# Teenage Childbearing and Educational Subsidies, Evidence from Colombia

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# Outline

# Aims of the paper

- Evaluate the effect of recent educational conditional cash transfers on teenage childbearing, in Bogotá.
  - City government has made large efforts on education policies (CCT, tuition fees, *gratuidad*).
  - Large incidence of teenage childbearing. Heterogeneity by *localidades*

# The main idea

- The main mechanism behind our study assumes that the event of becoming a mother by adolescent girls is not entirely a result of lack of family planning methods knowledge or availability and that
- In many cases becoming a mother at teenage may be a conscious decision.
  - Adolescent girls would see the possibility of becoming a mother as one of several alternative lifetime investment projects.
  - In our framework the alternative projects differ on the degree and timing of different decisions related to having a family and human capital investments.

# Main Result

- Two CCT: Familias en acción (FAM) and Subsidio Educativo (SED)
- Differences in assignment criteria (FAM-Sisben 1 and SED-Sisben 2) and school performance conditions
- Familias en acción also has a component of nutrition (CCT to households with children – 7 years old)
- The SED-CCT reduces childbearing incidence from 6.2% to 2.4%
- The FAM-CCT has no effect.

# Explanation

- SED- The performance condition provides girls incentives to reduce childbearing
- Familias en acción, net effect of two countervailing effects
  - Incentive effect (nutrition component) that increases likelihood of TC
  - Income effect (CCT, performance prize) that decreases likelihood of TC

# Review of Literature

- Descriptive studies
  - Flórez and Soto (2007 and 2008). Latin America countries
  - Flórez (2005) and Barrera and Jaramillo (2004). Colombia
    - High levels of teenage pregnancy rate
    - Rates are not decreasing (some cases increasing)
    - Negative effects on human capital accumulation of mothers and welfare of children (mixed evidence)
- Studies on the causal effect of policies interventions.
  - Girma and Paton (2006) Access of emergency birth controls, England
  - Wolfe, Wilson and Haveman (2001). Costs and benefits, US
  - Black, Devereux, Salvanes (2008) Compulsory schooling, US, Norway
  - Duflo et. al. (2006). School Uniforms, Kenya
  - Baird et.al. (2009). Educational CCT, Malawi

# Methodology issues

- Education policies were already on place. Non-experimental approach.
- Information about teenage childbearing incidence was scarce.
  - Administrative records were impossible to link with data on education.
  - Solution: building a data base to link education policies and teenage childbearing.
- We ran a survey covering around 300 schools in Bogota, with girls between 14 to 19 years old.

# Methodology design

- In February and March 2010 we ran a survey on 300 schools in Bogotá
- The instruments collected information on 4 dimensions
  - Sociooeconomic and family background (information of older sister and brother about childbearing, age and education).
  - Incidence of education policies (subsidies and CCT).
  - Childbearing and pregnancy incidence.
  - Knowledge and use of family different planning methods.
- Stratified random sampling, representative by *localidades*
- We collected information on 273 schools, with 21.287 interviewed girls.

# Education policies in Bogotá

- CCT -SED: Local government, covering 45.000, Started in 2006.
- CCT -FAM: National government, covering 120.000 children, Started in 2008.

- Non-experimental design
- Diff-in-Diff methodology based on Duflo (2001)
- Identification strategy uses the school level differences in the implementation of policies
- We are able to compare two CCT policies that differ mainly in one aspect:
    - CCT-SED asks by attendance and minimum performance.

# Empirical Strategy

- Two different treatments: $T_1$, $T_2$.
- Two cohorts, $C_i$: interviewed girls and their older sister (who went to the same school).
  - Older cohort: sisters between 19-32 years old that did not drop out from schools (in school between 1997-2005). Less likely to be affected by the policies.
  - Old cohort - Before policy.
  - Young cohort -After policy.
- We control by school and household unobservables that do not vary across time.
- Households that have not migrated and their socioeconomic conditions have not changed dramatically over time.

