

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

Joint work with

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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 student 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

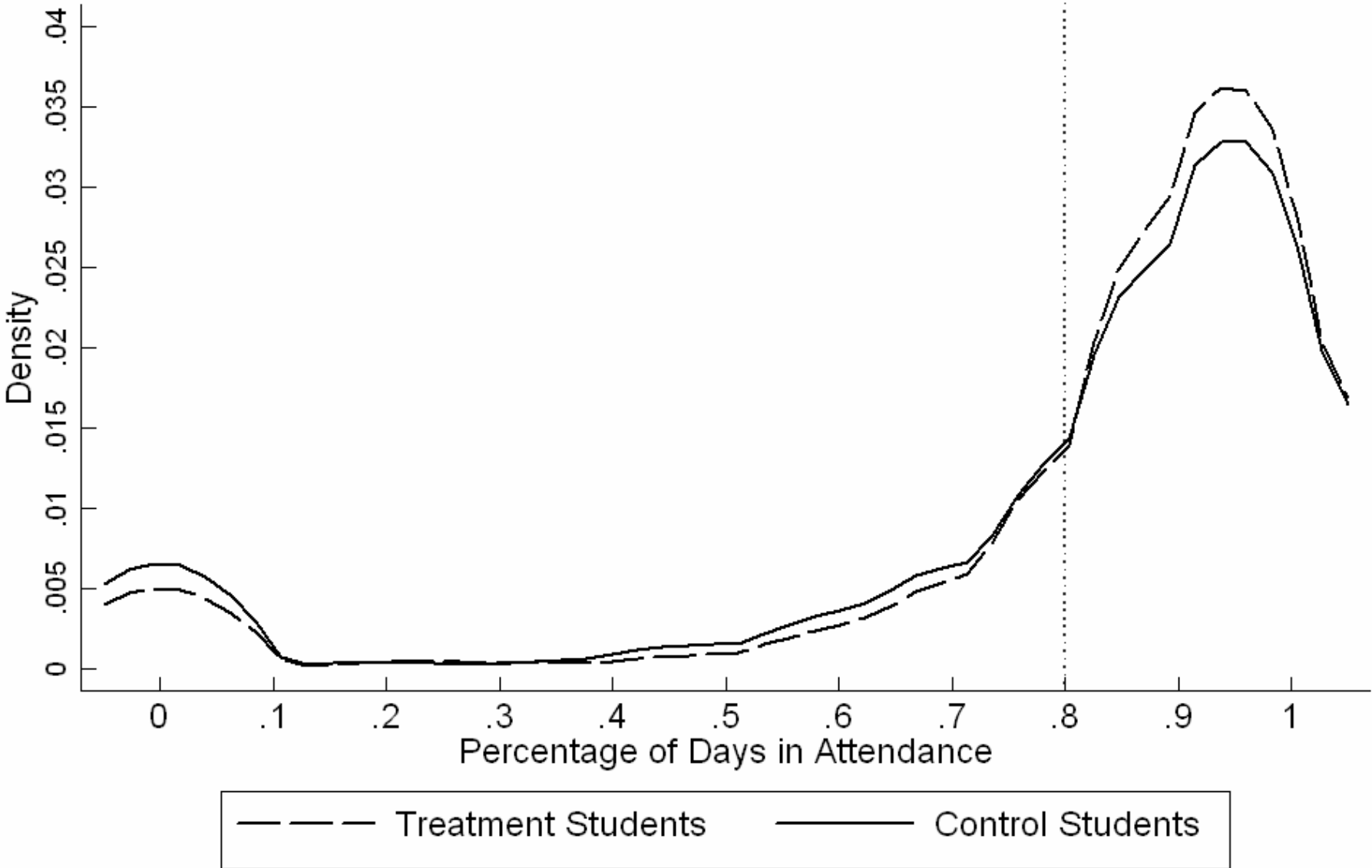
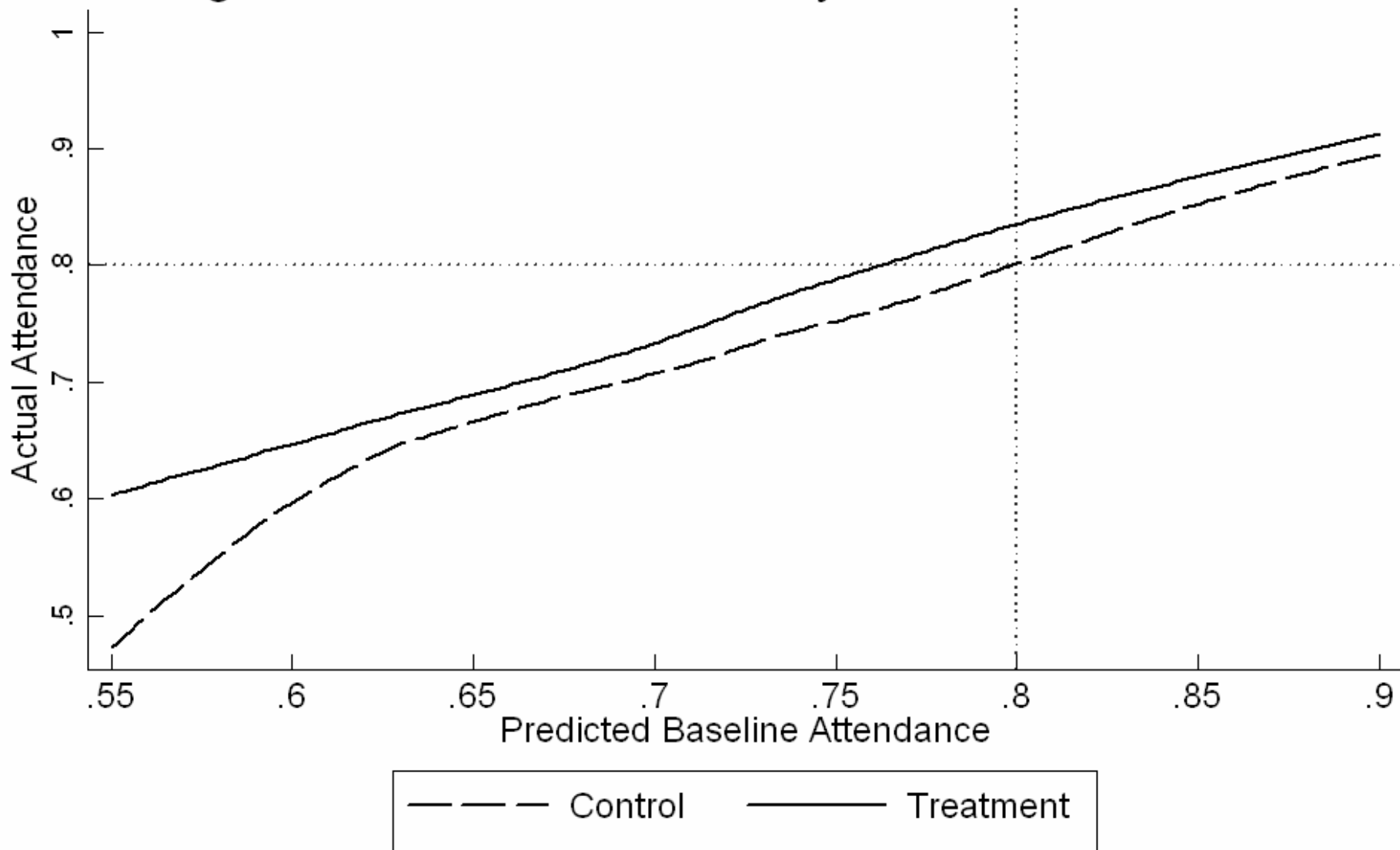




