

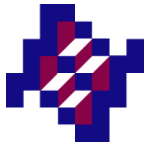
Heterogeneous impact of the social program
Oportunidades on use of contraceptive methods
by young adult women living in rural areas

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Washington, DC.

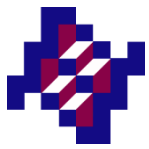
May 2010

Center for Evaluation Research and Surveys, National Institute of Public Health,
Mexico



Overview

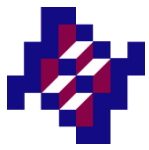
- The *Oportunidades* (actually, *Progresa*) program
- The evaluation design
- Estimating program effects on contraceptive use and uncovering heterogeneous effects
- Results
- Conclusions



The *Oportunidades* Program

Background

- Despite Mexico being middle-income economy, large proportion of population in poverty: in 1994, about 24% of households lived in extreme poverty.
- Extreme poverty concentrated in rural areas: 60% of rural households, while 20% of urban households (1994)
- Moreover, poor are in an inter-generational poverty trap
- Mexican Federal government response:
 - PROGRESA*, from 1998-2002
 - Changed name to *Oportunidades*, from 2002-present



The *Oportunidades* Program

Objectives:

- To “break the intergenerational cycle of poverty”
- To improve educational, health and nutritional status of poor households

The intervention:

- + Education: Cash transfers conditional on keeping kids at school
- + Health: - Package of services mainly for pregnant women and children under 5 years of age
 - Health Talks (*Pláticas*) to female heads of household
- + Nutrition: Supplements of vitamins

Target population:

Members of Eligible households in extreme poverty

The *Oportunidades* program and our paper

Oportunidades seeks to improve reproductive health status and contraceptive use. Family planning is one of the topics of *Pláticas*.

Our purpose: To estimate impact of *Oportunidades* on contraceptive use among young women 20-24 years old in rural areas

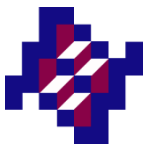
But, How *Oportunidades* could have an impact on contraceptive use?

- “Information” effect of *Pláticas*
- Income effect of cash transfers
- Effect of increased educational opportunities on women’s life plans: instead of marrying early and having kids, it is possible to get education and to participate in labor market.

Selection into *Oportunidades*

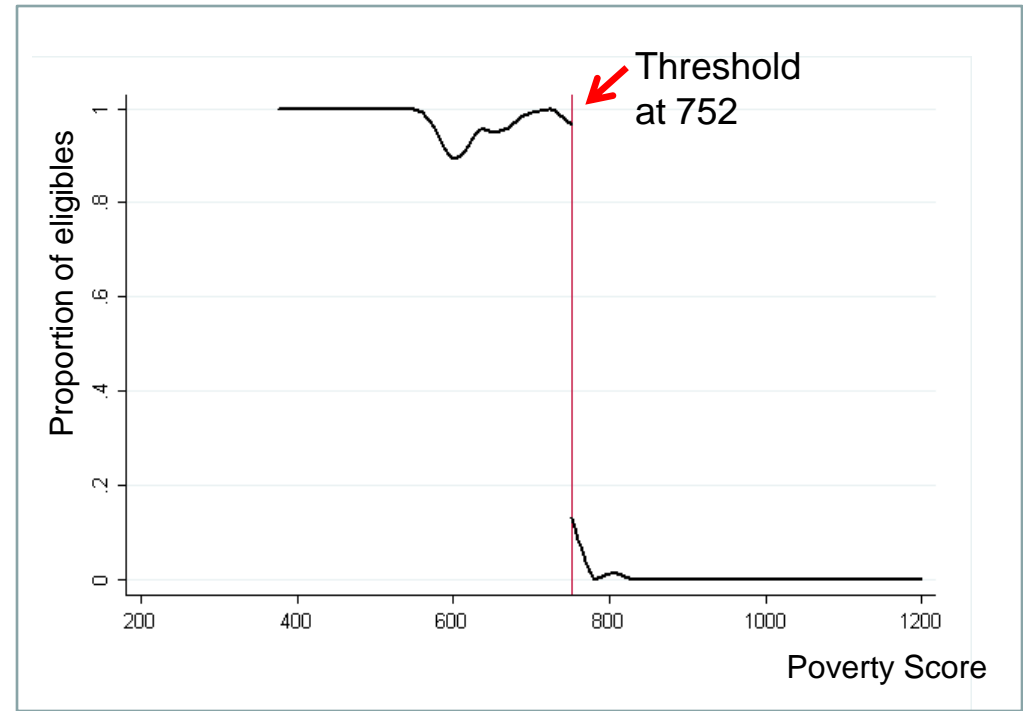
Two-stage process:

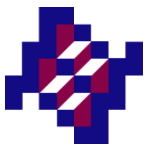
- 1st. Select communities based on Marginality Index, with census data
- 2nd. Select households within communities



