Testing Alternative Approaches to Conditional Cash Transfer Programs in Education: Evidence from Colombia

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Academic Participation

- More education is desirable in poor areas
  - Macro Level: Some evidence education related to growth (Krueger, Lindahl, 2001 among many others)
  - Micro Level: Education increases income (Angrist and Krueger, 1991; Duflo, 2001)
- Getting kids into school is hard
  - Sub-Saharan Africa: 64 percent enrollment rate
  - Oceania: 80 percent enrollment rate
  - Western Asia: 83 percent enrollment rate
- Variation in participation both across and within families
  - Low-income families attend the least
  - Girls generally attend less than boys
  - Older children generally attend less than younger children

The Decision to Participate

- We need to be able to understand the participation decision
  - What determines students' levels of participation?
  - What determines the allocation of academic opportunities within the family?
- Some evidence exists
  - The quality of education does not seem to change attendance rates.
  - Health matters
  - Up front costs or direct inducements to participate do matter.
- Conditional Cash Transfers have been shown to work
  - Surprising little variation in treatment and research design
- Our research is motivated by two questions:
  - Can we improve CCTs by changing their structure?
    - For example, we know that families have trouble saving
  - How do the incentives indirectly affect non-participating students?
    - Intra-family externalities
    - Peer effects

Bogota Subsidios Pilot

- Work with City of Bogota's Secretary of Education (SED).
  - Pilot project to inform larger program
- Three primary contributions:
  1. Multiple Treatments: Vary families' direct incentives
     - Basic Model
     - Savings Model: Change timing of the transfers
     - Tertiary Model: Incentivizes graduation and then tertiary enrollment
  2. Child Level Variation: Vary the treatment density
     - Within schools, families, and peer-networks
  3. Use direct measures of attendance
     - CCT's might be particularly susceptible to self-reporting bias
     - Hired a team to directly observed students in class
     - Compare to self-reported attendance used in other CCT studies
     - Other outcomes are self-reported

Overview of Results

- Overall treatments are effective for treated children
  - Increase attendance, enrollment, pass rates, graduation rates, and tertiary enrollment
- Timing of the payments matters
  - Lower monthly transfers do not reduce attendance
  - However, relaxing savings constraints can improve enrollment
    - 3.6 ppts for secondary, 3.3 ppts for tertiary
  - Increase reported spending on secondary school expenses
- Incentivizing graduation/tertiary enrollment is effective
  - Increases attendance by 6.1 pps (3.5 ppt more than basic)
  - Increases secondary enrollment by 3.3 ppts.
  - Increases tertiary enrollment by 49.7 pps
- Externalities
  - Negative externalities for registered peers
  - Mixed results for unregistered peers
  - Strong peer effects, same magnitude as direct effect, declining effect

Outline of Talk

1. Introduction
2. Description of Bogota
3. Details of the Treatments
4. Experimental Design
5. Details of the Available Data
6. Results

Education in Bogota

- Colombia is a relevant context in which to work
  - Typical middle income Latin American country
  - Per capita income is US$ 2,020
- Bogota city government manages Education
  - Administers local educational resources with national funds supplemented by local funds (property taxes, loans, etc.)
- Academic Structure
  - Academic Year: January – December
  - Grades: Basic Primary (1-5), Basic Secondary (6-8), Middle Secondary (9-11), Tertiary (University/Vocational Options)
- Challenge is preventing dropouts:
  - Enrollment for children 5-13 years old is in mid to high 90's
  - Enrollment at 17 years is down to 80 percent.
  - The majority of dropout are from poor families
    - 74 percent of dropouts are from SISBEN 1 and 2

Treatment Designs

- Goal: Vary families' incentives for academic participation.
  - Provide three treatments that incentivize different individual parts of the child's academic path.
  - Subsidies are *roughly* revenue neutral if a students starts in grade 6 and continues to grade 11 – 1,800,000 pesos (US$ 900) over 6 years
    - Basic and Savings Treatments most financially equivalent
    - Tertiary treatment is only tested on grades 9-11
- Basic Treatment – OPPORTUNIDADES
  - Students receive 30,000 pesos (US$ 15) for 80 percent attendance.
    - Over 3 times what student report earning on-average a month
    - Annual value of 300k is slightly more than the 250k families report spending
  - Payment made bi-monthly through a debit card provided by a major national bank.
  - Students are removed for:
    - Failing twice
    - Missing the target for 2 consecutive bi-monthly periods

Treatment Designs

- Savings Treatment: Varying timing of payments
  - Motivated by savings constraints that prevent paying enrollment costs
  - Students receive 30,000 pesos a month for meeting the attendance target.
    - 20,000 pesos (US$ 10) are paid on the bi-monthly basis.
    - 10,000 pesos are “banked” and paid in bulk in Dec.
  - Very short-term liquidity constraints vs. savings constraints
  - Hypothesized differences from Basic:
    - Lower attendance during year if short-term constraints bind
    - Expect higher rates of enrollment the following year if savings is a constraint

