THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF ECONOMICS

EFFECTS OF OPORTUNIDADES ON SCHOOL ATTENDANCE AND LABOR FORCE
PARTICIPATION: FIVE-YEAR FOLLOW UP ON INITIAL SUBSET OF 10-15 YEAR OLDS

GERALD THOMAS MALORGIO
SPRING 2016

A thesis
submitted in partial fulfillment
of the requirements
for a baccalaureate degree
in Economics
with honors in Economics

Reviewed and approved* by the following:

James Tybout
Professor of Economics
Thesis Supervisor

Russell Chuderewicz
Senior Lecturer
Honors Adviser

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

This paper initially defines poverty and introduces Mexico's model Conditional Cash Transfer Program, Oportunidades. The program has offered assistance to millions of families since 1997. It has been critically analyzed to find its overall effectiveness in alleviating extreme poverty. I will look at what has been studied - the outcomes Oportunidades has had on school attendance and performance, changes in labor and intergenerational earnings, and health and nutrition impacts. The second half of this paper will focus on the first generation of 10-15 year old children that benefitted from Oportunidades. Using data from 2002, I will attempt to analyze the impact the Oportunidades grant had on the number of months spent in school a year and the probability of working in the labor force. This age group was between the ages of 15-20 in 2002 and will enable us to see if Oportunidades incentivizes children to pursue secondary and tertiary education as opposed to entering the work force. Ideally, this study will serve as an indicator of effectiveness Oportunidades had on the first subset of participants.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1

Introduction

Extreme poverty is a multidimensional issue that roughly affects 10% of the global population. The most basic definition of poverty is "deprivation in well-being" (World Bank, 2000). Recently updated, a family that earns less than a $1.90 a day in considered below the poverty line. However, poverty is more than just measuring income levels. It applies to a family who is unable to fulfill any of the basic social functions of life such as nutritional needs, adequate income and schooling, good health, and access to basic human rights (Haughton, Khandker, 2009). Conditional Cash Transfer programs are one strategy that focuses on tackling multiple aspects of poverty.

Poverty has been a troubling issue in Mexico for decades. Roughly half of Mexico's population experiences at least one dimension of poverty. The rate of poverty has fallen but the number of people affected by it has increased. This can be explained by the rise in population (Wilson, 2009). Social programs have improved education, health, and nutrition for millions of poor families. Despite living in a growing economy, one aspect of poverty that has not improved is the overall income level of poor families.

Extreme poverty relates to families who fall victim to several aspects of social deprivation. According to Mexico's National Council for the Evaluation of Social Policy (2013), 9.8% of the population place in this category and average over three social deprivations. This issue becomes most evident when looking at the rural economy in Mexico.

The rural poverty headcount ratio measures the percentage of the rural population that live under the national poverty line. In Mexico, it was at 64% in 2012, which is a 10% increase across a six-year span (World Bank Data). Southern Mexico tends to have the highest poverty numbers due to rural communities being more dispersed and further away from urban areas (Harrington, 2011). This geographic area is where Oportunidades has reached the highest number of families.

Oportunidades

In the last twenty years, there has been a significant rise in the use of Conditional Cash Transfer Programs across the world. The goal is to alleviate poverty through investment in health, education, and nutrition by providing monetary aid to extremely poor households. CCT Programs enable governments to allocate funds to millions of households despite tight fiscal conditions (Skoufias, 2007). In order to obtain the funds, families must continue to abide by a set of conditions. These include, but are not limited to, wellness checks, vaccinations, and school attendance. CCT Programs have had the largest success in Latin America, but there is evidence of improvements in other areas of the world too.

Oportunidades has been the global example for a successful conditional cash transfer program. Started in 1997, this program known initially as Progresa, began by giving poor rural households small monetary sums. These transfers were conditional on household members fulfilling the number of medical checkups and for children to reach the yearly school attendance requirement.

By 2007, Oportunidades had reached over four million families with 2.5 million living in rural areas and the remaining in urban areas. It provides assistance to families with children under the age of 22 years of age enrolled between third grade of primary school and third grade of secondary school (Mexico's Oportunidades Program, 2004). Today, using approximately 1% of total GDP as its source of funding, Oportunidades has reached over 30 million families.

As mentioned, Oportunidades functions on a set of conditions that must be met in order for families to receive transfers. Beginning in third grade, participating students have their attendance tracked. They must attend at least 85% of classes and cannot fail a grade more than twice. As children progress to higher grades, the monthly stipends increase in increments. Beginning in secondary school, females receive higher amounts of aid to reduce the opportunity cost of staying in school as opposed to working to provide income for their family (Fernald et al, 2008).

Oportunidades also has a health and nutrition requirement. All children must receive regular check-ups, which is confirmed before the family receives any money. Children, pregnant women, and infants also receive food supplements to help them reach dietary needs. All together, this program tackles education, health, and nutrition for families suffering from poverty. Due to its success, the program has now been replicated in 52 countries (World Bank). However, studies have mixed findings. The following section evaluates the overall effectiveness of Oportunidades in several areas in both the short and long run.

Research Question

There have been many evaluations on the social program, Progresa/Oportunidades. Until recently most studies have focused on the short and middle run impacts the program has on its participating students and families. In Chapter 2, I will summarize the overarching themes that have appeared over the last twenty years. This includes examining school attendance and continuation, academic performance and effort, intergenerational earnings, and potential omitted variables and biases.

In 2002, the original wave of participants between the ages of 10-15 reached an age where they had to decide between attending secondary school and tertiary school or entering the labor force. Using a multiple linear regression model, I will evaluate if the Oportunidades grant does indeed increase the time these children allot to schooling throughout the year. Between the ages of 15-20, boys and girls must decide their future. For many rural families in Southern Mexico the student must leave school to assist their family. This often means ending the school year early to assist in agricultural means of production or other household chores.