Selection of Households into *Oportunidades*

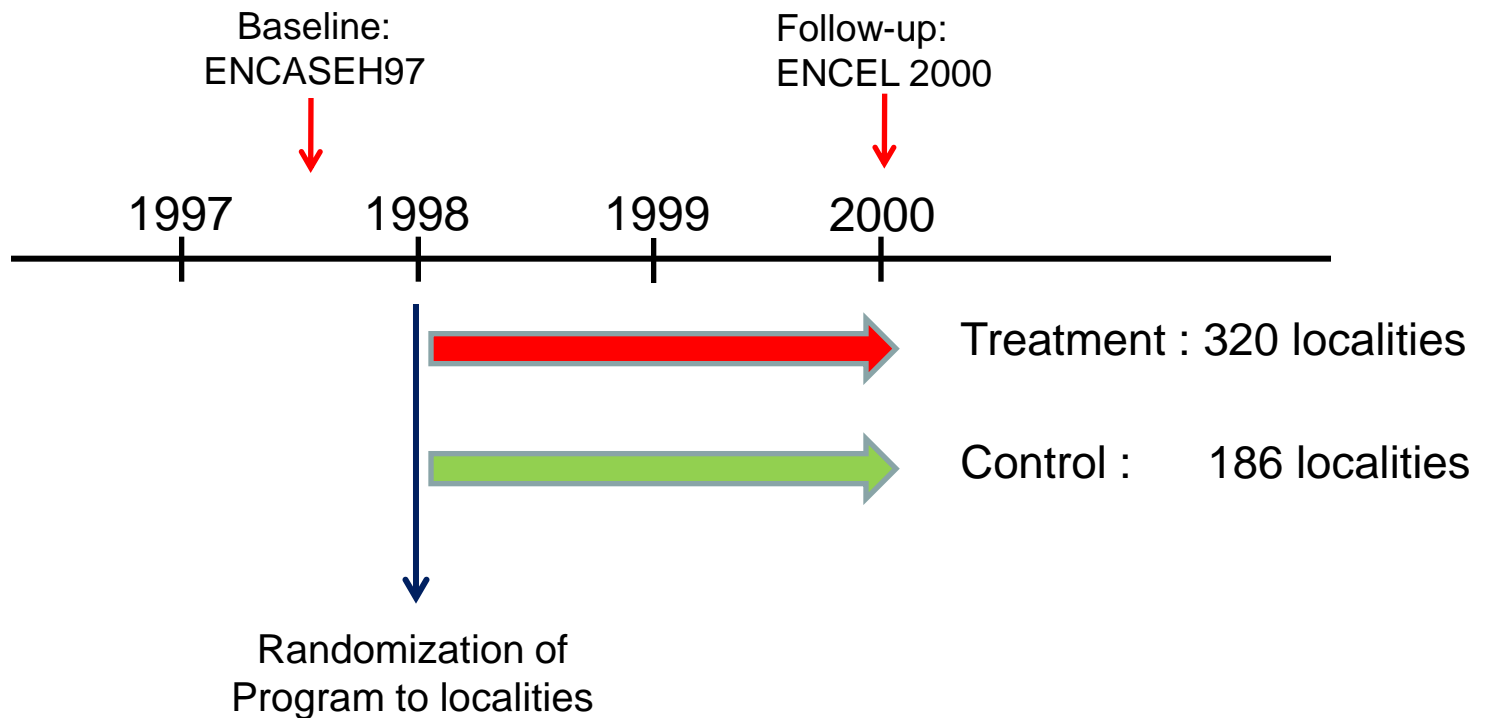
- Generate a Poverty Score for each household, depending on household characteristics
- Cutoff point of 752 points for Eligibility
- However...
 - Eligibility was not defined solely on the basis of the poverty score...
- Community assemblies and local administrators validated eligibility.



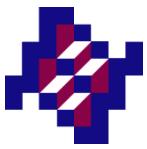


Evaluation Design

Experimental design between 1998 and 2000 in rural areas:
Intervention was randomly allocated among 506 communities*



*: Localities in seven Mexican states.



What we did, data sets and sample

- Take advantage of the experimental design of the *Oportunidades* evaluation effort.
- Data sets:
 - ENCEL 2000 (*Encuesta de Evaluación de Hogares Rurales*)
 - ENCASEH97 (*Encuesta de Características Socioeconómicas de los Hogares*), to check baseline conditions
- Analysis sample: 2,239 young adult women aged 20-24 in 2000, living in 395 localities.