Treatment Designs

- Tertiary Treatment: Varying incentive to graduate
  - Motivated by the relatively high cost of vocational enrollment
  - Students receive 20,000 pesos (US$ 10) a month.
  - Upon graduation they become eligible for a 600,000 pesos distribution.
    - Receive immediately if they document tertiary enrollment
    - Receive after 12 months without enrollment.
  - Hypothesized differences from Basic:
    - Lower attendance during year if short-term constraints bind
    - Conversely, could see higher levels of participation prior to graduation
    - Higher levels of enrollment after graduation

Randomization

- Two experiments in two similar localities
  - San Cristobal: Basic and Savings Treatment
  - Suba: Basic (grades 6-8) and Tertiary (grades 9-11)
- Conditions on enrollment (verified by SED):
  - Students must be enrolled in school
  - Must have completed grade 5
  - Must be in SISBEN 1 and 2
- Recruited 17,309 students through public advertising
- Conducted two student level randomizations
  - Stratified: locality, school type, grade and gender
- Assignment ratio varies by locality
  - 64 percent treated in San Cristobal vs. 45 percent in Suba
  - Weight observations when we pool data from both localities.

Six Data Sources

- Original SISBEN Survey Data
  - Collected in 2003 and 2004
  - Household assets, income, and characteristics
  - Contains all eligible households in Suba and San Cristobal
- Registration Data
  - Age, gender, last grade completed, and current school
  - Verified by SED
- Baseline Survey (May-July 2005)
  - 68 Schools with most registrants
  - Identify students with correct school information
  - Peer network
  - Contact information for follow-up survey

Six Data Sources

- Verified Attendance Data (Aug-Nov 2005)
  - 68 schools with most registrants over 13 weeks
  - Not limited to students who gave baseline survey
- Administrative Enrollment Data (2006)
- Follow-Up Survey (Feb-Mar 2006)
  - Academic participation, academic effort, consumption, labor
  - Collected labor market variables on all children in household
  - Less than 2% attrition rate from baseline, balanced by research group

Results

- Academic Participation
- Others
- Heterogeneity
- Family Members
- Peer Effects

Effects on Attendance

- Not shown here: Internal and external validity
- Specification: Verified Attendance

$$y_{ij} = \beta_o + \beta_1 Treat1_i + \beta_2 Treat2_i + \delta X_{ijk} + \phi_j + \varepsilon_{ij}$$

- Overall effect of 2.8 ppts
  - Similar for all grades
  - Slightly larger effect for students with low projected attendance
- Individual Treatments:
  - Basic: 3.3 ppts San Cristobal, 0.9 ppts Suba
  - Secondary: 2.8 ppts
  - Tertiary: 5 ppts
- Smaller, but similar, effects for students giving baseline
  - Higher projected attendance rates