# Empirical Strategy (cont.)

- Treatment dummy variable at school level: high treatment and low treatment schools.

$$T_{tj} = \mathbb{1}\left(prop_{tj} > E_j[prop_{tj}]\right),$$

- The following equation:

$$\begin{aligned} Y_{ij} \quad = \quad & \alpha_0 + \alpha_1 T_{1j} + \alpha_2 T_{2j} + \alpha_3 C_i + \\ & \theta_1 T_{1j} C_i + \theta_2 T_{2j} C_i + \\ & \beta_1 T_{1j} T_{2j} + \gamma_1 T_{1j} T_{2j} C_i + \\ & X_{ij}\eta + Z_j\vartheta + \varepsilon_{ij} \end{aligned} \tag{1}$$

# Descriptive Statistics

Descriptive Statistics

| | Total n=24885 | | | Sample n=2402 | | |
|---|---|---|---|---|---|---|
| | Interviewed girls | Sisters | Diff[1] | Interviewed girls | Sisters | Diff[1] |
| Childbearing | 0.03 | 0.03 | 0.00 ** | 0.02 | 0.05 | -0.03 *** |
| Age | 15.41 | 19.23 | -3.82 *** | 15.49 | 21.82 | -6.33 *** |
| Standard of living | 23.16 | 22.55 | 0.61 *** | 22.97 | 22.90 | 0.07 |
| HH Size | 5.26 | 5.72 | -0.46 *** | 5.57 | 5.66 | -0.09 |
| Children | 3.24 | 3.70 | -0.46 *** | 3.60 | 3.72 | -0.12 * |
| Rooms | 4.10 | 4.22 | -0.12 *** | 4.30 | 4.31 | -0.01 |
| PRIV | 0.12 | 0.10 | 0.02 *** | 0.10 | 0.10 | 0.00 |
| Students-teacher | 27.02 | 30.71 | -3.69 *** | 27.03 | 30.55 | -3.52 *** |
| Sch-quality | 325.49 | 325.01 | 0.48 | 329.90 | 330.18 | -0.28 |
| Private | 0.24 | 0.22 | 0.02 *** | 0.25 | 0.25 | 0.00 |
| Distance | 2110.54 | 2135.72 | -25.18 | 1978.68 | 1981.26 | -2.58 |
| Person theft | 1.42 | 0.77 | 0.65 *** | 1.46 | 0.82 | 0.64 *** |
| Motorcycle theft | 0.13 | 0.15 | -0.02 *** | 0.13 | 0.17 | -0.04 *** |

# The treatments

Outcome: Childbearing

| | Familias en acción | | | Subsidio Educativo | | |
|---|---|---|---|---|---|---|
| | Control | Treated | Diff | Control | Treated | Diff |
| Sisters | 0.053 | 0.050 | −0.003 | 0.035 | 0.074 | 0.039 |
| Interviewed | 0.019 | 0.035 | 0.016 | 0.023 | 0.024 | 0, 001 |
| Diff | −0.034 | −0.015 | *0.019* | −0.012 | −0.050 | *–0.038* |

# No controls

| Outcome: childbearing | | |
|---|---|---|
| VARIABLES | (1) | (2) |
| Cohort | -0.0120 | -0.0343*** |
| | (0.00847) | (0.00984) |
| SED | 0.0389*** | |
| | (0.0149) | |
| Cohort x SED | -0.0382** | |
| | (0.0174) | |
| FAM | | -0.00281 |
| | | (0.0150) |
| Cohort x FAM | | 0.0194 |
| | | (0.0182) |
| Observations | 2,402 | 2,402 |
| R-squared | 0.011 | 0.006 |
| Standard errors clustered by school | | |
| ***p<0.001 **p<0.05 *p<0.1 | | |