Descriptive Statistics for Study Subjects in 1997

(If it really was an experiment, then Control Group = Treatment Group)

	Control Areas (N=671)		Treatment Areas (N=1,041)		P**
	Mean	Std. Dev.	Mean	Std. Dev.	
Poverty Score	764.03	135.10	755.34	126.72	0.56
Age	19.11	1.36	19.18	1.31	0.42
Literacy	0.88	0.32	0.88	0.32	0.93
Currently attends school?	0.06	0.23	0.07	0.26	0.19
Has a job?	0.17	0.38	0.17	0.38	0.87
Has a spouse?	0.52	0.50	0.54	0.50	0.29
Number of children	0.65	0.88	0.71	0.87	0.08
Number of children school age	0.01	0.12	0.02	0.13	0.82
Currently uses contraceptives?	0.33	0.47	0.31	0.46	0.67

No significant difference between Treatment-Control CU.

*:Mann-Whitney test for continuous variables, chi-square for dichotomous.

Arithmetic means for continuous vars.; proportion for dichotomous.

Descriptive Statistics for Study Subjects in 2000

	Control Areas (N=853)		Treatment Areas (N=1,340)		P*
	Mean	Std. Dev.	Mean	Std. Dev.	
Poverty Score	760.84	138.3	753.21	129.34	0.54
Age	22.02	1.47	22.07	1.42	0.46
Currently attends school?	0.05	0.21	0.03	0.18	0.12
Has a job?	0.14	0.34	0.12	0.33	0.41
Has a spouse?	0.57	0.50	0.62	0.49	0.03
Number of children	1.25	1.25	1.36	1.30	0.07
Number of children school age	0.25	0.54	0.26	0.55	0.29
Currently uses contraceptives?	0.19	0.39	0.23	0.42	0.03

Treatment-Control Difference in CU is 4 percentual points, and significant

*:Mann-Whitney test for continuous variables, chi-square for dichotomous.
Arithmetic means for continuous vars.; proportion for dichotomous.

Program Impact on Contraceptive Use (CU): Intent-to-Treat Estimates

Model 1 (OLS Simple): Difference average CU between Treatment and Control Areas*

	Model 1 Simple OLS	
Treatment Area (1=treatment;0=control)	0.046** (.022)	
Eligible (1=eligible;0=non-eligible)		
Observations	2,230	

**Impact
estimate**



*: Models include Age, log of Poverty Score up to the fourth power, and state dummies; estimation by OLS; robust standard errors adjusted for clustering at locality level in parenthesis. ** Significant at 5%.

Program Impact on Contraceptive Use (CU): Intent-to-Treat Estimates

Model 1 (OLS Simple): Difference average CU between Treatment and Control Areas*

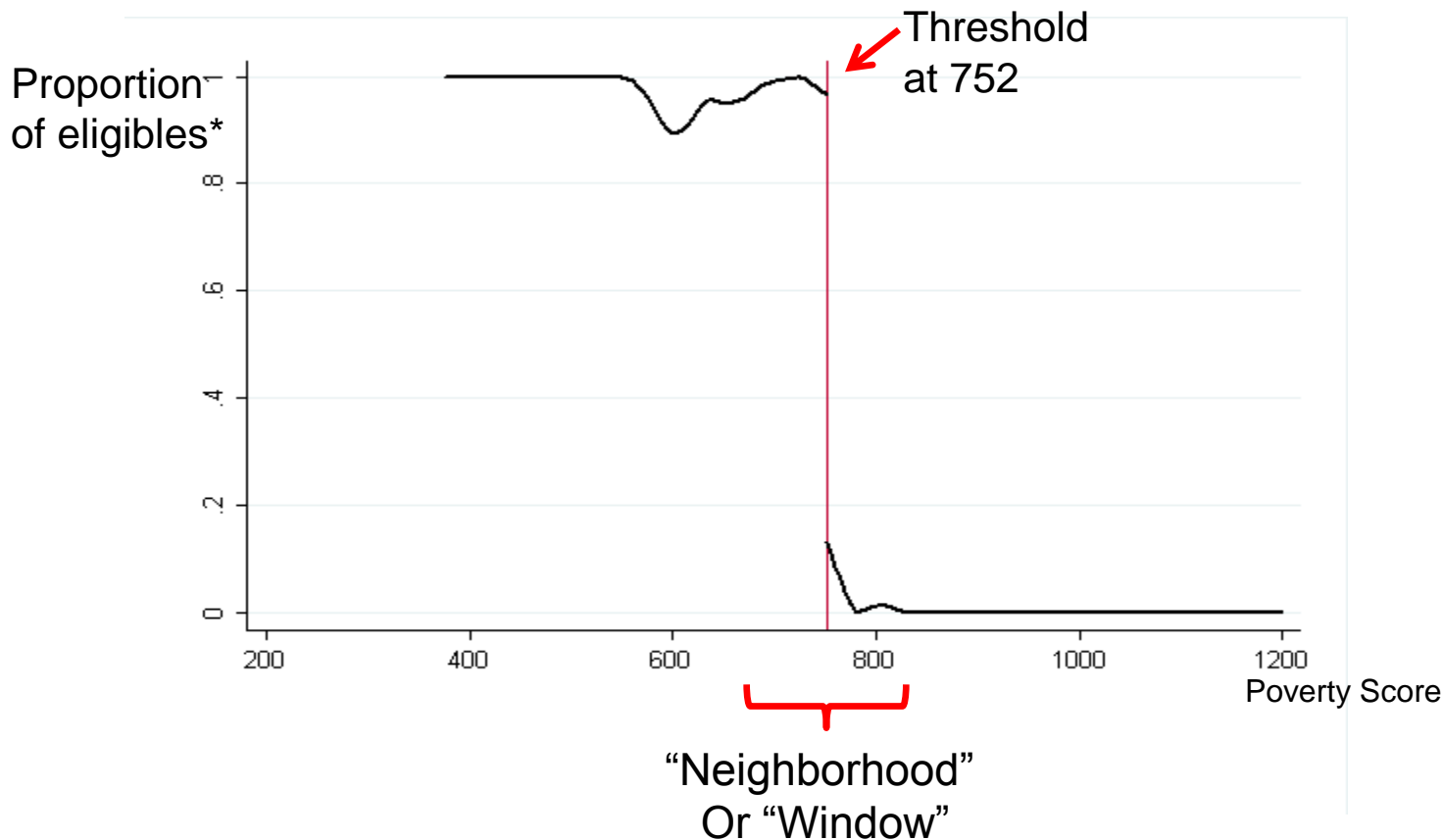
Model 2 (Dif-in-Dif): Difference average CU for eligibles between Treatment and Control Areas, controlling for average difference for non-eligibles.