Currently, for teenagers 15-20, the average number of months spent in school is approximately six. In Mexico, the education system runs on a 9-month school year. Therefore, if Oportunidades has been successful then we will see a significant increase in the number of months these teenagers dedicated to higher education each year. This regression will be controlled for by many individual, household, and regional indicators. This study will also investigate if the Oportunidades grant decreased the probability of working for the teenagers after five years of exposure. It is important to see the change in labor outcomes for families

based on participation in Oportunidades to indicate potential long-term benefits later in life. Specifically, it will focus on older teens who are making the decision between higher education and the work force. Results will help determine future strategies for Oportunidades in eliminating extreme poverty in rural Mexico.

Chapter 2

The History of Oportunidades

Design of Experiment

The social experiment, Progresa, began to target localities that were in need of assistance to battle extreme poverty in 1997. For a variety of reasons, including geographic size and the difficulty of setting up treatment and control groups within the same community, randomization was done at the local level (Behrman & Todd, 1999). First, geographic focalization was used to locate localities with the greatest deprivation and to confirm there were basic schooling and health services. Within these areas, the social program observed socioeconomic data to evaluate the conditions of individual households in the selected localities (Behrman et al., 2007). The resulting subset included 506 communities. There were 320 treatment localities where all eligible households were offered and given assistance through Progresa starting in the Spring of 1998. The other 186 localities were not initially offered assistance and did not receive any until the beginning of 2000. The Program used evaluation surveys every six months from 1998-2000 for all households in the 506 communities. These rural evaluation surveys (ENCEL) included information on social demographics, education, health, and income (Behrman, Parker, Todd 2004).

In 2003, Progresa/Oportunidades proceeded with a second round of ENCEL, which consisted of the original 506 communities and an additional 151 new localities. The reasoning

was to observe the medium and long-term effects by comparing original households from 1997 with a new sample of participants. The most recent round of ENCEL took place in 2007. Surveys collected included those from the original treatment, original control, and the new matched comparison group (Rodríguez-Oreggia, 2012). There were also surveys collected from households participating from localities outside of the 8 original states.

Today, Oportunidades assists over 30 million families in Mexico. The 2007 ENCEL dataset will be effective in examining the labor outcomes for the population of 15-24 year old participants. There are many different findings and outcomes from Progresa/Oportunidades.

Years of Schooling

In many developing countries, two important issues that keep families from sending their children to school are 1) being unaware of the economic benefits and return to human capital, 2) not having the financial means to afford school (Checchi, 2006).

The first involves a trade off between education and child labor. Extremely poor households are often floating around the threshold of earning $1.90 a day. This creates a generational conflict between parents and their children. Family members expect their children to help around the house and to enter the labor force at a young age. However, there is statistical evidence that show a positive correlation between education and wages (Cooper, 2015).

The vicious cycle of poverty contributes to the second issue. This is extremely prevalent in Mexico's education system where parent's education level has about a 60% influence on their child's education level. This is significantly higher than Latin American and United States averages (Behrman et al., 2008). In imperfect capital markets, families battling severe poverty do

not have the resources to carry out the necessities of life. All of their income goes to food, health, living conditions, etc. There is already no money to save which makes consumption in the future more difficult. Families are forced to invest their resources in the short run instead of being able to focus on the long run investments such as human capital. Unfortunately, even families that are aware of the economic benefits of sending their children to school end up in this group.

Oportunidades provides families with enough aid to reduce the opportunity costs of going to school. It provides them income to send their child to school and to still have resources to manage every day life. Oportunidades has had different effects on enrollment for all age groups.

Before Progresa/Oportunidades, attendance in the continuation of primary school was already at 95% (Dubois, 2004). The Program also does not begin to pay families until the child reaches the third grade of primary school. Therefore, Oportunidades does not have direct significant effects on primary school enrollment.

Evidence from Behrman, Parker, and Todd (2007) does support an increase the number of grades completed for children who were at least nine years old before the program began. There is a slightly higher effect on boys participating in Oportunidades than the girls. Using difference-in-difference matching, boys who were between the ages of 9 to 12 in 1997 accumulated approximately an entire grade more than boys not participating in the program by 2003. In addition, boys older than 12 years of age at the time still showed significant positive impacts on years of schooling. There were also positive impacts on years of education for girls who were between the ages of 9 to 12 in the original treatment group. However, there was no statistical evidence of effects for older girls (Behrman et al., 2007). This contributes to the fact that girls leave school at an earlier age because they are given responsibilities within their households.

Multiple studies confirm the findings of Behrman and agree that Oportunidades has positive short and medium run impacts on years of schooling for boys and girls at different ages. This contributes to the success of Oportunidades in rural Mexican localities.

School Performance and Effort

Historically, there has been little statistical evidence on Oportunidades positively affecting student performance past primary school. This goes against the common misconception of assuming more time in school would result in better test scores for those students. In 2008, a ten-year summary of Oportunidades concludes there is no evidence of changes in cognitive ability or achievement from receiving cash transfers for multiple years (Behrman, 2008).

Using standard math and reading evaluations, a study found a 6% increase in primary school performance for students. The same study found evidence of negative outcomes for performance in secondary and high school as a result of Oportunidades (Dubois, 2004). This can be related to several factors. When students are in primary school, they want to perform well to acquire higher increments of cash at later grade levels. After the third grade in high school, a family no longer receives cash transfers for that student. This creates an incentive for students to perform poorly so they are held back a year. Now the Program enforces that a student's family will no longer receive the benefits if the student fails the same grade twice. The change in motive of the students shows how a monetary incentive can drastically impact a student's performance and effort.