Figure 4: Distribution of Attendance at Follow-Up

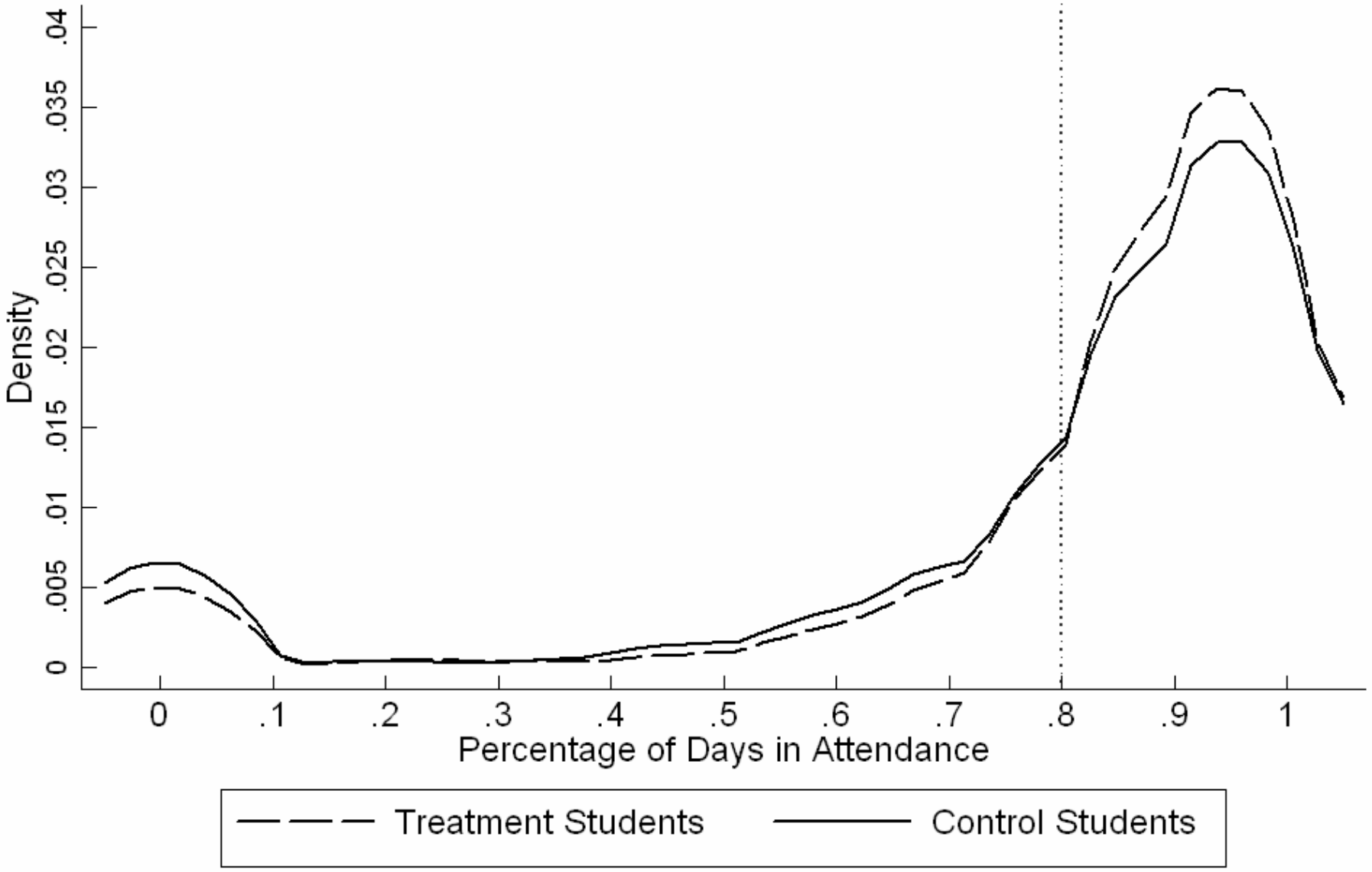
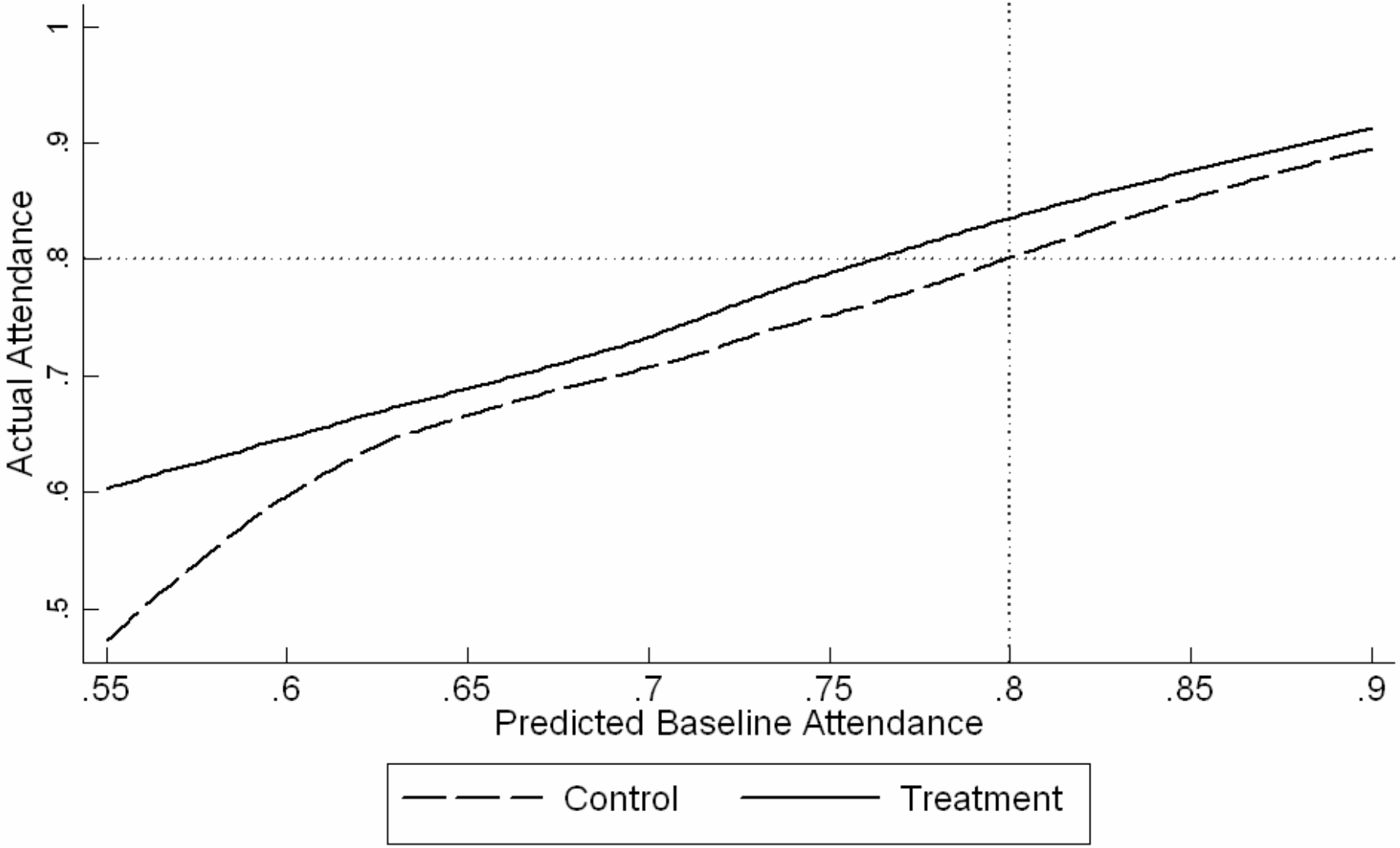