	Model 1 Simple OLS	Model 2 Dif-in-Dif	
Treatment x Eligible		0.049 (.036)	Impact estimate
Treatment Area (1=treatment;0=control)	0.046** (.022)	0.021 (.029)	
Eligible (1=eligible;0=non-eligible)		-0.03 (.037)	
Observations	2,230	2,230	

*: Models include Age, log of Poverty Score up to the fourth power, and state dummies; estimation by OLS; robust standard errors adjusted for clustering at locality level in parenthesis. ** Significant at 5%.

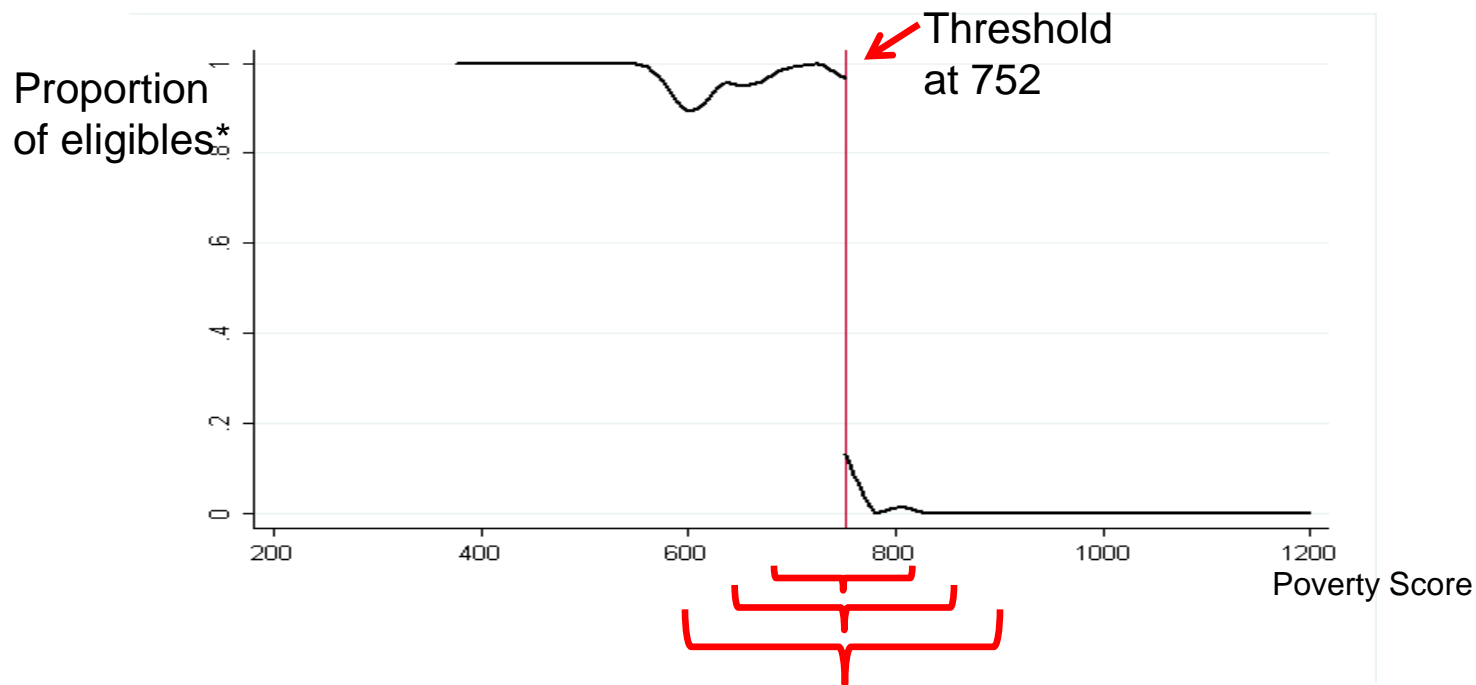
Regression Discontinuity Analysis (RDA)

- It tries to replicate conditions existing in a (good) experiment
- Clever approach: If Eligibility cut-off point creates two groups (eligible and non-eligible) and cut-off point is exogenous to health process, then the two groups are “similar” in a “neighborhood” of the threshold.



