# Education Impacts of Conditional Cash Transfer: Urban Household Evidence From Mexico

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May 11, 2016

**Abstract:** *Nations of the world have long searched for a poverty relief solution that can break the cycle of poverty and encourage education and health among low income citizens. This analysis measures the effect of a specific policy, the conditional cash transfer (CCT), on school attendance. Conditional cash transfer programs are means tested poverty relief efforts that give households money provided they comply with certain human capital development goals. Specifically, the Mexican Progresa program (now rebranded Oportunidades or Prospera) gives monetary transfers provided children attend school 85% of the time and visits health clinics a certain number of times a year. This analysis uses household data from a Mexican survey to measure the effect of a household receiving a conditional cash transfer on whether or not children are attending school in the next year. Controlling for several other factors, a linear probability regression on the binary outcome of child school attendance yields a positive and significant effect.[1]*

Since the turn of the century, the international community and of many governments of developing countries have focused on alleviating poverty for their citizens. Welfare, development aid, debt relief, and microfinance strategies have been implemented on a wide scale during this time. In Central America, Mexico pioneered a new type of poverty alleviation program. *Oportunidades*, as it is called, transfers money from government to citizen, but with specific stipulations for beneficiaries and clearly outlined goals. This program, beginning in 2002, was the first of what would become known as Conditional Cash Transfer Programs (CCTs). This model would go on to be implemented in several other central and South American countries, notably, Brazil, Nicaragua, and Colombia.[2] The international community has hailed the program as a success because its effectiveness at poverty targeting, lowering of administrative costs, human capital development focus, and its framework for future monitoring and adjustment.[3]

*Opportunidades* began in 2002, building off an earlier program named *Progresa* that began in 1997. *Progresa-Opportunidades* was the world's first large scale conditional cash transfer program. Its goal simple was simple: to help poor families in rural and urban communities. But its design is complex. One of the economists who was a father of the program, Santiago Levy, described it as a novel program for its time. The program was first implemented under president Zedillo, under whom it covered 300,000 families. By 2005 the program expanded to cover 5 million people and twenty four percent of the nation's population.[4]

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[2] Levy, Santiago. *Progress against Poverty Sustaining Mexico's Progresa-Oportunidades Program*. Washington, D.C.: Brookings Institution Press, 2006.

[3] IBID

[4] IBID

Part of what makes the Mexican program such a success is its methodological rigor and attentive monitoring. The big question for Progresa is whether or not it has significant effects on education. The following analysis will focus on the effect of the conditional cash transfer (CCT) policy, on school enrollment. Controlling for a number of factors, the analysis uses household data from a Mexican survey to measure the effect of an urban household receiving a conditional cash transfer on whether or not children are attending school in the next year.

II. Literature Review

A number of scholars have studied conditional cash transfer programs. Two of the most notable are Behrman Parker, and Todd (2010) and Attansio, Meghir, and Santiago (2011). Before looking at these econometric analyses, Rawlings and Rubio provide some important background theory and context behind why CCT programs work

There are several reasons why CCTs are effective, as defined by Rawlings and Rubio. First, cash goes directly to households, reducing overhead costs and changing the roles of government, providers, and beneficiaries. Second, it is able to maximize complementaries between different elements of human capital development. Third, cash is a flexible and efficient medium for transfer, avoiding distortions. Fourth, the systems tend to have sound design and strong monitoring.[5] Rawlings and Rubio find significant positive effects of the Mexican program on school attendance five years down the line.[6] They estimated seven to nine percentage point increases in average enrollment rates for girls and three and a half to six percentage point increases for boys in treatment areas.[7]

Behrman, Parker, and Todd used matched pairing to estimate the effects of cash transfers on school attendance comparing like households that were part of the CCT program and those that were not. They used a 2007 ENCEL survey or rural households. The survey is an external evaluation survey of Progresa. The analysis to follow will use a similar dataset but more recent (2009) and from urban households as opposed to rural. Berman, Parker, and Todd found that cash transfers had significant effects on increasing education and future employment.