Figure 5: Actual Attendance by Predicted Attendance



Note: Results from local polynomial regressions (bandwidth=0.075)

Table 5: Attendance, 2005

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel A: All Students in Selected Schools								
All	0.794	0.033***	0.028***	0.782	0.009	0.793	0.050***	0.028***
	(0.006)	(0.006)	(0.006)	(0.009)	(0.012)	(0.011)	(0.015)	(0.005)
Grades 6-8	0.792	0.035***	0.026***	0.782	0.009			0.023***
	(0.008)	(0.009)	(0.009)	(0.009)	(0.012)			(0.007)
Grades 9-11	0.797	0.030***	0.030**			0.793	0.050***	0.037***
	(0.009)	(0.010)	(0.012)			(0.011)	(0.015)	(0.008)
Baseline Att >= 0.8	0.857	0.024**	0.022***	0.878	0.021*	0.86	0.032**	0.025***
	(0.007)	(0.010)	(0.007)	(0.009)	(0.012)	(0.012)	(0.014)	(0.006)
Baseline Att < 0.8	0.728	0.043***	0.033***	0.63	-0.009	0.688	0.078**	0.035***
	(0.009)	(0.014)	(0.011)	(0.016)	(0.017)	(0.019)	(0.034)	(0.010)

Table 5: Attendance, 2005

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel B:Students Completing Baseline Survey								
All	0.872	0.011**	0.013**	0.841	0.007	0.857	0.016	0.011**
	(0.004)	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.013)	(0.004)
Grades 6-8	0.874	0.012*	0.011*	0.841	0.007			
	(0.005)	(0.007)	(0.006)	(0.007)	(0.008)			
Grades 9-11	0.869	0.011	0.016*			0.857	0.016	0.014*
	(0.006)	(0.008)	(0.010)			(0.008)	(0.013)	(0.007)
Baseline Att >= 0.8	0.912	0.005	0.005	0.921	0.015	0.91	0.009	0.007**
	(0.004)	(0.004)	(0.006)	(0.005)	(0.009)	(0.007)	(0.011)	(0.004)
Baseline Att < 0.8	0.825	0.018*	0.022**	0.7	-0.001	0.766	0.028	0.015*
	(0.006)	(0.010)	(0.010)	(0.014)	(0.011)	(0.015)	(0.026)	(0.008)

