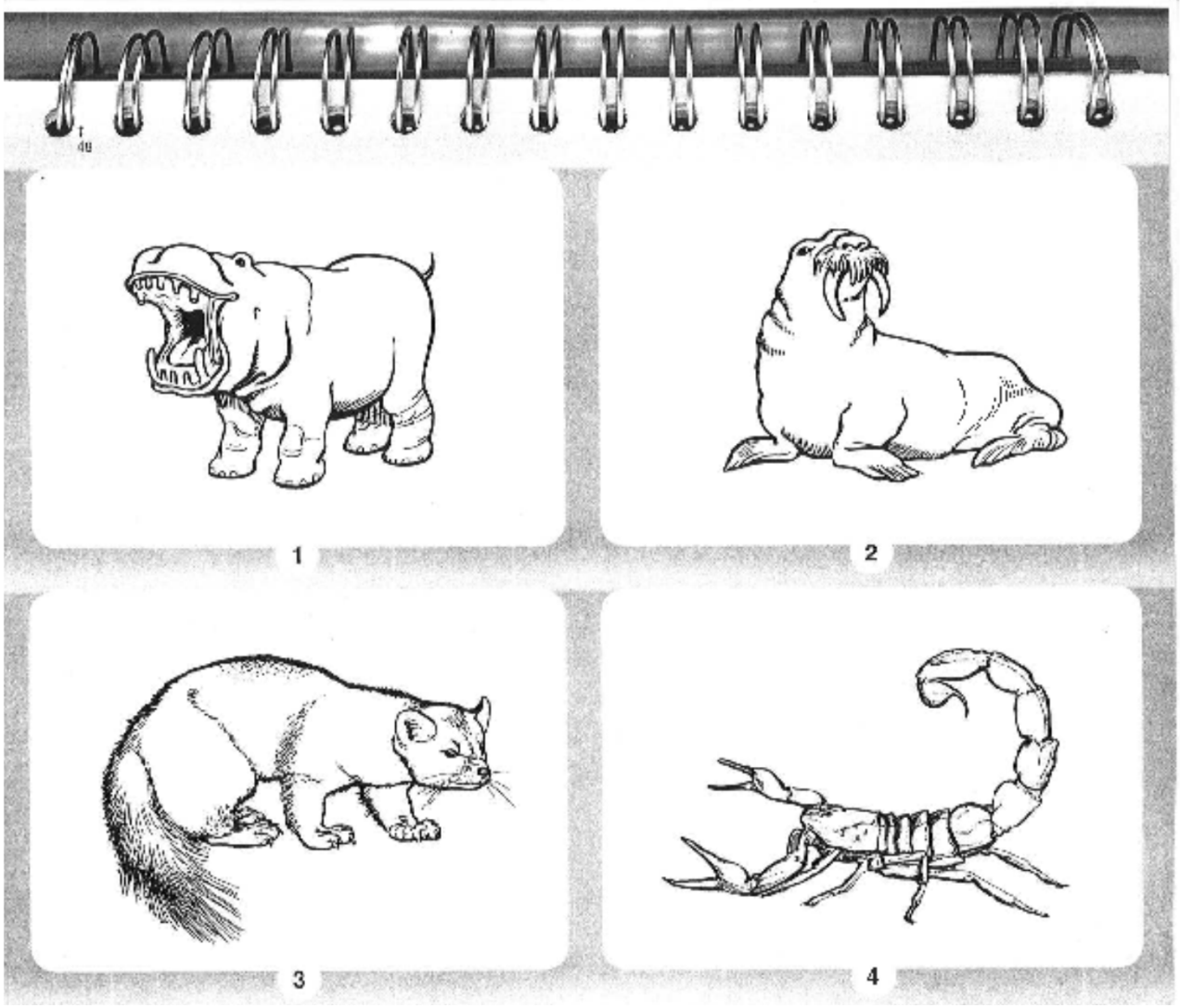
Raven Colored Progressive Matrices (A, AB, B)



Peabody Individual Achievement Test-Revised (PIAT-R vol. III-Math)



Peabody Picture Vocabulary Test (Spanish version – TVIP)



Migration networks ?