*: Moving average

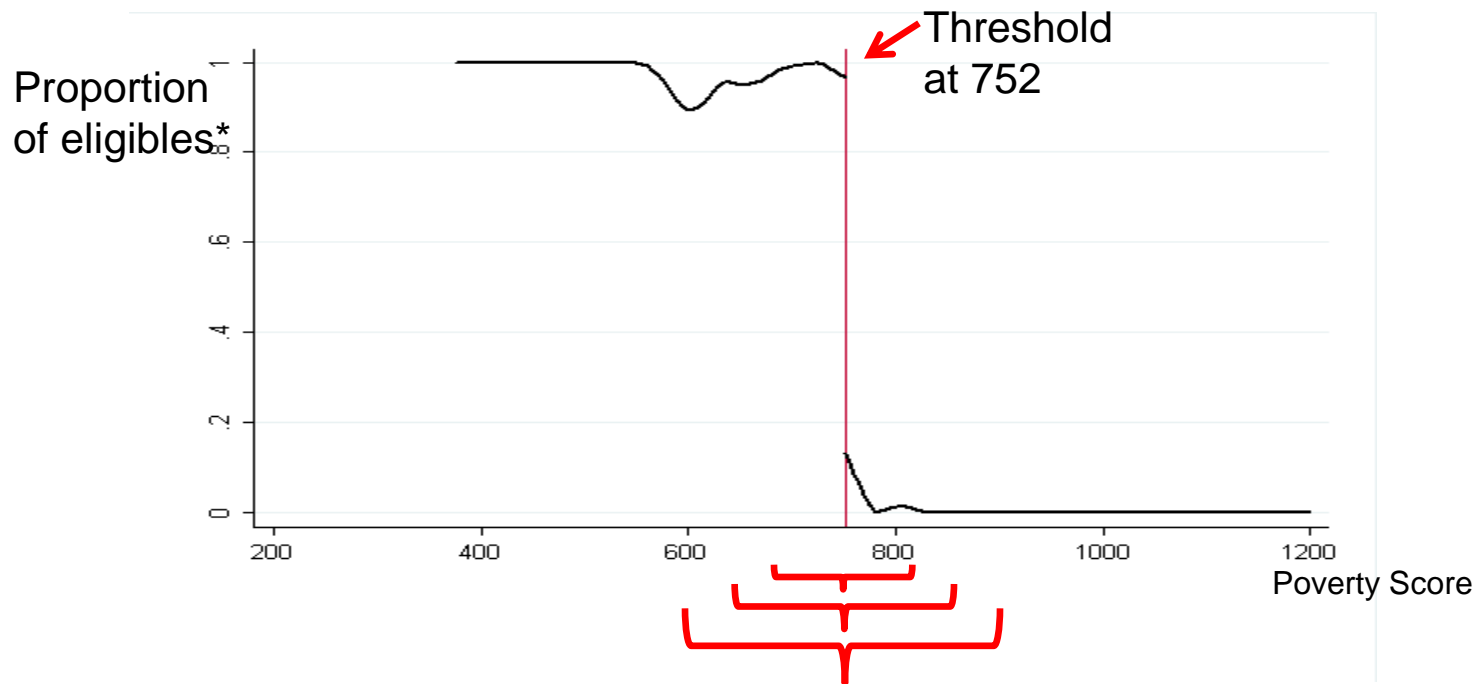
Regression Discontinuity Analysis: Program Impacts from OLS and 2SLS models of contraceptive use, 20-24 years old, treatment areas



Window	Program Impact	
	OLS	2SLS
50-point	-0.224*	-0.218*
100-point	-0.179*	-0.173*
150-point	-0.088	-0.105

*: Significant at 5% level. OLS and 2SLS models control for age, log of poverty score and its square, state dummies. Robust std. errors corrected by clustering. In 2SLS, Eligibility was instrumented using a dummy indicating if individual below Threshold.

