Conferencia Interamericana de Seguridad Social

Centro Interamericano de Estudios de Seguridad Social

VOL. 3 NUM. 2 SECOND SEMESTER 2007

Well-being and Social Policy

Quality of Education II
Guest Editor
Harry Anthony Patrinos

CISS

UNIVERSIDAD IBEROAMERICANA
CIUDAD DE MÉXICO

WELL-BEING AND SOCIAL POLICY
VOL 3, NUM. 2, pp. 3-20

IMPACT OF SCHOOL QUALITY ON CHILD LABOR AND SCHOOL ATTENDANCE: THE CASE OF THE CONAFE COMPENSATORY EDUCATION PROGRAM IN MEXICO*

Furio Camillo Rosati
Understanding Children's Work (UCW) Project** and University of Rome "Tor Vergata"
frosati@ucw-project.org

Mariacristina Rossi
Understanding Children's Work (UCW) Project and University of Rome "Tor Vergata"
rossi@economia.uniroma2.it

Abstract

This paper focuses on the impact that two different types of policy interventions, namely enhancing school quality and contingent cash transfers, have on child labor and school attendance in Mexico. While there are many studies on the impact of Oportunidades on schooling outcomes, little evidence is available on whether school quality programs such as CONAFE also reduce child labor and help keep children in school. To carry out the analysis, we merge the Oportunidades panel dataset for the years 1997 to 2000 to the CONAFE dataset containing detailed information on the school quality program components. The econometric strategy involves a bivariate probit model for child labor and schooling, both for primary school aged children and adolescents. In this way, we are able to control whether the impact of the program on schooling differs according to the age of the targeted child. Our findings suggest that school quality programs are not only effective in increasing school attendance, but also act as deterrents to child labor, especially for children of secondary school age.

——— Key words: child labor, schooling, compensatory education, conditional cash transfers, Mexico.
Classification JEL: I21, I28, J22.

* This paper is part of the research carried out within UCW (Understanding Children's Work), a joint ILO, World Bank and UNICEF project. The views expressed here are those of the authors' and should not be attributed to the ILO, the World Bank, UNICEF or any of these agencies' member countries.

** As part of broader efforts toward durable solutions to child labor, the International Labor Organization (ILO), the United Nations Children's Fund (UNICEF), and the World Bank initiated the interagency Understanding Children's Work (UCW) project in December 2000. The project is guided by the Oslo Agenda for Action, which laid out the priorities for the international community in the fight against child labor. Through a variety of data collection, research, and assessment activities, the UCW project is broadly directed toward improving understanding of child labor, its causes and effects, how it can be measured, and effective policies for addressing it. For further information, see the project website at www.ucw-project.org.

Introduction

Education quality is attracting increasing attention in both developed and developing countries. The outcome of the PISA studies in particular have helped focus the attention of policymakers and researchers on what pupils are actually learning at school, thus making school quality the focus of an intense debate.

The issue of school quality is becoming increasingly relevant not only in high and middle income countries, but also in low income countries. As enrolment rates increase, developing countries are facing the challenge of supplying children and society at large with "quality" education. Low school quality is beginning to be seen as an obstacle to expanding school attendance, although little evidence is available to support such a link.

School quality is mainly measured in terms of students' achievements (using various indicators) and there now exists a substantive body of evidence showing that returns to education are significantly affected by the quality of the student and hence by the quality of education. As returns to education are also a proxy for labor productivity, the crucial role of education quality in the growth process is evident.

Much attention has been given in the literature to the analysis of the determinants of school quality, but we are far from achieving a generalized consensus. For a recent review, the reader can refer to EFA report for 2005.

Much less attention has been paid to the role of school quality in determining household decisions about children's time use, i.e., decisions concerning school attendance and involvement in work. The allocation of children's time across different activities depends, among other things, on the relative returns of such activities. To the extent that school quality affects returns to education, it should also influence the household's decision concerning the investment in children's human capital.

An assessment of these effects will shed light on how important the provision of "quality" education is in order to promote school attendance and reduce child labor. It will also contribute to the broader debate on the relative merits of supply- and demand-side policies in achieving school enrolment and child labor reduction goals.