Quantile regression: off-farm earnings per month

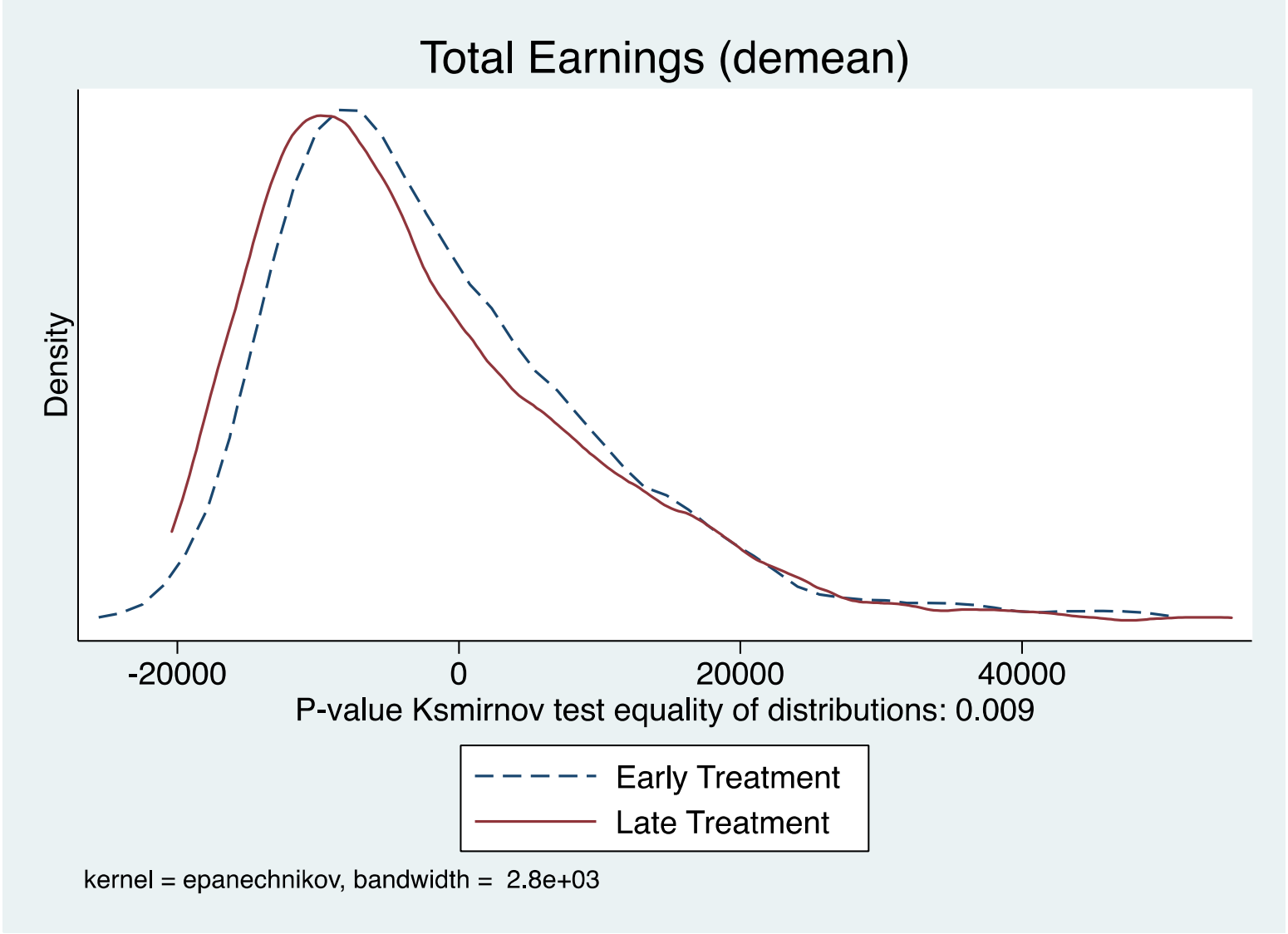
	10%	25%	50%	75%	90%
T	66.70	37.76	136.6**	286.3***	302.6
	(103.4)	(106.0)	(63.79)	(99.67)	(281.9)
T*migration rate 13-16	0.148	212.2	194.0**	297.3*	373.9
	(108.8)	(130.5)	(81.91)	(153.1)	(337.8)
T*migration rate 9-12	143.4	-35.86	-52.59	-220.4*	-183.8
	(140.4)	(138.6)	(82.65)	(126.8)	(424.5)

Notes: 9–12 year olds. Standard errors are clustered at the locality level and in parentheses. Controls included. Migration rate for cohorts from same school (standardized).

*** p<0.01, ** p<0.05, * p<0.1

Total Annual Earnings

Boys 9-12



Long-term Health Results 2010

Boys 9-12

	Sick past month	Sick past 12 months	Days no activities	Day in Bed	Flu vaccine past 12 mths	Deworming past 6 mths
T	0.085**	0.048***	0.491	0.366*	0.002	0.026
	(0.034)	(0.016)	(0.357)	(0.186)	(0.035)	(0.039)
N	1,005	1,005	1,005	1,005	1,003	1,003
Mean	0.494	0.808	2.078	0.488	0.273	0.332

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Mean is for late treatment group. *** p<0.01, ** p<0.05, * p<0.1

Short-term Labor and Migration 2002, 2004
Boys 9-12

	Worked past week		Hours worked past week		Temporary migration	University aspirations
	2002	2004	2002	2004	2004	2004
T	-0.168**	-0.005	-5.215***	-0.769	0.004	0.022
	(0.065)	(0.055)	(1.867)	(2.124)	(0.023)	(0.044)
N	475	458	475	458	458	458
Mean	0.40	0.67	11.56	24.00	0.04	0.215

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Mean is for late treatment group.