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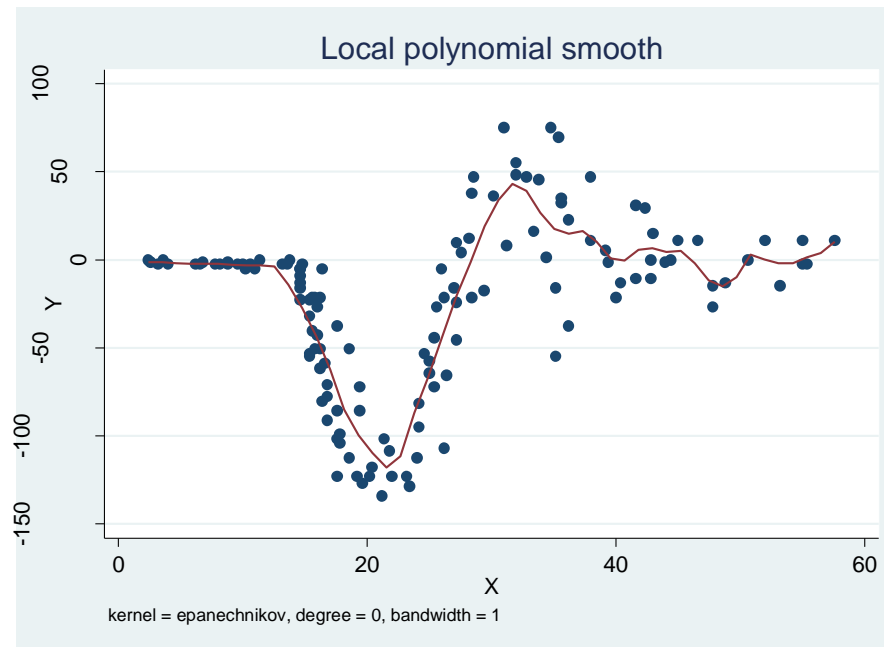
So, Results of RDA:

- Unexpected negative impacts
- Program impact depends on “size of window” so, clear heterogeneous effects!

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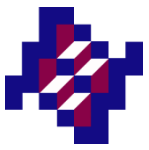
Estimating the distribution of contraceptive use by poverty score

- Use Kernel-weighted local polynomial regression (LPOLY)
- A smoothing technique: it makes no assumptions about the functional form for the expected value of a response Y on a given regressor X but allows the data to “speak for themselves”.
- It is weighted so that the central point (x_i, y_i) gets the highest weight, points farther away receive less weight.