Another factor to take into consideration are the children who are forced to work on top of attending school. Studies have shown that students in this situation tend to perform worse in

school. They are going beyond their mental capability and do not have the capacity to focus on their studies due to a fraction of their time being spent in the work force. This plays a large role in academic performance and goes beyond the capability of the support of Oportunidades.

Intergenerational Earnings

One of the goals of Oportunidades is to interrupt the cycle of poverty in Mexico. Intergenerational earnings help researchers look at how much of an impact parent's jobs and income have on their children. Mexico has a relatively high intergenerational earnings elasticity meaning parent's income have a large impact on the success of their children. For many years, children who are born into poverty remain in poverty. They grow up with jobs similar to their parents and with the same wages and educational level.

Eduardo Rodríguez Oreggia and Samuel Rodríguez (2008) did an analysis of the employment, wages, and intergenerational occupational mobility after the tenth year of Oportunidades. They found little change in wage between male students who participated in Oportunidades and others who did not but still completed higher education. Majority of boys stayed in the same occupational level as their parents. Girls had much different results. Participating girls increased their occupational level by around 60%. This is very encouraging because it shows Oportunidades has increased the incentive for girls to continue their education as opposed to dropping out and working at home.

In absolute terms of all participants, as of the ten year mark of Oportunidades there was not conclusive evidence of an aggregate change in intergenerational earnings as a result of

Oportunidades. At the time participants were just beginning to look for jobs and had the possibility of continuing education.

Implications of the Social Experiment

Oportunidades has a few shortcomings that may have skewed the conclusions drawn from the ENCEL surveys. In many of these rural communities there is a lack of schooling resources to absorb the influx of students. As more students are incentivized to enter secondary school and high school, school quality begins to decrease as class sizes get larger and teachers who are not qualified are hired to fill vacancies in rural schools.

There is also the lag in the labor market in these labor communities. Agriculture still plays a major role in many of these localities which is not considered skilled labor. About 40% of Mexicans in the labor force do not believe their skill set is being optimally used because they cannot find a job requiring skilled labor.

This leads to the final factor of migration. Many students who were in the original treatment and control groups back in 1998 who are now young adults have migrated to different localities or emigrated to the US in order to continue their education or find skilled work. Oportunidades does not track those who migrate from the localities that were included in the experiment. Therefore, we are unsure of the progress those students have made since benefitting from the program. This could also have a bias on the conclusions that many economists have pulled from the ENCEL data. Students who are excelling in school are more inclined to continue their education and search for higher wages. This would not be accounted for in results and

therefore a portion of the original waves is missing. These implications cause shortcomings in

estimating the overall effect of Oportunidades.

Chapter 3

Methodology

Theoretical Framework

Many studies have proven to show that Oportunidades increases the years of schooling a child will receive in secondary education. Using a basic household consumption model provided by Russell Cooper at Penn State, let's assume a students spends all of their time either working or in secondary school. Let e be the fraction of time spent in secondary school over a year. Therefore, $1 - e$ is the time a child spends working in the labor force. In theory, Oportunidades reduces the need for children to enter the labor force to help support their family. As a result, it should help the student achieve a higher level of student capital, $h(e)$ in the long run which is subject to diminishing returns. A student's return to education is also dependent on natural ability, Θ. We also know that schooling is not free. Therefore, let p be the price of secondary school for each student. This is where the Oportunidades grant plays a large role. Many families in Mexico have limited resources and education is not as inelastic as it is in the United States. The grant reduces the price of schooling increasing the total earnings. In a one period model, the student's total earnings would be:

$$y(e) = w(1 - e) + \Theta h(e) - pe;$$

$$y(e) = total\ earnings$$

$$w = wage\ earned$$

This study focuses on the time children spend between school and working. To maximize total earnings in respect to education, the first order condition gives us MC=MR (Cooper, 2015).

$$w + p = \theta h'(e)$$

Since the price of school is less due to Oportunidades, it would be expected that a student would spend more of their time in school because human capital diminishes with more time spent learning. Since the child has a budget constraint for time, the additional schooling would take away the hours spent working each week.

Now let's look at a two period model where time $t = 1, 2$. This will examine a household decision in the long run. In this new model, w_t is the real wage the student earns in periods $t = 1, 2$. We must also account for the human capital accumulation the student received from period 1 from the time they did not spend working. We are still assuming the student spends all time either working or in school. The new equation results in:

$$y(e) = w_1(1 - e) - pe + \frac{w_2 \Theta h(e)}{R} + B;$$

where B is any additional income the student may have received and R is discounted present value from the first period. In this situation, a family must have enough savings in order to maintain the essentials of life.

Families eligible for Oportunidades typically have a borrowing constraint that limits the access to education. The graph below is a two-period consumption model that shows the for households who choose education in period 1 versus those who don't. It is assumed that a student will spend all of their time in school or working. We can also assume $\theta = 1$ because ability will not play a role in this model. Let $\bar{e}$ be defined as the optimal fraction of time spent in secondary school and let p be the price of education. The red line is the hypothetical budget line a household choosing no period 1 education would have in a credit market where borrowing is available.. The blue line is the analogous line for a household that chooses to purchase education.

However, we can assume that the rural families facing extreme poverty do not have access to borrowing from credit markets.

Therefore, without additional aid from Oportunidades, a household that chooses education in period 1 would consume $\omega_1(1 - \bar{e}) - p\bar{e}$. The household would see an increase in income for period 2 enabling them to consume $\omega_2 h(\bar{e})\theta$. As seen in the graph, a household that does not choose education in period 1 consumes ω_1. This leaves them with consumption level, $\omega_2 h(0)$ in period 2. When we compare the households after two periods, the household that chose education in period 1 is at point E and the household without education is at point N. The resulting indifference curve shows the family at point N is better off due to the price of education the other household had to incur because they did not have access to borrowing.