Figure 5: Actual Attendance by Predicted Attendance



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

# Table 5: Attendance, 2005

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

# Table 5: Attendance, 2005

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

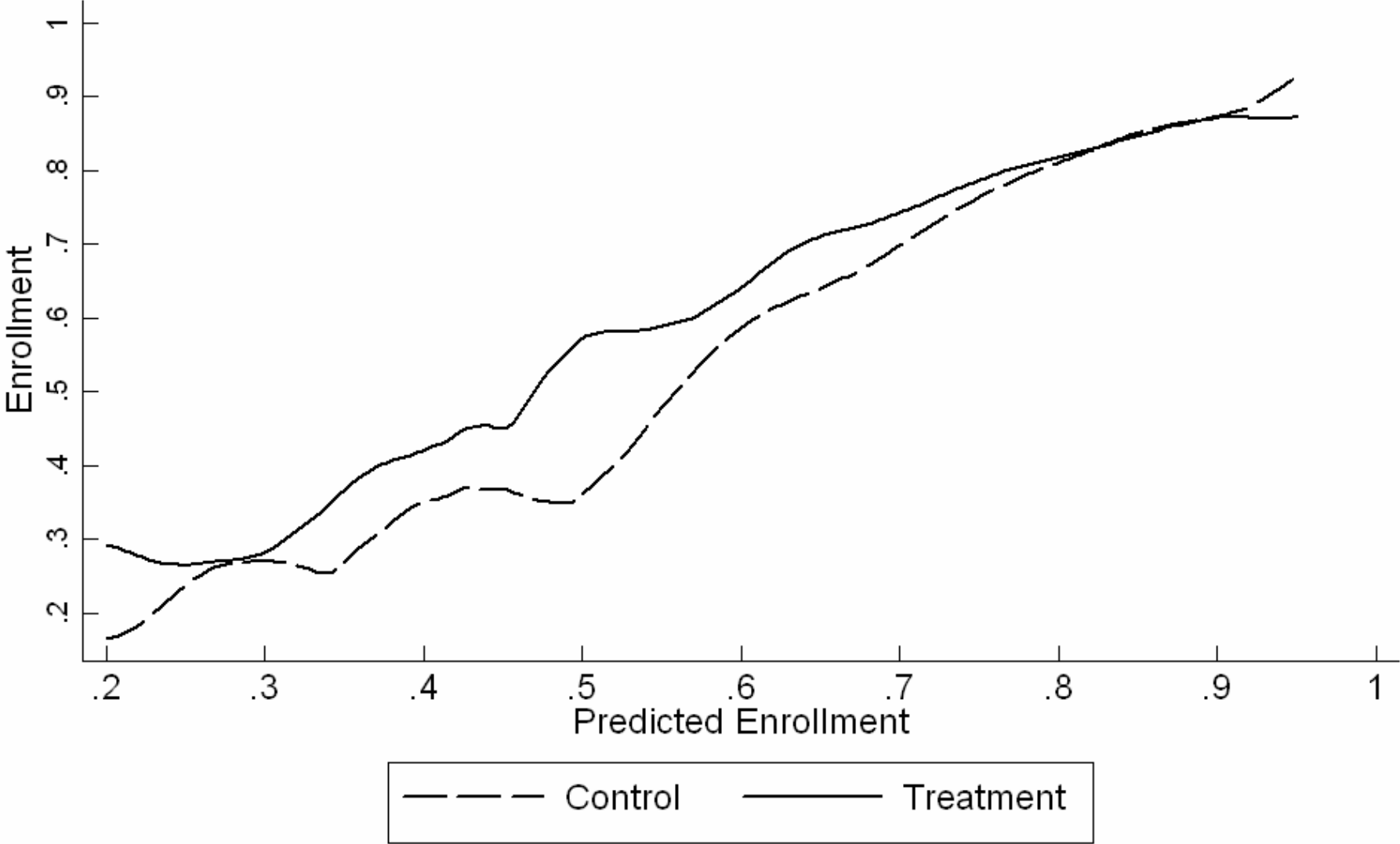
# Effects on Enrollment

- 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

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

# Table 6: Enrollment, 2006

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

# Table 6: Enrollment, 2006

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



# Table 6: Enrollment, 2006

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

# Table 6: Enrollment, 2006

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

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

# Table 7: Other Outcomes

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

# Table 7: Other Outcomes

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

# Table 7: Other Outcomes

Outcome Variable	San Cristobal			Suba, Grades 6-8		Suba, Grades 9-11		All
	Control Average	Basic - Control	Savings - Control	Control Average	Basic - Control	Control Average	Tertiary - Control	Treat-Control
<i>Panel D: Labor Activities, Grade 11</i>								
<b>Primary Activity, S</b>	0.305 (0.035)	0.034 (0.060)	0.037 (0.048)			0.232 (0.034)	0.430*** (0.047)	0.189*** (0.061)
<b>Primary Activity, V</b>	0.153 (0.027)	0.004 (0.029)	0.032 (0.057)			0.252 (0.035)	-0.149*** (0.052)	-0.038 (0.030)
<b>Primary Activity, H</b>	0.175 (0.029)	0.003 (0.039)	0.011 (0.053)			0.219 (0.033)	-0.193*** (0.032)	-0.067* (0.036)
<b>Hours Worked</b>	6.932 (1.273)	1.008 (1.887)	0.18 (1.676)			8.548 (1.470)	-7.045*** (1.325)	-2.024* (1.183)
<b>Earnings</b>	9.87 (1.918)	1.833 (3.316)	2.369 (2.765)			16.39 (3.346)	-11.250** (5.103)	-2.414 (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
	<b>Verified Attendance</b>		<b>Admin Enrollment</b>		<b>Passed in 2005</b>	
<b>All Students</b>	0.79 (0.018)	0.029*** (0.005)	0.774 (0.010)	0.024*** (0.009)	0.896 (0.006)	0.016** (0.006)
<b>Baseline Attendance</b>						
<b>Attendance &gt; 0.8</b>	0.864 (0.006)	0.025*** (0.006)	0.812 (0.008)	0.012 (0.009)	0.907 (0.008)	0.01 (0.009)
<b>Attendance ≤ 0.8</b>	0.696 (0.023)	0.036*** (0.010)	0.728 (0.020)	0.038** (0.015)	0.882 (0.010)	0.023** (0.009)
<b>Gender</b>						
<b>Female</b>	0.801 (0.020)	0.016** (0.006)	0.791 (0.010)	0.024** (0.011)	0.921 (0.007)	0.016** (0.007)
<b>Male</b>	0.778 (0.016)	0.043*** (0.008)	0.756 (0.013)	0.027** (0.014)	0.87 (0.010)	0.017 (0.013)
<b>Income</b>						
<b>Upper Tercile</b>	0.778 (0.022)	0.046*** (0.009)	0.778 (0.011)	0.033** (0.015)	0.902 (0.010)	0.018* (0.010)
<b>Middle Tercile</b>	0.802 (0.017)	0.023*** (0.008)	0.773 (0.013)	0.034** (0.016)	0.898 (0.008)	0.029*** (0.010)
<b>Low Tercile</b>	0.79 (0.017)	0.018** (0.009)	0.771 (0.016)	0.01 (0.015)	0.889 (0.010)	0.003 (0.011)