The widespread success of cash contingent transfer schemes (CCT) has shown the potential of demand-side policies for increasing human capital investment. In particular, these programs have been very effective in increasing school attendance, while the evidence of their efficacy on child work is not as consolidated. It is therefore of interest to see whether supply-side policies (quality-enhancing policies in our case) are effective alongside large demand-side programs, and how their efficacy compares.

A large number of studies have been devoted to the evaluation of *Progresa*/*Oportunidades* and we refer the interested reader to the available surveys. Most of the studies have not compared *Progresa/Oportunitades* with other interventions, one notable exception being Coady and Parker (2002), which focused on the comparison of demand and supply (school construction) policies.

Less is known about the effects of *Oportunidades* and CCT schemes in general on the supply of child labor. The available evidence on this link is reviewed in Raju (2006). The review

underscores the need for further research work in order to reach to reach any firm conclusions concerning the effectiveness of CCT schemes as a policy tool for combating child labor.

Similarly, while several published works look at the link between school quality and educational outcomes (for Mexico, see the recent paper by Gertler, Patrinos and Rubio, 2006), much less is known about the links among school quality, school attendance and children's work.

This paper aims to help fill these knowledge gaps by evaluating the impact of a specific school quality program, namely, the Compensatory Education Program (referred to hereafter as CONAFE for the sake of brevity), on school attendance and children's work. The paper also offers some initial comparison of the effects of CONAFE and *Oportunidades*.

The comparison of the effects of demand- and supply-side policies is particularly complex in the specific case of *Oportunidades*, and of CCT schemes in general, as such programs have multiple objectives and often represent a very important and large component of a country poverty reduction strategy. In this paper, we only aim to assess the impact of a quality-improving intervention, conditioning also on demand-side policies, to assess whether enhancing quality has an independent role in addressing children's work and schooling when implemented alongside CCT programs. We will also offer some initial evidence on the relative efficacy of the two programs.

In the next section we present the Oportunidades and CONAFE programs. We will then briefly review the results already available on the impact of these programs. Our estimation strategies and the datasets used are discussed in Section 3. Section 4 presents and discusses the main results of the estimation.

1. CONAFE Compensatory Education Program and Oportunidades Cash Contingent Transfer Scheme

Mexico is considered a middle-income country according to the World Bank indicators. However, the country is characterized by a strong inequality: 51% of the population lives below the poverty line and 42% of total wealth belongs to the highest decile.[1]

The concentration of income has occurred despite large investment in health, education and other social sectors.. A number of programs have been put in place over the years to reduce and mitigate the effect of poverty. Among them, both conditional cash transfer programs and supply-side programs share the goal of enhancing the chances of the poor to move up the social ladder.

Supply-side programs are typically considered weak instruments for improving the access of poor families to social services. In other words, supply-side programs alone do not appear to be sufficient vehicles for "reaching" the poor and changing their circumstances by granting them better access to health and educational investments. Cash transfer programs (CCT), on the other hand, are regarded as better-suited instruments for reaching the poor, as they provide regular benefits, typically in the form of cash, to poor households conditional on their satisfying certain behavioral conditions required for continued benefit eligibility.

[1] See Nigenda and Gonzalez-Robledo, 2005.

Oportunidades has served as the blueprint of many of the subsequently implemented CCT programs. This program has channeled resources directly to the poor so as to promote their access to public available resources and infrastructure. *Oportunidades* started in 1997 (originally known as *PROGRESA*) and radically changed the social sector policies of the Mexican government. The program represents a shift away from the traditional supply–side oriented policies towards a demand-side oriented policy. The program approach centers on transferring public resources directly to poor families, by allowing them to invest in their children's human capital. *Oportunidades* cash benefits represent a consistent and significant portion of beneficiaries' income; the benefits raise beneficiary income by 22% on average. Another characteristic of the program is that mothers are the direct beneficiaries of the cash transfer. The areas covered by the program have changed over time. The program initially targeted only rural areas but starting from 2001 was also extended to urban areas. *Oportunidades* spans different areas of intervention, encompassing three crucial aspects of development: nutrition, education and health.