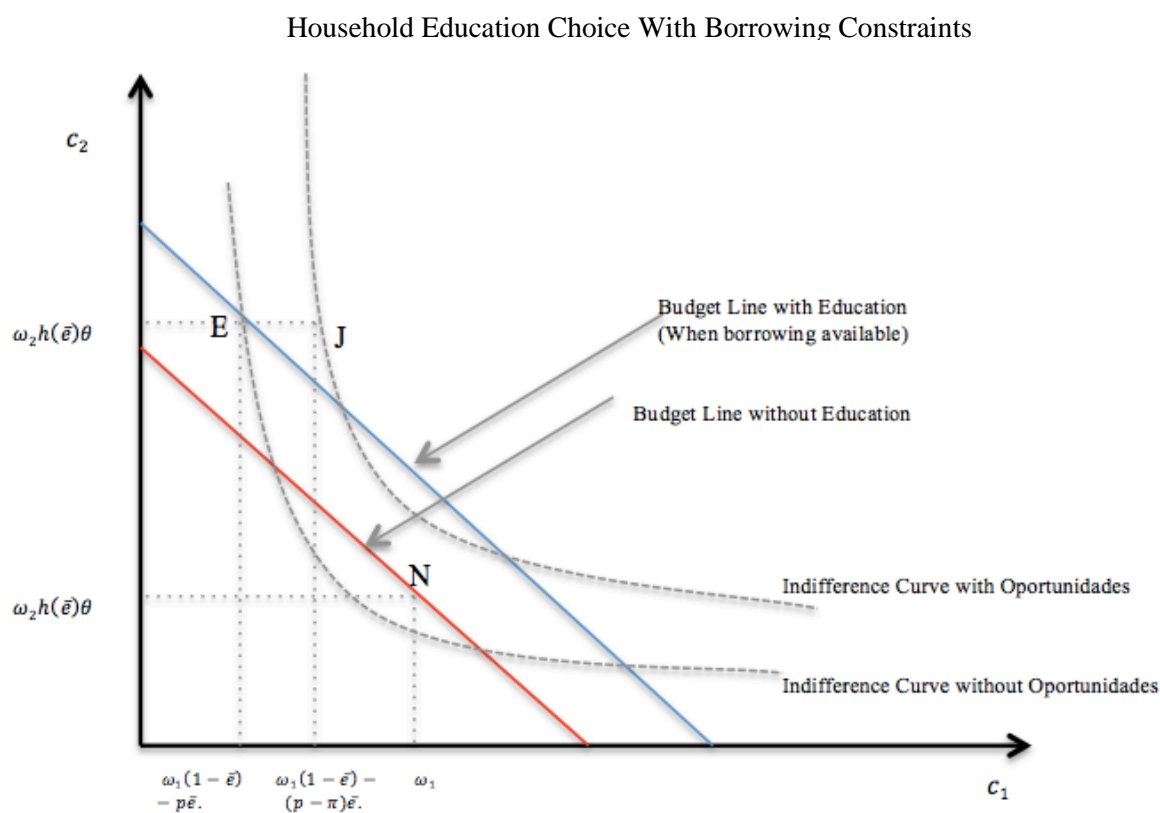Household Education Choice With Borrowing Constraints

Figure 1 Household Education Choice with Borrowing Constraints

Theoretically, the Oportunidades grant reduces the effect of the constraint imposed on these families be reducing the price of education, p. Let π be the Oportunidades grant a family who chooses education receives. As we can see in the graph above, this will shift the household's consumption in period 1 to $\omega_1(1 - \bar{e}) - (p - \pi)\bar{e}$. The decrease in price of education shifts the household's total consumption to point J. At point J, the household now has an indifference curve that expresses higher utility than a household that does not choose education in period 1. This is what this paper hopes to show through the empirical model in the following sections.

Data

The research will be done using data from Mexican and Family Life Surveys (Rubalcava & Teruel, 2006). MxFLS was initially carried out in 2002 by the National Institute of Statistics and Geography (INEGI, per its name in Spanish). The survey is a longitudinal study representative of the Mexican population at both national and regional levels. The MxFLS currently contains information for a 10-year period that was collected in three rounds; 2002, 2005-2006, and 2009-2012. The first round of surveys consisted of 35,000 individuals from 8,400 households in 150 communities. The second and third waves were able to interview about 90% of the original sampled households (Rubalcava & Teruel, 2006). This makes the MxFLS database a better alternative to the ENCEL data that tracked the families specifically in the treatment and control groups for Oportunidades. Future studies can build off this research with the other waves of the MxFLS because it was successfully able to account for migration and for families moving to other states in Mexico. It also tracks those individuals from Oportunidades that have moved location in order to find work after completing secondary and high school

education. In recent years, many studies have utilized this data including Behrman, Parker, and

Todd who have submitted many findings in the past using ENCEL data.

The MxFLS is the first survey in Mexico with a longitudinal design and statistical

representation of the population at the national level. It also consists of a wide range of

indicators, both socioeconomic and demographic, and a broad variety of other topics at the

community, household, and individual level.

This study will use the 2002 wave when examining the effect that participating in

Oportunidades has on the number of hours worked. Researchers have begun to use MxFLS to

analyze the effects of Oportunidades but there are not many focused primarily on additional time

spent in school each year. Fortunately, this dataset identifies which households and individuals

receive the Oportunidades grant and reports the annual income received (Ishikawa, 2014). This

makes it possible to study the long term effects of participating in Oportunidades because the

2002 wave was taken before the new treatment group was selected in 2003. Ultimately, there

were roughly 1200 households that reported receiving grants from Oportunidades in the 2002

wave.