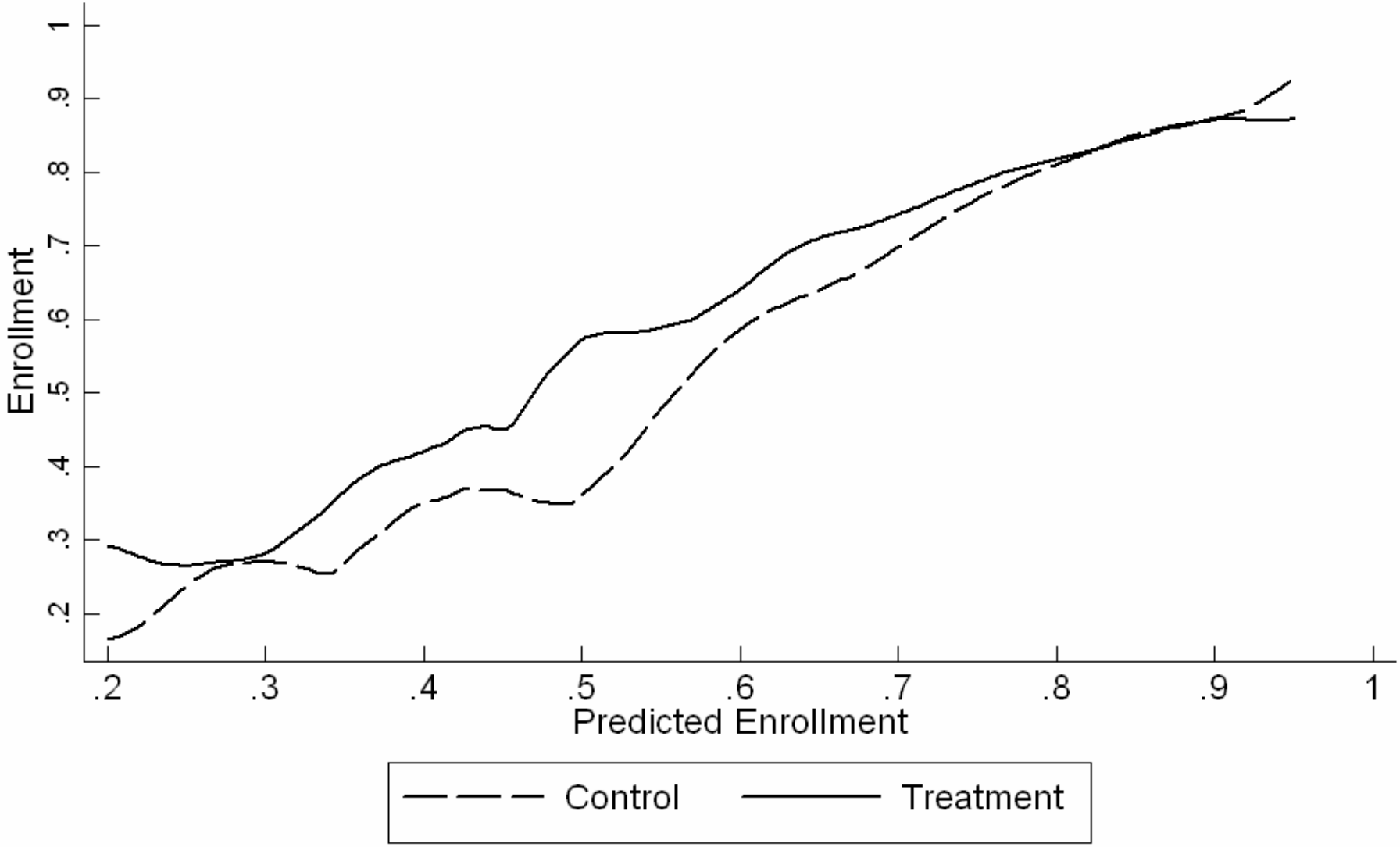
Effects on Enrollment

- Specification: Administrative Data and Follow-Up

$$y_{ij} = \beta_o + \beta_1 Treat1_i + \beta_2 Treat2_i + \delta X_{ijk} + \phi_j + \varepsilon_{ij}$$

- Overall effect of 2.6 ppts for all students in study
  - San Cristobal: Timing matters, savings effect 2.7 ppts larger than basic.
  - Tertiary: 3.3 ppts increase for grades 9-10
  - Basic: Inconsistent effects between grades 6-8 in Suba and San Cristobal
  - Significantly larger effects for families least likely to re-enroll.
- Other results
  - Effects in monitored schools similar to effect for students overall.
  - Smaller effects for students in selected schools who gave baseline.
  - Significant over-reporting of participation in self-reported data
- Tertiary enrollment
  - Consistent with other self-reported data for students in 11 grade in 2005
  - Overall increase in graduate rates (4ppts)
  - Increases in tertiary enrollment for savings (8.8ppts) and tertiary (49.7ppts)

Figure 6: Enrollment by Predicted Enrollment



Note: Results from local polynomial regressions (bandwidth=0.075)

Table 6: Enrollment, 2006

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel A: All Students								
All	0.698	0.009	0.036***	0.704	0.027*	0.741	0.033*	0.026***
	(0.008)	(0.010)	(0.011)	(0.010)	(0.014)	(0.014)	(0.019)	(0.006)
Grades 6-8	0.683	0.016	0.044***	0.704	0.027*			0.030***
	(0.010)	(0.012)	(0.014)	(0.010)	(0.014)			(0.009)
Grades 9-11	0.728	-0.003	0.027*			0.741	0.033*	0.022**
	(0.013)	(0.016)	(0.016)			(0.014)	(0.019)	(0.010)
Baseline Att >= 0.8	0.847	-0.005	-0.008	0.853	-0.021	0.886	-0.009	-0.01
	(0.012)	(0.020)	(0.017)	(0.014)	(0.019)	(0.015)	(0.021)	(0.011)
Baseline Att < 0.8	0.639	0.016	0.056***	0.63	0.049***	0.61	0.080***	0.043***
	(0.010)	(0.014)	(0.011)	(0.014)	(0.017)	(0.022)	(0.027)	(0.008)

Table 6: Enrollment, 2006

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel B: Selected for Survey								
All	0.767	0.015	0.026*	0.78	0.017	0.792	0.042*	0.024***
	(0.010)	(0.011)	(0.014)	(0.013)	(0.018)	(0.019)	(0.023)	(0.009)
Grades 6-8	0.758	0.012	0.023	0.78	0.017			0.020*
	(0.012)	(0.015)	(0.018)	(0.013)	(0.018)			(0.011)
Grades 9-11	0.782	0.023	0.034			0.792	0.042*	0.036**
	(0.016)	(0.020)	(0.023)			(0.019)	(0.023)	(0.015)
Baseline Att >= 0.8	0.845	-0.011	-0.011	0.834	0.003	0.872	-0.002	-0.007
	(0.014)	(0.021)	(0.020)	(0.019)	(0.020)	(0.021)	(0.027)	(0.012)
Baseline Att < 0.8	0.723	0.028*	0.045***	0.749	0.032	0.707	0.104***	0.041***
	(0.013)	(0.015)	(0.018)	(0.017)	(0.023)	(0.030)	(0.029)	(0.011)