The provision of cash transfers to eligible households is conditional on meeting several requirements: the child (below the age of 18) she must attend school, she must not repeat a grade more than twice, she must attend regular medical check-ups, and the mother must attend health and nutrition training talks. In kind benefits are also provided to the households through the program.

It is worth noting, given the focus of our study on child labor, that the cash transfers provided through this program are tied to school and health outcomes of the child and not to the cessation of children working,[2] child labor reduction would occur as substitution of child labor in favor of school, due to school-promoting program interventions (see Raju, 2006**).** The cash transfer program, in fact, reduces the attractiveness for the household of resorting to child labor as a source of income.

Turning to supply-side oriented interventions, Mexico started to address the challenge of provision of equal and high quality education to all Mexicans in the 1970s by creating the National Council of Education Promotion (CONAFE), a division of the Secretariat of Public Education Promotion (SEP).

In the early 1990s, CONAFE initiated the Compensatory Education Program with the aim of improving the supply and quality of education in order to reach the most disadvantaged students and reduce schooling inequalities. CONAFE targets those schools with the lowest educational performance in highly disadvantaged communities. It now serves about four million students in preschool and primary education, and about 300,000 students in telesecundaria education, in 44,165 marginalized rural and urban areas (29,534 schools) in all 31 states in Mexico (Gertler et al., 2006).

CONAFE contains a number of elements. The first directly targets schools and consists of improving infrastructure and providing updated audiovisual technology (such as computers) and equipment (desks, bookcases, etc.) to schools. A second set of interventions directly targets school pupils or teachers. These interventions involve providing learning materials to each

[2] Usually cash transfers programs are not directly linked to child labor ending. An exception, among others, is Brazil's conditional cash transfer programs, PETI, which explicitly aimed at eradicating child labor. Under this program beneficiary households, in order to obtain cash transfers, had to agree in writing that child work would have ended.

student (notebooks, pens, pencils, etc.),[3] and professional development and training to all educational staff.

A third element of the CONAFE program involves providing monetary incentives to teachers and principals in multiple grade schools[4] and in schools with more than six teachers, to reduce the high teacher turnover and absenteeism. These incentives should be monitored by parents. Monetary support is also given to school supervisors and for the improvement of monitoring methods. A fourth element consists of institutional strengthening and updating of the informational systems and evaluation planning.

A final program element is support to school management (*Apoyo a la Gestión Escolar*, AGEs). AGEs is based on the provision of grants to parents and leaders to be spent on the educational purpose of their choosing, though these grants are limited to small civil works and infrastructure improvements. AGEs also provides parents' associations with training to guide them on their spending (*Capacitación para el Apoyo a la Gestión Escolar*, CAPAGEs). This element has been proven to be particularly successful in affecting schooling outcomes. Gertler et al. (2006) show that a reduction in children's school failure and drop-out rate of 0.4 percentage points can be imputed to AGEs.

School management programs can be very cost-effective, as they can represent a low-cost way to improve school efficiency, by decentralizing decisions at school levels. Decentralization generates an output that is generally more efficient and tailored to the needs and characteristics of the local environment, thus inducing a more productive learning environment for the child. On the other hand, it is important that the incentive mechanism within a supply program is properly designed so as not to be exposed to the risks that decentralization may imply. These risks include the possible misallocation of public resources when the management of resources is controlled at a local level.

2. Existing Evidence on the Impact of Supply Side and Cash Transfer Programs

There is a large body of literature that illustrates the positive impact of CCT programs on education. In Mexico, among other countries, Schultz (2001) and Skoufias (2005) focus on *Oportunidades* and its impact on children's schooling outcomes. Parker and Skoufias (2001) estimate the impact of *Oportunidades* both in terms of school and work outcomes. A companion paper by the same authors and Patrinos et al. (2005) examine the differential impact of *Oportunidades* on child work rates focusing on both indigenous and non-indigenous households. The empirical evidence shows a large impact of the program on school enrolment, raising the enrolment rate by up to 6% and 9% for boys and girls aged between 12 and 17, respectively. The largest reported impact of the program was on children in secondary school, increasing enrolment rate by 20% and 10% among boys and girls, respectively, at the secondary level.