Attansio, Meghir and Santiago (2011) use an econometric model to analyze data from Progresa's major randomized social experiment. They find strong impacts on enrollment, particularly in secondary school, in accordance with much of the other literature. They also find that child wages are 6% higher in communities with CCT programs.[8] This is a program externality that a lot of previous literature had not forseen.

Fernald, Getler and Hou, look at a different type of dependent variable, approaching the CCT impact from the perspective of health outcomes. However, something novel about their approach is their use of the amount of cash transfer as their independent variable. They found that doubling the cumulative cash transfer had a significant effect on increasing body mass index

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[5] IBID

[6] Rawlings, Laura B, and Gloria Rubio. "Evaluating The Impact Of Conditional Cash Transfer Programs." The World Bank Research Observer 20, no. 1 (2005): 29-55.

[7] IBID

[8] Attansio, Meghir, and Santiago. "Education Choices in Mexico: Using a Structural Model and a Randomized Experiment to Evaluate Progresa." Review of Economic Studies 79, no. 1 (2011): 37-66

at the 5% confidence level. This held true for blood pressure and obesity. This study is an important contribution to the literature, demonstrating how not only the presence of a conditional cash transfer, but the amount of a cash transfer can have significant impacts on program outcomes.

Lastly, Bauw and Houdinnott construct an analysis intended to model whether the conditionality of school attendance is necessary for cash transfers to perform as intended within the Progresa program. They do this by comparing households that received a monitoring form (E1 form) that explained the conditionality of the cash transfer with those did not receive such a document and were thus unaware of the conditions of the policy. To do this analysis, the authors use what they call a nearest-neighbor matching technique that compares like beneficiaries of the program that have similar household conditions, ideally isolating the effect of the awareness of conditionality. The authors find that awareness of conditioning has significant positive effects on school attendance for children entering lower secondary school, but very little effect on those in primary school.[9] The question that emerges being: is it the cash or the attendance condition that increases educational outcomes long term?

II. Data

The data comes from two externally administered 2009 household surveys evaluating *Progresa* program impacts. Specifically, these study the effects of *Progresa* on urban households.

The difference between the two surveys is one measures household level data and provides most of the socioeconomic information that are necessary controls for the regression. This survey contains our variable of interest – whether or not the household received a *Progresa* payment in the past twelve months.

The second survey is a survey of young people and this contains our outcome – whether or not children will be attending school in the next year. The survey only includes data from the first child listed in the survey in order to be able to pair observations between two different surveys. The two most important variables in the model are dummy variables with a value of one indicating yes and a value of 0 indicating no. The first is our independent variable (cct), which is a yes or no answer to the survey question "did this household receive a progresa transfer in the past 12 months?" The independent variable is a dummy as well, and is the answer to a question from the young person's survey "are you attending school in the 2009-2010 school year?"

The data includes nearly 3,000 children in as many households. 64% of these households received a Progresa transfer in the past 12 months and nearly 40% of young people in this dataset are going to school in the year following this window.

The model will also control for several other factors including household consumption, a per capita measure of how much a household consumes in a year; the size of the household, defined by a series of dummy variables (low 1-5 persons, mid 5-10 persons, big 10+ persons); literacy, a dummy for whether or not the child can read and write; grade level, a series of dummy variables for primary, secondary, high school, or beyond; and finally work, demined by whether

[9] Brauw, Alan De, and John Hoddinott. "Must Conditional Cash Transfer Programs Be Conditioned to Be Effective? The Impact of Conditioning Transfers on School Enrollment in Mexico." *Journal of Development Economics* 96, no. 2 (2011): 359-70.

or not a child has contributed to household income in the past 12 months. Individual data comes from the young people survey and household data comes from the household survey.