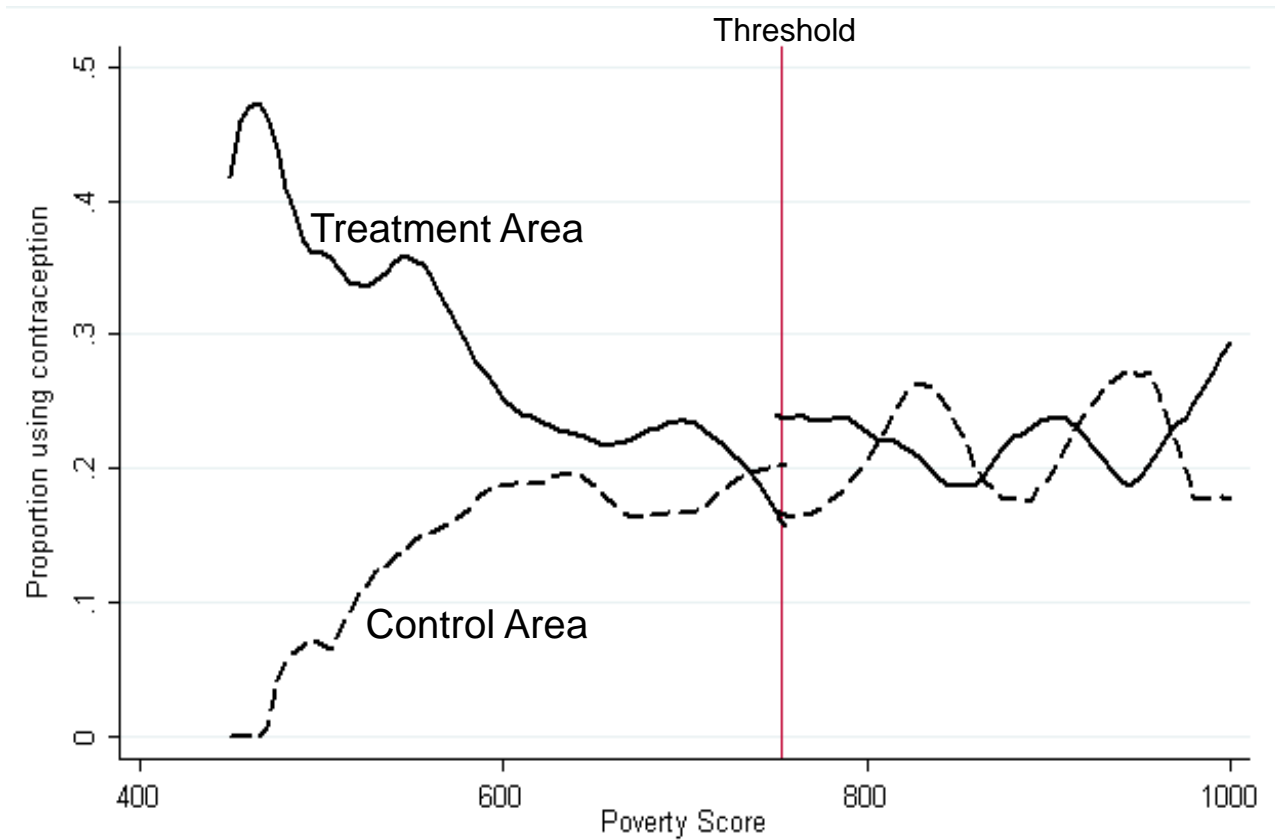


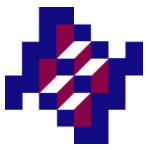
•It can be used for dichotomous variables. So, for a given value of Poverty Score, we obtain the Proportion of Contraceptive Users.





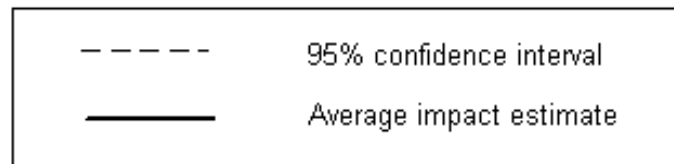
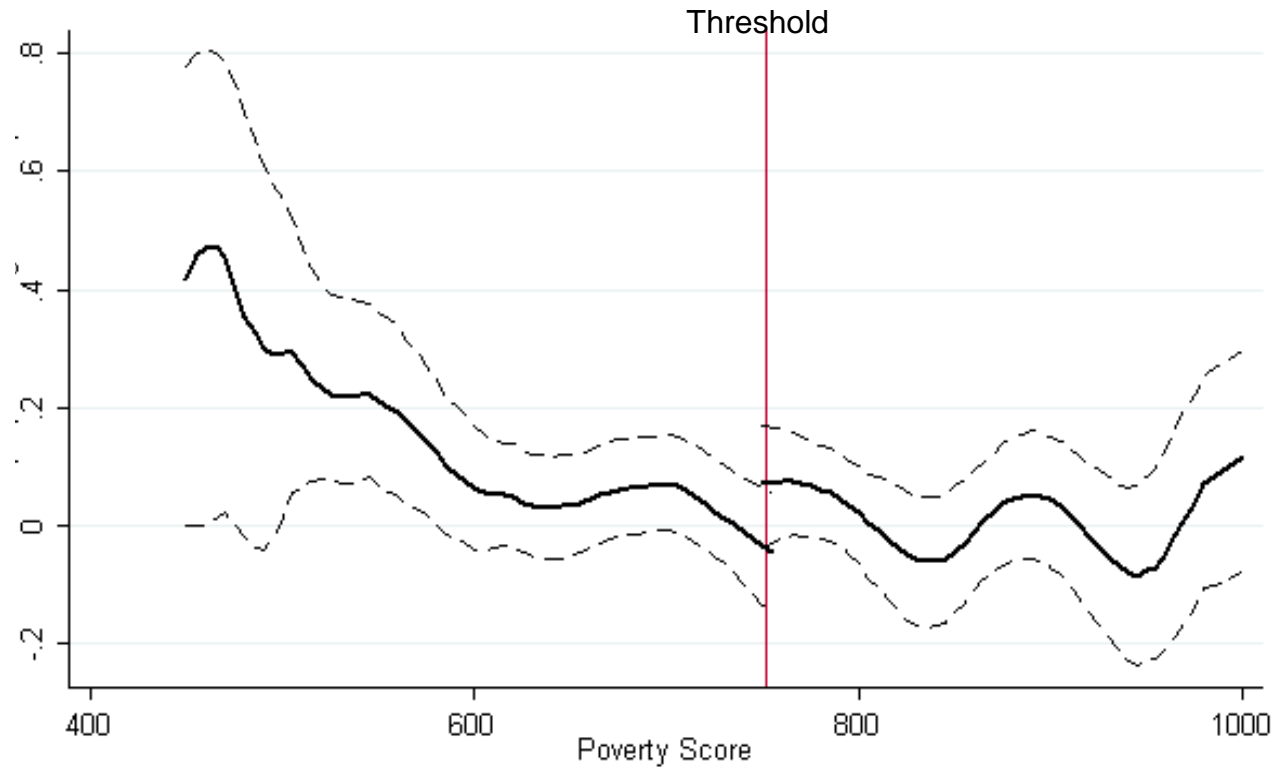
Contraceptive Use by Poverty Score and Type of Area, 20-24 years old, 2000 (Smoothed means)



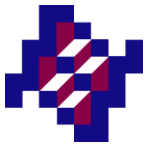


Impact of *Oportunidades* on Contraceptive Use, by poverty score, 20-24 years old

Treatment - Control
Difference in Proportion using Contraception

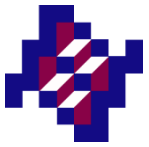


Impact = Treatment - Control. Difference in proportion using contraception, using Lowess smoothing, confidence bands obtained by a 1000 repetition bootstrap performed on clusters (communities).