# General Results

| Outcome: childbearing | | | | | |
|---|---|---|---|---|---|
| VARIABLES | (1) | (2) | (3) | (4) | (5) |
| Cohort | -0.0152 | 0.0832*** | 0.0843*** | 0.0792*** | 0.0654*** |
| | (0.00933) | (0.0151) | (0.0152) | (0.0149) | (0.0160) |
| Cohort x FAM | 0.0124 | 0.00938 | 0.00916 | 0.00650 | 0.0126 |
| | (0.0214) | (0.0211) | (0.0210) | (0.0213) | (0.0225) |
| Cohort x SED | -0.0492** | -0.0517** | -0.0522** | -0.0502** | -0.0483** |
| | (0.0222) | (0.0219) | (0.0218) | (0.0215) | (0.0211) |
| Individual controls | No | Yes | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes | Yes |
| School controls | No | No | No | Yes | Yes |
| Localidad | No | No | No | No | Yes |
| Observations | 2,402 | 2,402 | 2,402 | 2,402 | 2,402 |
| R-squared | 0.012 | 0.042 | 0.047 | 0.054 | 0.061 |
| Standard errors clustered by school | | | | | |
| ***p<0.001 **p<0.05 *p<0.1 | | | | | |

# Continuous Treatments

| | Outcome: childbearing | | | | |
|---|---|---|---|---|---|
| VARIABLES | (1) | (2) | (3) | (4) | (5) |
| Cohort | -0.0220** | 0.0779*** | 0.0796*** | 0.0714*** | 0.0543*** |
| | (0.0108) | (0.0161) | (0.0162) | (0.0161) | (0.0179) |
| Cohort x FAM | -0.0954 | -0.115 | -0.115 | -0.124 | -0.106 |
| | (0.0937) | (0.102) | (0.102) | (0.101) | (0.101) |
| Cohort x SED | -0.208 | -0.247* | -0.250* | -0.224* | -0.218* |
| | (0.137) | (0.135) | (0.135) | (0.130) | (0.124) |
| Individual controls | No | Yes | Yes | Yes | Yes |
| Family controls | No | No | Yes | Yes | Yes |
| School controls | No | No | No | Yes | Yes |
| Localidad | No | No | No | No | Yes |
| Observations | 2,402 | 2,402 | 2,402 | 2,402 | 2,402 |
| R-squared | 0.014 | 0.044 | 0.047 | 0.052 | 0.059 |
| Standard errors clustered by school | | | | | |
| ***p<0.001 **p<0.05 *p<0.1 | | | | | |

# Robustness Checks (1)

| Outcome: childbearing | | | | |
|---|---|---|---|---|
| VARIABLES | (1) Benchmark | (2) Without 19 | (3) Without 19 and 20 | (4) Without 19, 20 and 21 |
| Cohort | 0.0654*** | 0.0599*** | 0.0287 | -0.0276 |
| | (0.0160) | (0.0192) | (0.0270) | (0.0338) |
| Cohort x FAM | 0.0126 | 0.0131 | 0.0139 | 0.0115 |
| | (0.0225) | (0.0270) | (0.0339) | (0.0427) |
| Cohort x SED | -0.0483** | -0.0586** | -0.0747** | -0.0912** |
| | (0.0211) | (0.0262) | (0.0327) | (0.0408) |
| Observations | 2,402 | 2,115 | 1,866 | 1,699 |
| R-squared | 0.061 | 0.060 | 0.063 | 0.073 |
| Standard errors clustered by school | | | | |
| ***p<0.001 **p<0.05 *p<0.1 | | | | |
| All controls included in all regressions | | | | |