III. Econometric Model and Results

$$attend_i = \beta_{0} + \beta_1 cct_i + \beta_2 consumption_i + \beta_3 literacy_i + \beta_4 familymid_i + \beta_5 familylarge_i + \beta_6 schoolprivate_i + \beta_7 schoolmissing_i + \beta_8 secondary_i + \beta_9 highsch_i + \beta_{10} grad_i + \varepsilon_i$$

The dependent variable is binary – whether or not the child will be attending school in the following year. As a result the model will be run as a linear probability model, a probit, and a logit model to identify the best fit. Because of similar results across models, my selected identification strategy was a linear probability model because of the ease of interpretation on coefficients.

I hypothesize that households that receive Oportunidades transfers (CCT) will have a higher probability of attending school in the following year. I expect the marginal effect on the variable of interest to be positive, that a household receiving a transfer will cause young people to be more likely to attend school.

$$\frac{dattend}{dcct} = \beta_1(cct) = .0407(cct)$$

| VARIABLES | (1) Linear Probability | (2) Probit | (3) Logit | (4) Linear Interaction |
|---|---|---|---|---|
| | Attend | Attend | Attend | Attend |
| CCT | 0.0407*** | 0.192*** | 0.319*** | .00354 |
| | (0.0142) | (0.0640) | (0.115) | (.0211) |
| Marg effects | 0.0407*** | 0.0419*** | 0.0386*** | .0417*** |
| | (0.0142) | (.01399) | (0.014) | (.0141) |
| Conspcap | -5.66e-06 | -2.60e-05 | -6.01e-05 | -9.39e-06 |
| | (3.60e-05) | (0.000136) | (0.000296) | (3.61e-05) |
| Sizemid | -0.0360** | -0.166*** | -0.290** | -0.0809*** |
| | (0.0145) | (0.0639) | (0.117) | (0.0245) |
| Sizebig | -0.0883** | -0.381** | -0.715** | -0.196*** |
| | (0.0355) | (0.174) | (0.314) | (0.0420) |
| Literacy | 0.165*** | 1.483*** | 2.521*** | 0.162*** |
| | (0.0278) | (0.378) | (0.744) | (0.0284) |
| Secondary | 0.0527 | 0.173 | 0.321 | 0.0540 |
| | (0.0464) | (0.176) | (0.309) | (0.0466) |
| Highsch | -0.0373 | -0.166 | -0.269 | -0.0361 |
| | (0.0476) | (0.175) | (0.304) | (0.0478) |
| Grad | -0.527*** | -1.652*** | -2.804*** | -0.525*** |
| | (0.0470) | (0.172) | (0.300) | (0.0472) |
| Work | -0.0617*** | -0.210** | -0.346** | -0.0623*** |
| | (0.0233) | (0.0875) | (0.153) | (0.0233) |
| Workmissing | -0.263*** | -0.977*** | -1.746*** | -0.265*** |
| | (0.0186) | (0.0651) | (0.117) | (0.0186) |
| Sizemid X CCT | | | | .0666** |
| | | | | (.0285) |
| Sizebig X CCT | | | | .1642*** |
| | | | | (.0614) |

| | | | | |
|---|---|---|---|---|
| Constant | 0.680*** | -0.359 | -0.602 | 0.708*** |
| | (0.0552) | (0.411) | (0.799) | 0.0567 |
| **F-Statistics and P-Values on Hypotheses** | | | | |
| CCT ($\beta_1 \neq 0$) | 0.004*** | 0.003*** | 0.006*** | 0.003*** |
| Size F test ($\beta_4, \beta_5 \neq 0$) | -- | -- | -- | F=5.04 p=.0065*** |
| Adjusted $R^2$ | 0.5009 | -- | -- | 0.5021 |
| Sensitivity | -- | 80% | 79.52% | -- |
| Specificity | | 85.72% | 86.46% | -- |
| Correctly Classified | -- | 83.25% | 83.45% | -- |
| Observations | 2,877 | 2,877 | 2,877 | 2,877 |

In comparing the linear probability models with the probit and logit models, there are similar marginal effects of the cash transfer on attendance rates, with the exception of slightly lower effects in the logit model. The probit and logit model, in both cases offer high sensitivity, specificity, and percent of observations correctly classified. Because of similar magnitudes and standard errors across the board, the linear probability model is the best choice because of the ease of interpretation on coefficients.