Table 6: Enrollment, 2006

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel C: Students Completing Baseline Survey								
All	0.834	-0.002	0.008	0.827	0.024	0.857	0.024	0.011
	(0.009)	(0.012)	(0.014)	(0.012)	(0.016)	(0.017)	(0.017)	(0.008)
Grades 6-8	0.825	-0.001	0.008	0.827	0.024			0.013
	(0.012)	(0.014)	(0.018)	(0.012)	(0.016)			(0.010)
Grades 9-11	0.85	0.001	0.015			0.857	0.024	0.014
	(0.015)	(0.017)	(0.023)			(0.017)	(0.017)	(0.013)
Baseline Att >= 0.8	0.895	-0.021	-0.022	0.863	0.007	0.904	0.012	-0.012
	(0.012)	(0.022)	(0.018)	(0.018)	(0.019)	(0.020)	(0.022)	(0.012)
Baseline Att < 0.8	0.797	0.01	0.028	0.805	0.043**	0.802	0.048*	0.026**
	(0.013)	(0.013)	(0.018)	(0.016)	(0.019)	(0.029)	(0.026)	(0.010)

Table 6: Enrollment, 2006

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel D: Self Reported Enrollment								
All Students	0.982	0	0.001	0.994	-0.003	0.988	0.008	0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.002)
All, Pred Enroll >=	0.992	0.001	0.001	0.998	-0.003	0.992	0.005	0.001
	(0.003)	(0.005)	(0.005)	(0.002)	(0.006)	(0.006)	(0.010)	(0.004)
All, Pred Enroll < 0	0.974	0.001	0.002	0.991	-0.003	0.983	0.005	0.001
	(0.005)	(0.007)	(0.008)	(0.004)	(0.005)	(0.010)	(0.007)	(0.004)
Panel E: Self Reported Attendance, 2006								
All	0.958	0.005	0.006	0.962	0.010**	0.955	0.016*	0.008**
	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.009)	(0.003)
Baseline Att >= 0.8	0.964	0.004	0.004	0.964	0.007	0.968	0.01	0.006*
	(0.003)	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.006)	(0.003)
Baseline Att < 0.8	0.95	0.005	0.008	0.957	0.014**	0.932	0.022	0.010**
	(0.004)	(0.006)	(0.005)	(0.005)	(0.005)	(0.011)	(0.020)	(0.005)

Table 6: Enrollment, 2006

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	**Control Average**	**Basic - Control**	**Savings - Control**	**Control Average**	**Basic - Control**	**Control Average**	**Tertiary - Control**	**Treat-Control**
Panel F: Students in Final Year of Secondary School in 2005								
Graduated, 2005	0.876	0.029	0.043			0.903	0.054	0.040*
	(0.025)	(0.044)	(0.032)			(0.024)	(0.040)	(0.023)
Higher Ed, 2006	0.227	0.04	0.088***			0.193	0.497***	0.225***
	(0.032)	(0.034)	(0.033)			(0.032)	(0.044)	(0.052)

Other Outcomes

- Specification: Follow-up surveys

$$y_{ij} = \beta_o + \beta_1 Treat1_i + \beta_2 Treat2_i + \delta X_{ijk} + \phi_j + \varepsilon_{ij}$$

- Few effects on academic outcomes
  - Tertiary treatment on homework (+0.5 hours)
  - Pass rates (1.6 ppts)
- Consumption
  - Small increase in quantity and quality of meals
  - Educational expenses:
    - Savings increases expenditures on secondary school expenses
    - Increase of 250k pesos (to 390k) for eligible tertiary students
- Labor market activities:
  - General reduction in hours worked for grades 6-10.
  - Tertiary treatment, grade 11:
    - 43ppt increase in students whose primary activity is studying
    - Reduces labor hours by 7 hours a week, earning by 11k a week

Table 7: Other Outcomes

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel A: Academic Effort, Grades 6-11								
Hours of Homewor	2.697	0.02	0.035	2.961	0.022	2.609	0.540***	0.098***
	(0.033)	(0.043)	(0.048)	(0.040)	(0.044)	(0.072)	(0.110)	(0.036)
Total Grades	0	0.060*	0.05	0.024	-0.04	-0.041	-0.046	0.021
Self-Reported	(0.024)	(0.034)	(0.036)	(0.034)	(0.062)	(0.040)	(0.052)	(0.025)
Total Grades	0	0.083	0.048	0.049	0.02	-0.097	-0.059	0.037
Verified	(0.034)	(0.054)	(0.046)	(0.048)	(0.061)	(0.056)	(0.081)	(0.033)
Passed in 2005	0.889	0.01	0.019**	0.906	0.015	0.903	0.022	0.016**
	(0.007)	(0.009)	(0.010)	(0.009)	(0.014)	(0.012)	(0.017)	(0.006)

Table 7: Other Outcomes

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel B: Consumption, Grades 6-11								
Meals	8.018	0.191**	0.239***	8.197	0.065	8.199	0.166**	0.177***
Last 3 days	(0.051)	(0.076)	(0.073)	(0.059)	(0.092)	(0.075)	(0.076)	(0.049)
Meals	5.069	0.164**	0.182***	5.24	0.05	5.278	0.172*	0.144***
with Protein	(0.042)	(0.074)	(0.053)	(0.050)	(0.070)	(0.063)	(0.092)	(0.043)
School Expenses	231.419	9.997	20.972***	236.285	-13.348	269.817	-20.706	4.228
Grades 6-10	(5.090)	(7.105)	(6.311)	(6.815)	(10.182)	(11.440)	(12.656)	(5.471)
School Expenses	171.559	8.584	19.878			142.329	246.038***	95.729***
Grade 11	(31.640)	(37.512)	(44.919)			(30.014)	(47.523)	(33.638)