# Robustness Checks (2)

| | Outcome: childbearing | | | | |
|---|---|---|---|---|---|
| VARIABLES | (1) Benchmark | (2) Without 32 | (3) Without 31 and 32 | (4) Without 30, 31 and 32 | (5) Without 14, 30, 31 and 32 |
| Cohort | 0.0654*** | 0.0759*** | 0.0832*** | 0.0802*** | 0.0790*** |
| | (0.0160) | (0.0164) | (0.0172) | (0.0175) | (0.0184) |
| Cohort x FAM | 0.0126 | 0.0101 | 0.00793 | 0.00394 | 0.00849 |
| | (0.0225) | (0.0218) | (0.0224) | (0.0229) | (0.0258) |
| Cohort x SED | -0.0483** | -0.0505** | -0.0496** | -0.0553*** | -0.0553** |
| | (0.0211) | (0.0212) | (0.0213) | (0.0213) | (0.0223) |
| Observations | 2,402 | 2,394 | 2,387 | 2,370 | 2,125 |
| R-squared | 0.061 | 0.065 | 0.068 | 0.063 | 0.061 |
| Standard errors clustered by school | | | | | |
| ***p<0.001 **p<0.05 *p<0.1 | | | | | |
| All controls included in all regressions | | | | | |

# Robustness Checks (3)

| Outcome: childbearing | | | | | | |
|---|---|---|---|---|---|---|
| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) |
| | Benchmark | Placebo[1] | No program | Bootstrapping | With Dropout | Last Grade |
| Cohort | 0.0654*** | -0.0583* | 0.0675*** | 0.0654*** | 0.0783*** | 0.0538*** |
| | (0.0160) | (0.0299) | (0.0185) | (0.0144) | (0.0166) | (0.0204) |
| Cohort x FAM | 0.0126 | 0.00609 | | 0.0126 | -0.00494 | 0.00213 |
| | (0.0225) | (0.0400) | | (0.0179) | (0.0204) | (0.0371) |
| Cohort x SED | -0.0483** | -0.0237 | -0.0464** | -0.0483*** | -0.0407** | -0.0376 |
| | (0.0211) | (0.0403) | (0.0210) | (0.0183) | (0.0202) | (0.0315) |
| Observations | 2,402 | 1,516 | 1,680 | 2,402 | 2,912 | 1,145 |
| R-squared | 0.061 | 0.067 | 0.077 | 0.061 | 0.056 | 0.083 |

Standard errors clustered by school

***p<0.001 **p<0.05 *p<0.1

[1] Placebo cohort

All controls included in all regressions

# Different Thresholds

| | Outcome: childbearing | | | | |
|---|---|---|---|---|---|
| VARIABLES | (1) Benchmark | (2) P30th | (3) P40th | (4) P50th | (5) P60th |
| Cohort | 0.0654*** | 0.0699*** | 0.0670*** | 0.0653*** | 0.0552*** |
| | (0.0160) | (0.0181) | (0.0162) | (0.0159) | (0.0150) |
| Cohort x FAM | 0.0126 | -0.00118 | 0.0255 | 0.0146 | 0.0173 |
| | (0.0225) | (0.0312) | (0.0252) | (0.0233) | (0.0218) |
| Cohort x SED | -0.0483** | -0.0367** | -0.0342** | -0.0417** | -0.0313* |
| | (0.0211) | (0.0156) | (0.0148) | (0.0179) | (0.0166) |
| Observations | 2,402 | 2,402 | 2,402 | 2,402 | 2,402 |
| R-squared | 0.061 | 0.060 | 0.060 | 0.060 | 0.059 |
| Standard errors clustered by school | | | | | |
| ***p<0.001 **p<0.05 *p<0.1 | | | | | |
| All controls included in all regressions | | | | | |

# Final Remarks

- Not all CCT programs reduce teenage childbearing
- Disentangle effects of components of FA on teenage childbearing
- Use the additional information to understand other potential determinants of teenage childbearing. Increases the knowledge about the problem.
- We have information of sexual risk behaviour, which can be combined with other type of information and administrative records.
- We also interviewed boys. Mix boys' data with the existing girls' data. Peer group effects.

Thank you!