According to model one children in households that have received Oportunidades payments in the past twelve months are 4.07 percentage points more likely to go to school in the following year. Some other important coefficients to look at are significant negative effects of larger family size, illiteracy, and the effect of working on one's enrollment in school in the next year.

The hypothesis test on our coefficient of interest, the conditional cash transfer shows significance at the one percent level across the board. In the linear probability model the p value of .004 indicates a strong causal link. Model four includes an interaction term of household size. The coefficients on these interaction terms are significant in this model, and a joint F test shows a significant p-value at .0065. This indicates that the effect of the cash transfer program varies significantly with rising household size. Bigger households see bigger effects on enrollment when they receive the cash transfer.

Despite the significant results on the variable of interest, this model has some limitations. First among these concerns is a concern over correct functional form. A Ramsey Reset Test performed on this regression is cause for concern.

Ho: model has the correct functional form

$F(3, 2863) = 25.45$

Prob > F = 0.0000

This zero F stat indicates I should reject the null hypothesis. The model may not have the right functional form. The large number of dummy variables as control variables is a potential cause of this endogeneity problem. Perhaps OLS is not the best estimation method.

Secondly, this model may suffer from omitted variable bias. One key variable that may be omitted could be gender. The survey data did not include gender for children. This omission could affect the outcome because school attendance rates may differ between gender because of different values around women helping in the home. Child gender could be correlated with a family's choice to opt into the program or not for similar reasons. If a child's gender affects how useful they may be in a family business or helping around the house this would justify its

inclusion. If this argument follows, and being female would make you more likely to stay home from school and help around the house, it would also disincentive families with many girls from accepting the transfer if the value of girls staying home is greater. As a result the model would be underestimating the effect because of the negative correlation with both the outcome and the explanatory variable.

These results are similar to results in prior literature. Behrman, Parker, and Todd found significant results of Oportunidades transfers on children's enrollment five years after the program's inception. They stratify results by grade level and gender, but find similarly significant results for both adolescent girls and boys, showing percent increases in schooling from two to seven percent depending on grade level. There are some key differences between this study and the above. First is the distinction between girls and boys, an important piece of data that was not available in the dataset used above, and a possible sources of endogeneity. The program demonstrated disproportionate positive impacts on students entering secondary school, a result that the above model does not confirm, as none of the coefficients on secondary school were significant.

Attansio, Meghir, and Santiago also find significant results of Progresa grants. Their difference estimate of the impact of Progresa on school enrollment demonstrates significant impacts across multiple age levels. They look at data from the first years of the program, and find that the program becomes more effective with increases in age, particularly around the transition from primary to secondary school. Their results are significant at the 5% level for ages 10-16. Again, a difference between this study and the results above is the division by gender. These particular results were only for boys. Nevertheless they show a similar trend of positive program impact.

In comparing results to previous literature, it is important to look at the power of one's analysis. A power test conducted against Attansio, Meghir and Santiago's coefficient on boys aged 10-16 (Appendix A) yielded interesting results. With a low power of .0985, the model will reject the null hypothesis about 10 percent of the time when the null is false. However this number is not very useful at all. First, the studies are working with different models, OLS vs. linear probability in my case. Second, the appropriate data available from Attansio et. all was only for boys, whereas the model here looks at both genders. Their coefficients measure total enrollment rates instead as opposed to individual probabilities.

V. Conclusion

In conclusion the results suggest that the CCT program is a success in incentivizing school attendance. Households receiving CCT payments showed significant increases in attendance rates over those that did not.

The magnitude of this increase was fairly big as well at over four percentage points. This provides some compelling evidence in line with the previous literature indicating positive educational impacts of the program. While this result does confirm a lot of the previous literature with more recent data, there are some notable limitations. These include potential wrong functional form and omitted variable bias. Both of these factors jeopardize the robustness and causal interpretation of these results.

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