Empirical Design

The main interest of this study is to find if there is evidence that participation in

Oportunidades has a significant impact on time teenagers spend in secondary and tertiary school.

Specifically looking at teenagers who have been exposed to the program for five years. A

multiple linear regression will be used to examine the additional months of schooling a student

will complete due to the Oportunidades grant.. The independent variable to focus on is the binary

$Grant_i$ which will be 1 for those individuals who are receiving aid and 0 for those who are not receiving aid. The model being used in this study evolved from a previous study done at Duke University. Aki Ishikawa (2014) developed a regression to study the effect Oportunidades has on migration using MxFLS. The model distinguishes individual, household, and regional characteristics and is set up as:

$$Months_{ij} = a + \sum_{k=1}^{n} \theta_{ijk} X_{ijk} + \sum_{k=1}^{m} \gamma_{jk} B_{jk} + \sum_{k=1}^{16} \varphi_k S_k + D_o Grant_i + \varepsilon$$

The outcome of this regression will be the number of months children between the ages of 15-20 in 2002 spent in school.

Individual-level characteristics (X) are included in the first summation. Age will be controlled for with a binary, $Young$. This will show the difference age has on time spent in school. The binary will be equal to one if the participant was between 15-17. This is the standard age for secondary school. It will be equal to zero for those who were 18-20. This age group may be in either secondary school or deciding whether to advance to tertiary school. A binary, $Gender$ (male =1, female=0), will adjust for any difference directly linked between boys and girls. There are also two binaries $Work$ and $WorkSec$. These account for if the participant has received income in the past 12 months or worked at any point throughout secondary school. This is used to evaluate how students decide to dedicate time to school if they are required to work.

Household-level characteristics (B) are included in the second summation. Once again, primary school has been omitted. There is a binary, $SusWater$ used to study the effect having drinkable water within the household has on education attendance. $Migrate$ is another binary that will be used to control for the likelihood a household has to migrate. These two binaries are an attempt to control for living conditions and long-term goals of each household. There tends to

be variables that play significant roles in stunting development outside of obvious variables that

may not be issues in countries such as the United States.

The final summation is used to control for regional characteristics for each state. There

will be a dummy variable for each of the 16 states included in the MxFLS. The Southern states

of Mexico tend to have the most participation in Oportunidades. Each state may have differences

in labor markets, availability of schools, crime, economy, and other exogenous factors that need

to be controlled for when strictly looking for the effect of Oportunidades' grants on child labor

hours a week.

In order to study the probability of working for students this age, a similar test will be

used. The only difference is as follows:

$$Work_{ij} = a + \sum_{k=1}^{n} \theta_{ijk} X_{ijk} + \sum_{k=1}^{m} \gamma_{jk} B_{jk} + \sum_{k=1}^{16} \varphi_k S_k + D_o indGrant_i + \varepsilon$$

Ultimately, seeing the effect grant money has on a child's time spent in school and in the labor

force will explain the incentives that Oportunidades creates for these families.

Potential Short-Comings

Unfortunately there are a few shortcomings that will not be able to be accounted for in

this regression. The model will not be able to account for the exact number of years the

individual has been receiving benefits from Progresa/Oportunidades. The MxFLS only tracks if

the individual has received benefits over the last 12 months. Since this wave was done before

ENCEL 2003, it does show the individual was either included in the original treatment or control

wave. This means they have had 4 or 5 years of exposure to the Oportunidades program.

Another potential shortcoming is that this regression will not be able to track the hours of unpaid labor at the child's home. All of these families live in rural areas in Mexico and there may be agricultural work to that children are needed to complete. There are also the jobs that girls typically fulfill around the household that would not be included in the hours worked by the children that MxFLS recorded. Without being able to monitor this, we do not know the true number of hours a child works outside of being in class. This is important because studies have shown that students who work long hours at home on top of going to class have worse academic results than their peers. Although not the topic of this research question, it is an important concept to look at when observing academic performance.

In the regression looking at the number of months a teenager spends in school each year, it will not include their performance. This is the reality of the model being used in this study. For example, certain schools may be short on resources and teachers who are capable of carrying out daily lessons every day. If a child spends all day in a school where they accumulate little knowledge then their time is being wasted and it will not benefit them in the long run. However, this research is being done to strictly examine the time children allot between the labor force and school on a yearly basis.

Finally, due to the nature that for those who were in the original treatment groups between the ages of 10-15, the sample size will be relatively small. This is a shortcoming that cannot be avoiding especially in developing countries such as Mexico where acquiring data from over 15 years ago is difficult.

Chapter 4

Findings

This section has been split into two parts. The first will deal with the effect the Oportunidades grant has on school attendance for the entire school year. The second will look at how the grant affects the probability for a teenager to work over the last 12 months. The main issue I found with analyzing these outcomes was the lack of data for variables that would most likely effect them. For example, there was a lack of responses to certain survey questions such as the distance the household is from the closest school. This would likely have an impact on the number of months a child goes to school. It must be taken into consideration when looking at the results.

Yearly School Attendance

Using the regression defined in the previous chapter the Oportunidades seems to have positively affected the number of months a student spends in school after five years of exposure. For the age group between 15-20, the average number of months a student spends in school is 6.4 months. This is very interesting because the school year is 9 months in Mexico. It also provides evidence that students are forced to leave the school year early in these agricultural-based communities.