*** p<0.01, ** p<0.05, * p<0.1

2010 Tests Combined

Boys 9-12

Achievement			Mixed Cognition and Achievement	Cognition (Raven)
All	Language	Math		
9-12 year olds - test administrator control				
0.21***	0.23***	0.17**	0.12*	0.03
(0.06)	(0.06)	(0.07)	(0.06)	(0.08)
9-12 year olds – short-term survey sample				
0.23***	0.27***	0.18**	0.12	0.05
(0.08)	(0.07)	(0.10)	(0.08)	(0.12)
9-12 year olds – short-term survey sample with HH controls				
0.24***	0.27***	0.19***	0.11	0.06
(0.07)	(0.07)	(0.09)	(0.07)	(0.11)

Notes: S.e. clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group. *** p<0.01, ** p<0.05, * p<0.1

Baseline Balance, Boys 9-12 with Tests

	Early Treatment			Late Treatment			Difference	
Characteristic	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**T-stat**
Grades attained	1.3	(1.41)	470	1.17	(1.27)	436	0.13	0.71
No education (=1)	0.42	(0.49)	470	0.42	(0.49)	436	0.00	0.04
works (=1)	0.25	(0.43)	470	0.25	(0.44)	436	0.00	0.09
Dad present (=1)	0.17	(0.37)	472	0.15	(0.35)	437	0.02	0.80
Mom present (=1)	0.07	(0.26)	472	0.06	(0.24)	437	0.01	0.77
HH age	44.	(12.37)	472	44.52	(11.06)	437	0.23	0.24
HH no ed. (=1)	0.52	(0.5)	472	0.49	(0.5)	437	0.02	0.53
HH literate	0.44	(0.5)	472	0.43	(0.5)	437	0.01	0.19
HH works (=1)	0.87	(0.33)	472	0.9	(0.3)	437	-0.03	1.03
Consumption pc	2432	(935	472	2344	(771)	437	88	0.89
Distance school	26.04	(31.76)	472	21.59	(24.42)	437	4.44	0.92
Family size	8.08	(2.94)	472	8.36	(2.72)	437	-0.28	0.96
Dirtfloor (=1)	0.85	(0.36)	472	0.87	(0.34)	437	-0.02	0.45
Latrine (=1)	0.63	(0.48)	472	0.58	(0.49)	437	0.05	0.75
Electric light (=1)	0.25	(0.43)	472	0.18	(0.38)	437	0.07	1.06

Short-term Education Results 2002, 2004

Boys 9-12

	Enrolment		Grades Attained		Completed Grade 4
	2002	2004	2002	2004	2004
T	0.13***	-0.10*	0.28***	0.36***	0.07**
	(0.03)	(0.06)	(0.08)	(0.09)	(0.03)
N	475	458	475	458	458
Mean	0.78	0.66	2.45	3.65	0.355

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Mean is for late treatment group.

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

2010: Learning Among Marginal Children
Boys 9-12

	Grades Attained (GA) 2010			Achivement (All)		
T	0.39*	0.29**	0.25	0.25***	0.17***	0.26***
	(0.20)	(0.13)	(0.18)	(0.07)	(0.05)	(0.07)
GA 2000	1.16***	0.79***	1.06***	0.31***	0.16***	0.25***
	(0.11)	(0.08)	(0.08)	(0.03)	(0.02)	(0.02)
T * GA 2000	-0.08			-0.07*		
	(0.11)			(0.04)		
Raven		1.13***			0.44***	
		(0.10)			(0.03)	
T * Raven		-0.27			-0.11***	
		(0.16)			(0.04)	
Mom GA			0.19***			0.07***
			(0.05)			(0.02)
T * Mom GA			-0.03			-0.06***
			(0.07)			(0.02)
Observations	977	904	903	891	891	821

Notes: S.e. clustered at the locality level and in parentheses. Controls included. Z-scores standardized using late treatment group. *** p<0.01, ** p<0.05, * p<0.1

Short-term Education Results 2002, 2004

Girls 9-12

	Enrolment		Grades Attained		Completed Grade 4
	2002	2004	2002	2004	2004
T	0.10***	-0.11**	0.23***	0.52***	0.08**
	(0.02)	(0.04)	(0.05)	(0.13)	(0.03)
N	448	392	448	392	392
Mean	0.86	0.75	3.014	4.392	0.55

Notes: Standard errors are clustered at the locality level and in parentheses. Controls included. Mean is for late treatment group.

*** p<0.01, ** p<0.05, * p<0.1

Impact on Months Worked Off Farm
Boys 9-12

	Total off-farm	Non-skilled wage	Skilled wage	Non agr. self- empl.
Local N=1007				
T	-0.40	-0.34	0.04	0.01
	(0.25)	(0.30)	(0.11)	(0.13)
Mean	3.84	3.21	0.30	0.32
From temporary migration N=1007				
T	0.30**	0.35**	-0.01	-0.04
	(0.13)	(0.12)	(0.05)	(0.03)
Mean	0.99	0.84	0.09	0.06

Notes: 9–12 year olds. Standard errors are clustered at the locality level and in parentheses. Controls included. Mean is for late treatment group.
*** p<0.01, ** p<0.05, * p<0.1