[3] CONAFE is also in charge of the distribution of this package to all OPORTUNIDADES students.
[4] Multiple grade schools (*multigrado*) are schools were one or more grades are taught simultaneously in one same room.

With respect to child labor, *Progresa*/*Oportunidades* (from now on *Oportunidades*) seems to negatively affect the child work supply, reducing it by 10-14% for all children. The reduction is more marked if we consider older children (12-17); the program reduces the probability of working by 15-20% for children in this age group (Parker and Skoufias 2001). The evidence on the size of the effects of *Oportunidades* on child labor is, however, less firm, and there is a large variation across the different estimates. The encouraging results and successful experience of *Oportunidades* shows the feasibility of such programs in a developing country with a limited social safety net, even when the targeted communities are poor, isolated and with few services.

While there is plenty of evidence on the impact of CCT schemes on school outcomes, relatively few studies have examined the impact of quality enhancing and other supply-side programs on schooling outcomes in Mexico. Exceptions include Lopez-Acevedo (2002) and Shapiro and Treviño (2004), which consider the impact of CONAFE on schooling outcomes. They show that CONAFE causes significant improvements in Spanish test scores for indigenous students while at the same time decreasing repetition and failure rates.

Another study by Gertler et al. (2006) focuses on the impact of one specific component of CONAFE, AGEs. As discussed above, AGEs is based on parents' direct involvement in the management of their children's education. A group of community parents and leaders receive a grant that can be used for educational purposes chosen by the group. AGEs generates mechanisms for the participation of directors, teachers and parents' associations in the management of the schools. The authors show that schools where AGEs program is present exhibit a 4.4% decrease in the proportion of children who repeat grades compared to other schools without the program.

Little has been written on how the two types of programs compare in terms of their impact on school attendance. Coady and Parker (2002) examine whether the impact of demand side programs, such as *Oportunidades*, is diluted when distance to school is taken into account. They show that a reduction in school distance of 1 km increases secondary school attendance by about 7%. They also show that the impact of *Oportunidades* is stable after controlling for supply side program effects.

To our knowledge, there has been no attempt to study the possible impact of school quality on child labor.[5] Our research aims to help fill this gap by looking at the impact of a school quality program on the supply of child labor and school attendance. in addition, as CCT programs were also run in some of the communities sampled, we are able to compare the impact that the two different programs had on schooling and child labor outcomes.

3. Data Sets and Estimation Strategy

To carry out our analysis we make extensive use of two datasets. The first contains the administrative data on CONAFE from 1997 to 2000 for primary schools. This dataset includes very detailed information on the schools targeted by CONAFE in Mexico. For each school, it provides information on the type of infrastructures and services available, number of teachers, supplies, and whether

[5] An exception is a companion paper focusing on Cambodia and Yemen (Guarcello and Rosati, 2007).

and when each type of CONAFE intervention was started. Each school treated by CONAFE can thus be identified through this dataset.

The second dataset used is the Survey of Household Socio-economic Characteristics (ENCASEH) and the Evaluation Survey of PROGRESA (ENCEL), covering the years from 1997 to 2000. The first round in 1997 is our baseline[6] while the following four waves (one in 1998, two in 1999 and the last one in 2000) are post-intervention years. The Evaluation Survey was specifically designed to evaluate the impact of the program intervention.

For each wave, the dataset contains a questionnaire at the community level and at the household level. All waves contain detailed information on school attendance and labor market participation.

We combine the two datasets by selecting only those communities of PROGRESA dataset that also belong to the CONAFE dataset.[7] For the communities that belong to both datasets, we merge all the information on primary schools treated by CONAFE to the communities to which they belong. Communities with more than one school were dropped from our sample as we were not able to identify the different schools within the community. As a consequence, three per cent of the schools were dropped from the sample.

The reason why we consider only communities in the CONAFE sample is due to the challenge of finding an appropriate control group for our estimates. As CONAFE communities receive or will receive CONAFE interventions, and given the gradual phasing-in of the project, those communities that are present in the dataset but not yet treated by the program represent a good potential control group. In this way, the set of CONAFE treatment schools is the set of schools that received CONAFE in the years 1997-2000. Those schools receiving CONAFE from 2001 onwards belong to the comparison group.