The results below significantly show at the 95% confidence level that a student included in the original wave of Oportunidades attended roughly 1.44 additional months of school when they were between the ages of 15-20 than those who did not receive the grant. This optimistic result shows Oportunidades is successfully incentivizing older teenagers to complete a full year

of secondary education. It also is creating more opportunities for students to continue further in school by reducing the opportunity cost.

Both of these can be explained by the minimum yearly attendance requirement and the increase in grant money for each grade passed.

$$Months_{ij} = a + \sum_{k=1}^{n} \theta_{ijk} X_{ijk} + \sum_{k=1}^{m} \gamma_{jk} B_{jk} + \sum_{k=1}^{16} \varphi_k S_k + D_o Grant_i + \varepsilon$$

# Months in School	Constant	Grant	Male	Young	Work	SusWater	Migrate	WorkSec
	6.35	1.44**	-0.70	.09	-0.95**	1.49**	-0.49	-.16
n = 252 $R^2 = 0.20$ ** Significant at 5%								

Table 1 Months Spent in School

I excluded geographic location from the table above because no region had significant influence.

It is not surprising to see that any student who had worked in the past year saw nearly a one month drop in school attendance. However, the significant positive impact that having sustainable water within the household is interesting. This proves that school attendance is affected by fundamental needs such as close access to drinkable water.

For example, to build on the above results, I ran the above regression for those for families with and without sustainable drinking water and the results showed that the Oportunidades grant only increased school attendance for those with access to drinking water within their household. Since this was the first group of 10-15 year olds using Oportunidades,

they did not receive the health and nutrition aid that is given to toddlers. It will be interesting to see the difference the nutrition package has on secondary school attendance.

The regression when ran for the different age groups also had worthy results. Those ages 15-17 were predicted to spend an additional 1.40 months in school each year. This result was significant unlike for the 18-20 year old group. This is another reassuring result because it shows that Oportunidades successfully increased enrollment for secondary education. The students who were 18-20 may discontinue school after they reach the last grade that they are eligible for the

Oportunidades grant. This could be one reason for the drop in attendance for the older age group.

By Age: $Months_{ij} = a + \sum_{k=1}^{n} \theta_{ijk} X_{ijk} + \sum_{k=1}^{m} \gamma_{jk} B_{jk} + \sum_{k=1}^{16} \varphi_k S_k + D_o Grant_i + \varepsilon$

	Constant	Grant	Male	SusWater	Migrate	WorkSec	Work	n	R^2
15-17	6.92	1.40**	-0.96**	1.64**	-0.32	0.34	-1.31**	164	0.23
18-20	6.19	2.04	-0.38	1.05	-0.75	-0.71	-0.86	88	0.11
** Significant at 5%									

Table 2 By Age: Months Spent in School

Next, a regression was used to test the difference between boys and girls with five years of exposure to Oportunidades. There was no significant effect visible for girls who were receiving the Oportunidades grant. The program has recently been changed to offer larger grants for girls in order to keep them in school. This was not the case for the initial group thus it is not surprising for their to be no effect.

In most rural communities, the girls are pulled out of school before boys to help out around the house. Boys who received the grant had a predicted increase of 2.6 months at the 1% significance level. This is another success of the Oportunidades program. In the first regression there was a negative correlation between boys and the number of months a student spends in school each year. This can be explained by the fact that traditionally boys between the ages of 15-20 begin to enter the labor force to help their families. In the rural communities it often means leaving for part of the year to help with harvests and other agricultural means of production. The additional income from Oportunidades had a positive impact on increasing the time the male students are able to spend in school.

By Gender: $Months_{ij} = a + \sum_{k=1}^{n} \theta_{ijk} X_{ijk} + \sum_{k=1}^{m} \gamma_{jk} B_{jk} + \sum_{k=1}^{16} \varphi_k S_k + D_o Grant_i + \varepsilon$

	Constant	Grant	Young	SusWater	Migrate	WorkSec	Work	n	R^2
Boy	5.29	2.57**	-0.38	1.59	-0.057	0.10	-1.05	126	0.23
Girl	7.29	0.23	0.46	1.06	-1.02	-1.41	-0.57	126	0.23
** Significant at 5%									

Table 3 By Gender: Months Spent in School

Finally, this paper separated the data by gender and age. However, the results were not clear due to small sample sizes for each group. The only group to show positive significant results was the 15-17 year old boys. This is not surprising based on the previous results above.

Entering the Labor Force

The MxFLS database also provides enough information to test the probability of working in the labor force within the last twelve months. The main difference from the previous test is

that the dependent variable is a binary: for teenagers who had worked in the last twelve months it will be equal to one and for those who had not it will be zero.

After the initial run there were some concerns with the regression. Nearly every independent variable was significant at the 1% level. This may have been due to the wide range of age, gender, and household conditions. Therefore, the second test was run to study the difference effects between age groups and gender. The data was sorted by the $Young$ and $Gender$ binaries and then ran for the remaining variables. This regression produced convincing results besides from having a very low R^2.

The only two groups to show significant decline in labor force participation were the boys and girls between 15-17. The boys were about 17% less likely to have earned income over the last 12 months and participation for girls went down about 7%. The grant failed to reduce the probability of the older age group that received the grant. Similar to the last section this may be contributed to the teenagers no longer having the incentive to progress as they reach their final years of receiving the additional income.