Conclusions

- **Good news:** The program has a large and positive impact on contraceptive use by the poorest; and it has a small impact on those near the threshold.
- **Bad news:** The program appears to have a negative effect on those very near the threshold. So far this is unexplained...

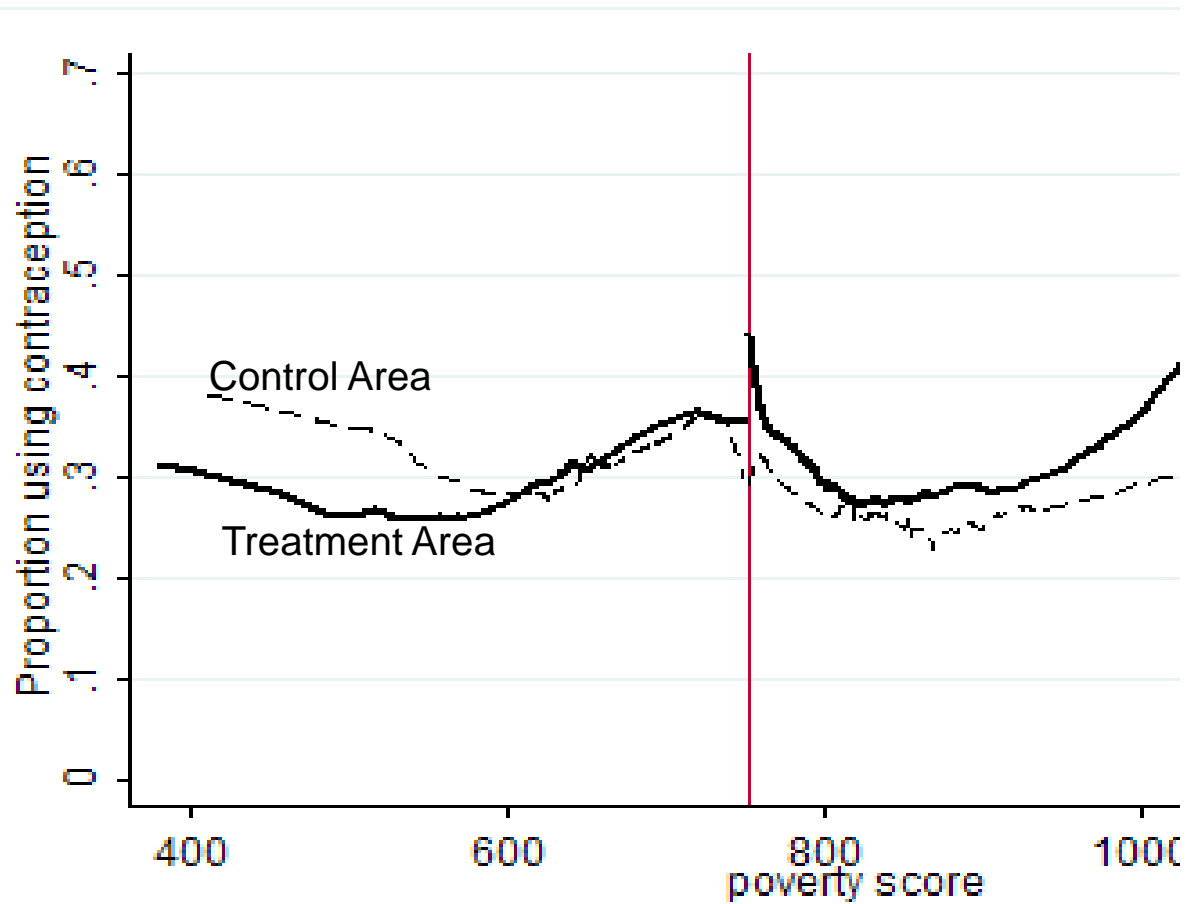


Conclusions

- This is a reminder that usual methods only provide an **average** estimate of effect, and do not tell us anything about the **distribution of effects**.
- Methods that estimate Average Treatment Effects (ATE) would have missed the important effect for the poorest group. Also, Regression Discontinuity Analysis (RDA) in particular only provides a local average treatment effect at the vicinity of the cutoff. It doesn't tell us much about what happens far from the cutoff. In this case, RDA greatly underestimates the program impact in the poorest.
- But, to find effects varying by characteristics of the group of interest one needs larger sample sizes.

Gracias

Contraceptive Use by Poverty Score and Type of Area, 17-21 years old, 1997 (Smoothed means)



Contraceptive Use by Poverty Score and Type of Area, 20-24 years old in 2000, who were 17-21 of age in 1997 (Smoothed means, for panel data, N=703)