# Table 8: Heterogeneity

Characteristic	Control Average	Treatment - Control	Control Average	Treatment - Control	Control Average	Treatment - Control
	<b>Meals</b>		<b>Meals with Protein</b>		<b>Hours Worked (Week)</b>	
<b>All Students</b>	8.1 (0.055)	0.178*** (0.049)	5.153 (0.047)	0.143*** (0.043)	1.618 (0.153)	-0.508*** (0.150)
<b>Baseline Attendance</b>						
<b>Attendance &gt; 0.8</b>	8.154 (0.048)	0.168*** (0.049)	5.222 (0.045)	0.099** (0.050)	1.433 (0.198)	-0.461*** (0.168)
<b>Attendance ≤ 0.8</b>	8.024 (0.092)	0.194*** (0.073)	5.058 (0.072)	0.206*** (0.054)	1.873 (0.288)	-0.553** (0.244)
<b>Gender</b>						
<b>Female</b>	8.044 (0.064)	0.165*** (0.063)	5.135 (0.054)	0.108** (0.054)	1.233 (0.177)	-0.378** (0.164)
<b>Male</b>	8.161 (0.064)	0.202*** (0.060)	5.17 (0.054)	0.189*** (0.053)	2.038 (0.193)	-0.619** (0.258)
<b>Income</b>						
<b>Upper Tercile</b>	8.12 (0.080)	0.249*** (0.085)	5.163 (0.062)	0.215*** (0.065)	1.602 (0.288)	-0.683** (0.321)
<b>Middle Tercile</b>	8.159 (0.063)	0.189*** (0.070)	5.218 (0.053)	0.125** (0.062)	1.566 (0.214)	-0.680*** (0.201)
<b>Low Tercile</b>	8.015 (0.081)	0.104 (0.087)	5.073 (0.072)	0.093 (0.080)	1.694 (0.256)	-0.377 (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
<i>Panel A: Treatment Effect in Households with Two Registered Children</i>						
<b>Verified Attendance</b>	0.882 (0.004)	0.016** (0.007)	0.859 (0.009)	0.015 (0.010)	0.868 (0.008)	0.013 (0.009)
<b>Administrative Enrollment</b>	0.831 (0.012)	0.021 (0.017)	0.814 (0.019)	0.037 (0.025)	0.846 (0.016)	0.024 (0.022)
<b>Hours Worked</b>	1.776 (0.245)	-0.870*** (0.264)	2.168 (0.410)	-0.834* (0.454)	1.438 (0.289)	-0.841*** (0.294)
<i>Panel B: Treatment Effect in Households with One Treated Child</i>						
<b>Verified Attendance</b>	0.873 (0.007)	0.019** (0.009)	0.852 (0.012)	0.015 (0.015)	0.857 (0.010)	0.019 (0.014)
<b>Administrative Enrollment</b>	0.821 (0.017)	0.029 (0.020)	0.818 (0.025)	0.044** (0.021)	0.824 (0.023)	0.049 (0.032)
<b>Hours Worked</b>	2 (0.360)	-1.150*** (0.397)	2.375 (0.597)	-1.198* (0.625)	1.679 (0.430)	-1.274** (0.542)

# Table 9: Registered Siblings

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