Table 7: Other Outcomes

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel C: Labor Activities, Grades 6-10								
Primary Activity, S	0.936	-0.003	0.003	0.913	-0.002	0.905	0.013	0.001
	(0.006)	(0.006)	(0.008)	(0.009)	(0.013)	(0.014)	(0.018)	(0.005)
Primary Activity, W	0.008	-0.002	-0.001	0.005	0.002	0.009	-0.008*	-0.001
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)	(0.002)
Primary Activity, H	0.007	0.001	0.003	0.005	0.002	0	0.003	0.002
	(0.002)	(0.004)	(0.004)	(0.002)	(0.004)	(0.000)	(0.003)	(0.002)
Hours Worked	0.92	-0.375**	-0.263*	0.626	-0.178	1.586	-0.793*	-0.330***
Last Work Week	(0.130)	(0.152)	(0.140)	(0.117)	(0.138)	(0.318)	(0.419)	(0.097)
Earnings	1.26	-0.3	-0.373*	0.793	0.17	2.061	-0.627	-0.23
Last Work Week	(0.212)	(0.285)	(0.211)	(0.146)	(0.441)	(0.385)	(0.700)	(0.208)

Table 7: Other Outcomes

	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
Outcome Variable	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
Panel D: Labor Activities, Grade 11								
Primary Activity, S	0.305	0.034	0.037			0.232	0.430***	0.189***
	(0.035)	(0.060)	(0.048)			(0.034)	(0.047)	(0.061)
Primary Activity, W	0.153	0.004	0.032			0.252	-0.149***	-0.038
	(0.027)	(0.029)	(0.057)			(0.035)	(0.052)	(0.030)
Primary Activity, H	0.175	0.003	0.011			0.219	-0.193***	-0.067*
	(0.029)	(0.039)	(0.053)			(0.033)	(0.032)	(0.036)
Hours Worked	6.932	1.008	0.18			8.548	-7.045***	-2.024*
Last Work Week	(1.273)	(1.887)	(1.676)			(1.470)	(1.325)	(1.183)
Earnings	9.87	1.833	2.369			16.39	-11.250**	-2.414
Last Work Week	(1.918)	(3.316)	(2.765)			(3.346)	(5.103)	(2.638)

Heterogeneity of Effects

- Pooled Specification

$$y_{ij} = \beta_o + \beta_1 Treat_i + \delta X_{ijk} + \phi_j + \varepsilon_{ij}$$

- Effects larger for children with lower projected attendance rates
- Effect on treated girls is lower than for boys
  - Higher attendance explains some but not all of the difference
- No effects on treated students for poorest families
  - Income of less than $3 a day

Table 8: Heterogeneity

Characteristic	Control Average	Treatment - Control	Control Average	Treatment - Control	Control Average	Treatment - Control
	Verified Attendance		Admin Enrollment		Passed in 2005	
All Students	0.79	0.029***	0.774	0.024***	0.896	0.016**
	(0.018)	(0.005)	(0.010)	(0.009)	(0.006)	(0.006)
Baseline Attendance						
Attendance > 0.8	0.864	0.025***	0.812	0.012	0.907	0.01
	(0.006)	(0.006)	(0.008)	(0.009)	(0.008)	(0.009)
Attendance ≤ 0.8	0.696	0.036***	0.728	0.038**	0.882	0.023**
	(0.023)	(0.010)	(0.020)	(0.015)	(0.010)	(0.009)
Gender						
Female	0.801	0.016**	0.791	0.024**	0.921	0.016**
	(0.020)	(0.006)	(0.010)	(0.011)	(0.007)	(0.007)
Male	0.778	0.043***	0.756	0.027**	0.87	0.017
	(0.016)	(0.008)	(0.013)	(0.014)	(0.010)	(0.013)
Income						
Upper Tercile	0.778	0.046***	0.778	0.033**	0.902	0.018*
	(0.022)	(0.009)	(0.011)	(0.015)	(0.010)	(0.010)
Middle Tercile	0.802	0.023***	0.773	0.034**	0.898	0.029***
	(0.017)	(0.008)	(0.013)	(0.016)	(0.008)	(0.010)
Low Tercile	0.79	0.018**	0.771	0.01	0.889	0.003
	(0.017)	(0.009)	(0.016)	(0.015)	(0.010)	(0.011)