The chosen control group is valid if the schools that are treated first do not differ from schools that will be treated in the future. Given the non-experimental nature of our data, if schools with the strongest (weakest) potential for improvement have been incorporated at earlier stages, our estimates would be overestimating (underestimating) the true program effect. Unbiased difference-in-difference estimates rely upon the assumption that post-intervention trends between treated and non-treated schools would have been identical in the absence of the intervention.

As CONAFE is not a randomized experiment, worst performing schools were selected first as beneficiary schools according to a target index. The validity of our estimates, though, relies on the fact that communities in the control group and the treated communities only differ by whether or not they received the treatment. Both communities, treated and untreated, should exhibit the same trends were the interventions not in place. But it is impossible to test this assumption, as the counterfactual does not exist. It is, however, possible to estimate whether the treated communities differ form the control group in their pre-intervention trends with respect to their educational outcomes. If no systematic difference in pre-intervention trends is found, it can be claimed that post-intervention trends would also be the same in absence of policy intervention.

[6] We use ENCASEH dataset as our baseline and not the first wave of ENCEL data as it does not contain information on labor force participation, our variable of interest.
[7] The communities belonging to both samples represent the 80% of all communities.

Gertler et al. (2006) tested whether pre-intervention trends in educational outcomes differ between treated and untreated groups. Their estimates show no significant differences in pre-intervention trends in grade failure rates, grade repetition rates and school dropout rates between schools reached by the CONAFE program in earlier and latter years. In particular, they show that there is no systematic difference in enrolment rate between the schools belonging to the highest quartiles of the distribution of the targeting index, according to which the schools were selected for treatment.

In addition to educational outcomes, Gertler et al. (2006) also exploit the 2000 targeting index constructed by CONAFE to select the worst performing schools as a way of testing for balance between the constructed treatment and control groups of schools. The rationale is that schools with similar targeting indexes are likely to share similar values of the variables used in the index construction, and, thus, similar educational outcomes. The authors show that distribution index of treated and control group overlap over the entire support. Hence this evidence supports the assumption of an absence of systematic difference between treated and control groups of communities.

We generate a sample consisting of 141,940 respondent-wave observations. The selected sample includes children and adolescents 8 to 16 years old, for whom information on both attendance and work is available.

We assume that the outcome variables of interest, school attendance and participation in the labor market, are the result of a joint decision at the household level. We thus jointly estimate them by using a bivariate probit model. One of the reasons that would lead to a correlation between school attendance and work is that the unobserved learning ability of the child is likely to positively affect schooling and negatively affect children's work.

Our estimates will then identify the magnitude of the impact of program interventions both on school attendance and on children's work. However, measuring the impact of program interventions may become a difficult challenge if an appropriate control group is not identified. To this aim, we have exploited the gradual phasing-in of both interventions to estimate the difference-in-difference impact of the program. The gradual phasing-in of programs generates a sample of potentially treated schools or households that differs from the currently treated sample, allowing us to detect the difference-in-difference average treatment effect.

To identify the difference-in-difference estimate we follow the procedure used by Gertler et al. (2006) and Parker and Skoufias (2001) and we refer the reader to these papers for further details.

We estimate the following equation, where the subscripts i and t refer, respectively, to children and time:

$$Y_{it} = \sum_t \alpha_t D_t + \sum_t \beta_t D_t * CPot_s + \sum_t \gamma_t D_t * Op_s + \lambda_t C_{s,t-1} + \sum_t \gamma_t D_t * EOp_i + \sum_{k=1}^{K} \phi_k X_{it} + \varepsilon_{it} \quad (1)$$

i=1..N, t=1..T

The outcome of interest Y is a vector of two variables, (we avoid for simplicity the subscripts), both binary and equal to one if the child works or goes to school. We allow the error terms of the schooling and working equations to be correlated through the correlation coefficient *p*.

D is a set of temporal dummies aimed to capture the time trend. The interaction of time dummies with *Oportunidades* and CONAFE (D*Op and D*CPot) is used to capture the time trend common to potentially treated households, respectively for Oportunitades and CONAFE.