It is also interesting to look at the difference gender has on the probability of working. The results show that boys of both ages are more likely to work. However, the results for monthly attendance showed boys had higher attendance throughout the year. This may be contributed to one of the issues listed in the shortcomings section. For many rural families, the girls do not necessarily drop out of school to join the formal labor force. They participate on projects at home. It is impossible to test this theory with the given data.

$$Work_{ij} = a + \sum_{k=1}^{n} \theta_{ijk} X_{ijk} + \sum_{k=1}^{m} \gamma_{jk} B_{jk} + \sum_{k=1}^{16} \varphi_k S_k + D_o indGrant_i + \varepsilon$$

	Constant	*Grant*	*SusWater*	*Migrate*	*WorkSec*	*n*	*R^2*
Male: 15-17	.45	-0.17**	-0.13**	-0.10**	0.18	949	0.08
Male: 18-20	.84	-0.24	-0.17**	-0.10	0.18	687	0.08
Female: 15-17	.225	-0.08	-0.085**	-0.016	.17	1,034	0.07
Female: 18-20	.35	-0.12	.035	-0.01	.18	807	0.06
** Significant at 5%							

Table 4 Probability of Working in the Last 12 Months

Chapter 5

Conclusion and Moving Forward

The results from the previous chapter have a few positive outcomes on economic decisions by the initial subset of 10-15 year olds after five years of exposure. When it came to the impact the grant had on the number of months of school these teens attended each year, there were mixed results. When considering the entire group of students, the grant did have a significant impact on increasing the number of months they spent in school. However, when broken down by age and gender, we saw the biggest effect for those who were younger in age. Boys also tended to show more change in their decisions based on the results.

The grant had less of an impact on the probability of working over the last 12 months for this age group. After looking at the gender and age breakdown, only boys between the ages of 15-17 benefitted from the Oportunidades grant.

However, for the first group of students who participated in the program, these results can be seen as a success. There have been many alterations since 2002 and therefore the program's growth is not considered in this paper. This research opens up the opportunity to pursue how the revamped program and grant distribution has impacted participants.

As mentioned, I used the 2002 survey data to hold the number of years the children were exposed to Oportunidades constant. Moving forward, it is possible to see the economic outcome of this same group of participants using new surveys that track up to 2012. The MxFLS has been able to reach over 90% of participants from the initial 2002 round so this is feasible. A follow up can be used to study if the increase in time spent in school each year played a role in influencing their economic situation later in life. Since Oportunidades does not change the labor market, it

may result in students with more education ending up in similar low wage jobs or students migrating to areas with new opportunities.

The later surveys can also be used to monitor the changes of Oportunidades. For example, girls received higher grants and students who pursue tertiary education are given savings accounts that accumulate more money over time. We saw the lack of these two incentives influence the results in this paper. Therefore it would be interesting to see if they further improve Oportunidades.

Finally, the one aspect of Oportunidades this paper could not measure was the health and nutrition piece of the program. Pregnant women and toddlers are required to receive medical treatment and have a nutritional package. We saw household living conditions affect student attendance in school. Therefore, using later surveys to analyze the long term benefits of Oportunidades would be a great follow up.

In regards to the research question of this paper, the initial round of Oportunidades had its successes and failures. There is much to learn from analyzing the results of teens with five years of exposure to the program. The grant had significant impacts on the number of months in school and the probability of working in the labor force within the last 12 months. Oportunidades has had the opportunity to grow over the past 19 years and it will be interesting to analyze the results over time as the program adapts to find optimal solutions for all stakeholders.

Chapter 6

Bibliography

Angelucci, M., & Giorgi, G. (2009). *"Effects of an Aid Program: How do Cash Transfers Affect Ineligibles' Consumption?* American Economic Association.*

Behrman, J. (2009). *Long-Term Effects of Oportunidades on Rural Infant and Toddler Development, Education, and Nutrition After Almost a Decade of Exposure to the Program.* External Evaluation of Oportunidades 2008.

Behrman, J., Todd, P. (1999). *Randomness in the Experimental Samples of Progressa.* International Food Policy Research Institute.

Behrman, J., Parker, S., & Todd, P. (2008). *Medium Tern Impacts of the Oportunidades Conditional Cash Transfer Program on Rural Youth in Mexico.* In Poverty, Inequality, and Policy in Latin America, edited by Stephan Klasen and Felictas Nowak-Lehmann, pp. 219-70. MIT Press.

Behrman, J., Parker, S., & Todd, P. (2004). *Medium-Term Effects of the Oportunidades Program Package, including Nutrition, on Education of Rural Children Age 0-8 in 1997.*

Behrman, J., Parker, S., & Todd, P. (2009). *Schooling Impacts of Conditional Cash Transfers on Young Children.* Evidence from Mexico.*Economic* Development and Cultural Change, *57*(3), 439–477.

Behrman, J., Parker, S., & Todd, P. (2007). *Do School Subsidy Programs Generate Lasting Benefits? A Five Year Follow-Up of Oportunidades.* Instituto Nacional de Salud Publica.

Cameron, S., & Heckman, J. (1999). *The Dynamics of Educational Attainment For Blacks, Hispanics, and Whites.* National Bureau of Economic Research.

Cardoso, E., & Portela S. (2003). *THE IMPACT OF CASH TRANSFERS ON CHILD LABOR AND SCHOOL ATTENDANCE IN BRAZIL.* The World Bank.

Chaudhury, N., & Okamura, Y. (2012). *Conditional Cash Transfers and School Enrollment: Impact of the Conditional Cash Transfer Program in the Philippines.* The World Bank Group.

Checchi, D. (2006). *The economics of education human capital, family background and inequality.* Cambridge, UK: Cambridge University Press.

Cohen, D., & Soto, M. (2001). *Growth and Human Capital: Good Data, Good Results.* OECD.

Cooper, R. (2015). *"Statistics Tools."* The Pennsylvania State University.

DeBrauw, A., Gilligan, D., Hoddinott, J., & Roy, S. (2011). *The Impact of Bolsa Família on Education and Health Outcomes in Brazil.* World Bank.