Table 8: Heterogeneity

Characteristic	Control Average	Treatment - Control	Control Average	Treatment - Control	Control Average	Treatment - Control
	Meals		Meals with Protein		Hours Worked (Week)	
All Students	8.1	0.178***	5.153	0.143***	1.618	-0.508***
	(0.055)	(0.049)	(0.047)	(0.043)	(0.153)	(0.150)
Baseline Attendance						
Attendance > 0.8	8.154	0.168***	5.222	0.099**	1.433	-0.461***
	(0.048)	(0.049)	(0.045)	(0.050)	(0.198)	(0.168)
Attendance ≤ 0.8	8.024	0.194***	5.058	0.206***	1.873	-0.553**
	(0.092)	(0.073)	(0.072)	(0.054)	(0.288)	(0.244)
Gender						
Female	8.044	0.165***	5.135	0.108**	1.233	-0.378**
	(0.064)	(0.063)	(0.054)	(0.054)	(0.177)	(0.164)
Male	8.161	0.202***	5.17	0.189***	2.038	-0.619**
	(0.064)	(0.060)	(0.054)	(0.053)	(0.193)	(0.258)
Income						
Upper Tercile	8.12	0.249***	5.163	0.215***	1.602	-0.683**
	(0.080)	(0.085)	(0.062)	(0.065)	(0.288)	(0.321)
Middle Tercile	8.159	0.189***	5.218	0.125**	1.566	-0.680***
	(0.063)	(0.070)	(0.053)	(0.062)	(0.214)	(0.201)
Low Tercile	8.015	0.104	5.073	0.093	1.694	-0.377
	(0.081)	(0.087)	(0.072)	(0.080)	(0.256)	(0.242)

Family Outcomes

- Effects on treated siblings ambiguous
  - Parents could equalize opportunities for all kids
  - Parents could allocate even more resources to treated children from untreated children (Oster, 2007)
- Opportunities Already Unequal at Registration:
  - 6,619 families providing follow-up have 2.5 kids, but registered 1.3 kids.
  - These students are different. Comparing families with no subsidies:
    - 93pct registered children enrolled vs. 75pct unregistered children
    - Registered children report working 3.1 hours less a week
- Registered Children: Untreated Siblings Fare Worse
  - Compare 1,329 households who registered 2 children
  - Treated vs. Untreated in the same household
    - Treated students fair significantly better (could be binding incentives)
    - Treatment effect is slightly larger than overall average effect
  - Treated students in singly treated HHs same as those in treated HHs
  - Untreated students in singly treated HHs worse than untreated HHs

Table 9: Registered Siblings

Outcome Variable	All		Male		Female	
	Control Average	Treat-Control	Control Average	Treat-Control	Control Average	Treat-Control
Panel A: Treatment Effect in Households with Two Registered Children						
Verified Attendance	0.882	0.016**	0.859	0.015	0.868	0.013
	(0.004)	(0.007)	(0.009)	(0.010)	(0.008)	(0.009)
Administrative Enrollment	0.831	0.021	0.814	0.037	0.846	0.024
	(0.012)	(0.017)	(0.019)	(0.025)	(0.016)	(0.022)
Hours Worked	1.776	-0.870***	2.168	-0.834*	1.438	-0.841***
	(0.245)	(0.264)	(0.410)	(0.454)	(0.289)	(0.294)
Panel B: Treatment Effect in Households with One Treated Child						
Verified Attendance	0.873	0.019**	0.852	0.015	0.857	0.019
	(0.007)	(0.009)	(0.012)	(0.015)	(0.010)	(0.014)
Administrative Enrollment	0.821	0.029	0.818	0.044**	0.824	0.049
	(0.017)	(0.020)	(0.025)	(0.021)	(0.023)	(0.032)
Hours Worked	2	-1.150***	2.375	-1.198*	1.679	-1.274**
	(0.360)	(0.397)	(0.597)	(0.625)	(0.430)	(0.542)

Table 9: Registered Siblings

Outcome Variable	All		Male		Female	
	Control Average	Treat-Control	Control Average	Treat-Control	Control Average	Treat-Control
Panel C: Treated Students in Single Treated (Treat) vs Twice Treated (Control) Households						
Verified Attendance	0.887	-0.005	0.882	-0.002	0.892	-0.012
	(0.005)	(0.008)	(0.008)	(0.013)	(0.006)	(0.012)
Administrative Enrollment	0.843	-0.001	0.814	0.043	0.869	-0.033
	(0.013)	(0.020)	(0.020)	(0.029)	(0.017)	(0.035)
Hours Worked	1.186	-0.315	1.723	-0.492	0.697	0.208
	(0.227)	(0.374)	(0.409)	(0.498)	(0.221)	(0.442)
Panel D: Untreated Students in Single Treated (Treat) vs. Untreated (Control) Households						
Verified Attendance	0.876	-0.017	0.868	-0.011	0.882	-0.031**
	(0.009)	(0.012)	(0.014)	(0.022)	(0.011)	(0.013)
Administrative Enrollment	0.844	-0.043**	0.808	-0.036	0.873	-0.074**
	(0.018)	(0.022)	(0.029)	(0.040)	(0.022)	(0.029)
Hours Worked	1.483	0.666	1.899	0.661	1.123	0.873
	(0.315)	(0.452)	(0.538)	(0.796)	(0.359)	(0.671)

Conclusion

- Overall treatments are effective for treated children
  - Increase attendance, enrollment, pass rates, graduation rates, and tertiary enrollment
- Timing of the transfer matters
  - Lower monthly transfers do not reduce attendance
  - However, relaxing savings constraints can improve enrollment
    - 3.6 ppts in secondary, 8.8 ppts in tertiary
- Incentivizing graduation/tertiary enrollment is effective
  - Increases attendance by 5.0 pps
  - Increases tertiary enrollment by 49.7 pps
- Important spillovers
  - Strong peer effects
  - Evidence of negative externalities on other children within the household, particularly girls.