CPot is a dichotomous variable equal to one if the school, or community, is a potential treatment school, i.e. if the school received support for all or some of the treatment years.

In a similar vein, the dichotomous variable Op is constructed so as to detect the households potentially treated by *Oportunidades*. This variable is equal to one if the household i is potentially eligible to receive *Oportunidades* benefits.

E is a dummy variable equal to one if the household is eligible, at time t, to receive *Oportunidades*. C is a dummy variable equal to one if the school is treated by the CONAFE program.

As the number of completed years of schooling is likely to be correlated with school attendance in the following year, we include a set of dummy variables for the number of grades completed in the X regressor set. These dummies should capture the differences in the propensity to attend school, due to the accumulated stock of education. We also include time-state dummies in our regression to capture macro-shocks and policies different across states.

The other regressors in X include dummies on the maximum education level within the households (whether below primary or primary), a set of dummies for the age of the child, the number of teachers per grade in the community school, the number of children, adolescents and adults in the household, and a dummy for the child's gender and time-state dummy variables to capture macro trends common within states.

4. Results and Discussion

As mentioned in section 3, we estimate equation (1) using a bivariate probit model, on the assumption that the two error terms are jointly normally distributed. Our dependent variables, jointly estimated, are the binary variables of working and school attending. The dummy for work takes the value of one if the child worked during the past week, while the school attendance dummy is equal to one if the child attended school during the past week.

Table 1 illustrates the descriptive statistics relative to the sample used in the estimates.

In the age group considered, which also includes secondary school age children, 75% of the children attend school while only eight per cent perform some economic activity. It is noteworthy that most of the working children, especially of primary school age, also attend school. A large group of children, just below 80%, reside in communities that have benefited from CONAFE interventions, while about 70% of them belong to households that are potentially eligible to *Oportunidades*.

Table 2 presents the percentage of children involved in four mutually- exclusive categories of activities: work only, work and study, school only and neither working nor studying. The results

are presented separately for 8 to 11 year-olds and for 12 to16 year-olds. Participation in the different activities differs widely according to the age range of the child. While almost all school-aged children only study before the age of 12, the proportion drops to 59% for older children. Children aged 12 to16 participate in the labor market more intensively; 12% of them is working and not going to school, while only two per cent combine school with work. Just over a quarter (about 27%) of the children aged 12 to 16 is neither working nor studying.

Table 1
Descriptive Statistics of Variables Employed in the Estimates

	Mean	Std Deviation
School	.7587149	.4278643
Work	.0884129	.2838954
Male	.5085068	.4999294
Children aged 0 – 5	.5558969	.8885804
Children aged 6 - 15	1.974074	1.202312
Adults	1.869233	1.635635
No education in the hh	.010899	.103828
Max education in the hh: primary	.3072777	.4613671
Number of teachers per class	1.585721	.7741979
Age=8	.116507	.320833
Age=9	.1066507	.3086697
Age=10	.1181978	.3228434
Age=11	.1113287	.3145399
Age=12	.1096097	.3124037
Age=13	.1061294	.3080042
Age=14	.1016415	.3021774
CONAFE	.7883049	.4085113
Eligible for Oportunitades	.6721699	.4694243
Years of education =1	.0549271	.2278388
Years of education =2	.1161661	.3204251
Years of education =3	.1335555	.3401754
Years of education =4	.125258	.3310124
Years of education =5	.1160952	.3203402
Years of education =6	.1989646	.3992227
Years of education =7	.072345	.2590591
Years of education =8	.0622744	.2416541
Years of education =9	.0665154	.2491817

Observations: 128,887.

Table 2
Children's Activity

	Age 8-11	Age 12-16
Work only	0.39	12.00
Study only	92.79	58.66
Work study	1. 40	2.43
Idle	5.42	26.90
All	100.00	100.00

Source: Our sample based on *Oportunidades* and CONAFE sample dataset. Data pooled (1997-2000).

As the sample used in the estimate is not representative at national level, we use the Mexican Family Life Survey to present nationally-representative estimates of the percentage of children in each activity for the year 2002 (Table 3).