Debowicz, D., & Golan, J. (2013). *The impact of Oportunidades on human capital and income*

distribution in Mexico: A top-down/bottom-up approach. International Food Policy Research Institute.

Dubois, P., Janvry, A., & Sadoulet, E. (2004). *Effects of School Enrollment and Performance of a Conditional Transfers Program in Mexico.*

Fernald, L., Gertler, P., Neufeld, L. (2008). *10-year effect of Oportunidades, Mexico's conditional cash transfer programme, on child growth, cognition, language, and behaviour: a longitudinal follow-up study.* The Lancet, Volume 374, Issue 9706. National Center for Biotechnology Information.

Fernald, L., Gertler, P., & Neufeld, L. (2008). *Role of cash in conditional cash transfer programmes for child health, growth, and development: an analysis of Mexico's Oportunidades.* National Center for Biotechnology Information.

Fiszbein A., & N. Schady (2009). *Conditional Cash Transfers: Reducing Present and Future Poverty.* Policy Research Report World Bank.

Harrington, L. (2011). *PROGRESSA/Oportunidades Mexico's Conditional Cash Transfer Program: Promises, Predictions, and Realities.* Ohio State University.

Ishikawa, Aki (2014). *Effects of Mexico's Conditional Cash Transfer Program on Migration Decisions.* Duke University.

Lamadrid, F. (2010). *Heterogeneous impact of the social program Oportunidades on use of contraceptive methods by young adult women living in rural areas.* National Institute of Public Health.

"Mexico's Oportunidades Program." (2004). *SHANGHAI POVERTY CONFERENCE: CASE STUDY SUMMARY*: *1-3*. The World Bank.

Rubalcava, L., & Teruel, G. (2006). *Mexican Family Life Survey, First Wave.* MxFLS-1.

Oreggia, E., & Rodriguez, S. (2008). *An Impact of Oportunidades on Rural Employment, Wages and International Occupational Mobility.* External Evaluation of Oportunidades 2008.

Parker, S. (2003). *The Oportunidades program in Mexico.* World Bank.

Saavedra, J., & Garcia, S. (2012). *Impacts of Conditional Cash Transfer Programs on Educational Outcomes in Developing Countries.* RAND Labor and Population.

Terrazas, A. (2011). *Evolving Demographic and Human-Capital Trends in Mexico and Central America and Their Implications for Regional Migration.* Migration Policy Institute.

Teruel, G., Davis, B. (2000). *An Evaluation of the Impact of Progresa Cash Payments on Private Inter-Household Transfers.* International Food Policy Research Institute.

The World Bank. Mexico. *World Bank Database*

Academic Vita

GERALD THOMAS MALORGIO

86 Judy Way, Aston, PA 19014 / (610) 803-4241 / jtmalorg@gmail.com

EDUCATION

The Pennsylvania State University   **University Park, PA**
Bachelors of Science in Economics with a Minor in Business   *2012-May 2016*
Focuses: Theory and Quantitative Methods;
International, Development, and Transition Economics

- Honors:
  - Schreyer Honors College
  - Paterno Fellows Program
  - Deans List: 7 Semesters
- Relevant Coursework:
  - Mathematical Economics: Equilibrium analysis, comparative-static analysis, optimization, and game theory.
  - Money and Banking: Money, credit, commercial and central banking, financial intermediaries, treasury operations, and monetary policy.
  - International Economics: Barriers to trade, balance of payments, exchange rates, Eurocurrency markets, and trade-related institutions.
  - Introduction to Econometrics: Single and multiple variable linear models, nonlinear regression, model specification, binary variables, dummy variables, and introduction to STATA.
  - Financial & Managerial Accounting: Financial reporting and financial statement analysis, long-term liabilities and stockholder's equity, and cash flows.
  - Introduction to Finance: Time value of money and capital budgeting, trade-off between risk and return, security market efficiency, capital structure, and dividend policies.
  - Spreadsheets and Databases: Design, use, and programming in Excel and Access with business application

PROFESSIONAL & VOLUNTEER EXPERIENCE

The Penn State IFC/Panhellenic Dance Marathon (THON)   **University Park, PA**
Dancer Relations Director, Executive Committee   *April 2015-Current*

- Serve as a leader of 15,000 people with 16 Co-Directors for a multi-million dollar philanthropy in the fight against childhood cancer
- Develop and implement new ideas, assist in important decisions and resolve problems under pressure with over 450 student organizations while being directly responsible for leading 20 direct reports and 700 indirect reports
- Implemented an allocation system for dance marathon participants by analyzing previous yearly monetary performances and created a timeline in five minute intervals of participant wellness events for a 46 hour dance marathon in Microsoft Excel

Digital Media Academy   **Stanford, CA**
Director, Stanford University   *June 2015-August 2015*

- Planned logistics of on-campus operations with university officials to provide STEM education and advanced instruction from industry experts to thousands of students at the largest summer technology program in the world
- Served as the primary point of contact for 250 families a week at Stanford University to resolve problems and relay information to the DMA Corporate staff
- Developed a system to track attendance predictions throughout the summer using data in Salesforce and Microsoft Excel

Mission Mexico   **Tijuana, Mexico**
Volunteer   *2013-2015*

- Led activities for a Penn State student organization designed to provide emotional and social support for orphans of the Hogar de los Ninos orphanage

International Student Volunteers   **La Mina, Dominican Republic**
Volunteer   *2013*

- Worked in a team setting of 20 student volunteers to improve infrastructure in a small community
- Assisted in teaching children English and preventing environmental contamination

SKILLS

Skills: Proficient in Microsoft Office, Salesforce, and Google Analytics
               Analytical skills in Microsoft Excel and STATA
               Spanish