As the determinants of schooling might differ widely according to whether the child attends primary or secondary school (as also demonstrated by the previous evaluations of *Oportunidades*), we estimate two separate models for children, 8 to 11 years old, and 12 to 16 years old, respectively, These age groups correspond to the age range relevant for attendance to primary and secondary education. The estimated impact coefficients are shown in Table 4 and will be discussed below.

The results presented in Table 4 show that both *Oportunidades* and CONAFE have an impact on children's work and schooling, but that this effect is differentiated according to the age group considered. For young children (aged 8 to 11), CONAFE does not appear to have an impact on school attendance, while it reduces participation in economic activities. The supply side program has, however, an impact both on schooling (positive) and on work (negative) for the children aged 12 to 16. *Oportunidades* has a positive impact on the school attendance of children at any age, and tends to reduce child labor, especially for the older children group.

Table 3
Children's Activities at National Level

AGE 8-11		AGE 12-16	
Number of children	Percentage	Number of children	Percentage
Work only	6,618	0.06	276,020	2.45
Study only	9,250,593	88.49	8,445,231	75.01
Work study	377,283	3.61	806,563	7.16
Idle	819,518	7.84	1,730,873	15.37
All	10,454,012	100.00	11,258,687	100.00

Source: Mexican Family Life Survey 2002 (MFLS). Data representative at National Level.

Table 4
Estimation Results. Coefficients of Bivariate Probit Model.
Impact of CONAFE and Oportunidades

	AGE 8-11			AGE 12-16	
	School	Work		School	Work
CONAFE	0.037	-0.090	CONAFE	0.058	-0.084
	(1.18)	(2.48)*		(3.37)**	(4.42)**
*Oportunidades*_wave2	0.216	-0.071	*Oportunidades*_waveave2	0.155	-0.097
	(2.67)**	(0.74)		(3.89)**	(2.26)*
*Oportunidades*_waveave3	0.246	-0.035	*Oportunidades*_wave3	0.079	-0.038
	(2.93)**	(0.35)		(1.89)	(0.80)
*Oportunidades*_wave4	0.345	-0.401	*Oportunidades*_wave4	0.193	-0.104
	(3.41)**	(3.49)**		(4.65)**	(2.22)*
*Oportunidades*_wave5	0.291	0.067	*Oportunidades*_wave5	0.116	-0.024
	(3.74)**	(0.71)		(2.79)**	(0.52)
*Oportunidades*_wave6	0.511	0.027	*Oportunidades*_wave6	0.204	-0.077
	(6.25)**	(0.19)		(4.91)**	(1.66)
Observations:	54431		Observations:	65999	
p= -0.38 (p-value: 0.00)			*p*= -.60 (p value: 0.00)		

Note: Regressors include time state dummy variables, treatment specific trends.
Robust z statistics in parentheses. *significant at 10%; ** significant at 5%; ***significant at 1%.

But the age ranges considered do not necessarily reflect potential enrollment in primary or secondary education, as late entry and grade repetition create a wedge between the age of the child and the actual grade she can attend. For this reason, we also estimate our model separately for children that have completed less than six grades (labeled Primary school age children) and for children that have completed six or more grades (Secondary school age children).

The estimation results based on grade completed are shown in Table 5, column (1) and (2). We can observe that the same pattern is maintained with respect to the estimation just discussed. However, in this case CONAFE appears to have an enhancing effect on school attendance for both age groups, while it maintains its negative impact on work. The effect of *Oportunidades* on schooling does not change, but becomes less defined in terms of children's work. The fact that the program effects are different according to whether we consider the actual age of children or their primary or secondary potential attendance, is likely to be due to the fact (well known for *Oportunidades*) that the largest effects of these programs are in terms of transition from primary to secondary education. We will return on this issue later on.

As the nature of our model is non-linear, the set of coefficients is not very meaningful, unless we provide the estimates of the corresponding marginal effects. The marginal effects are calculated for the regression model where the sample of children is divided by their age range (8-11 and 12-16) and are presented in Tables 4 and Table 5.

Table 6 illustrates the program impact on the probability of school attendance. Column (1) and (2) report the marginal effects of the programs on the young and older children, respectively. *Oportunidades* increases on average by two percentage points the attendance rate of the children aged 8 to 11, while CONAFE does not appear to have a significant impact. For the older children group (12-16), both programs significantly enhance school attendance. Belonging to a community treated by CONAFE increases the probability of attending school by almost two percentage points, while *Oportunidades* has a larger impact that has already been documented and needs not to be discussed here. The marginal effects calculated on the sample of primary and secondary school age children are reported in column (3) and (4) of Table 6. In this case, CONAFE has an impact on the school attendance of children belonging to both groups. Belonging to a community that has received CONAFE in particular increases the probability of school attendance by just less than two percentage points. The effects of *Oportunidades* continues to be significant and larger than those of CONAFE, especially for the children of secondary school age.

Increasing school quality appears to be particularly effective in decreasing child labor supply. CONAFE significantly decreases child work, albeit by only 0.5 percentage points, for children aged 8-11, as shown in Table 7 (column (1)). The effect on children's work is larger for the age range 12-16 (column(2)), with CONAFE reducing the probability that a child works (with or without attending school) by just more than 1.5 percentage points. Only marginally higher results are obtained for primary and secondary school aged children (illustrated in Table 5, column 3 and 4). Given the average participation rate in both age groups, the observed impact is far from negligible.

Table 5
Coefficients of Bivariate Probit Model. Impact of CONAFE and Oportunidades

	Primary school age			Secondary school age	
	School	**Work**		**School**	**Work**
CONAFE	0.071	-0.098	CONAFE	0.042	0.080
	(3.14)***	(3.85)***		(2.12)**	(3.60)***
*Oportunidades*_wave2	0.172	-0.058	*Oportunidades*_wave2	0.183	-0.065
	(3.07)***	(0.89)		(3.98)***	(1.30)
*Oportunidades*_wave3	0.099	-0.104	*Oportunidades*_wave3	0.143	0.038
	(1.60)	(1.46)		(3.03)***	(0.71)
*Oportunidades*_wave4	0.216	-0.286	*Oportunidades*_wave4	0.205	-0.013
	(3.31)***	(3.80)***		(4.31)***	(0.24)
*Oportunidades*_wave5	0.112	-0.028	*Oportunidades*_wave5	0.190	0.048
	(1.95)*	(0.42)		(3.97)***	(0.90)
*Oportunidades*_wave6	0.363	-0.073	*Oportunidades*_wave6	0.206	0.016
	(6.37)***	(0.96)		(4.25)***	(0.29)
Observations: 71473			Observations: 48957		
p= -0.45 (p-value=0.00)			p= -0.57 (p-value=0.00)		

Note: Regressors include time state dummy variables, treatment specific trends.
Robust z statistics in parentheses. *significant at 10%; ** significant at 5%; ***significant at 1%.

Table 6
Marginal Effects of CONAFE and Oportunidades on School Attendance

	8-11 (1)	12-16 (2)	Primary school age (3)	Secondary School age (4)
CONAFE	.0015	**.0179**	**.0180**	**.0191**
*Oportunidades*_wave2	**.0118**	**.0578**	**.0045**	**.0443**
*Oportunidades*_wave3	**.0133**	.0282	.0011	**.0329**
*Oportunidades*_wave4	**.0171**	**.0696**	**.0123**	**.0538**
*Oportunidades*_wave5	**.0151**	**.0409**	**.0043**	**.0469**
*Oportunidades*_wave6	**.0231**	**.0705**	**.0339**	**.0461**

Note: *Bold numbers represent significant marginal effect (at least at 10%).

Table 7
Marginal Effects of CONAFE and Oportunidades on Work

	8-11 (1)	12-16 (2)	Primary school age (3)	Secondary School age (4)
CONAFE	**-.0045**	**-.0164**	**-.0081**	**-.0158**
*Oportunidades*_wave2	-.0020	**-.0145**	-.0006	-.0038
*Oportunidades*_wave3	-.0001	-.0039	-.0033	.0151
*Oportunidades*_wave4	**-.0092**	**-.0168**	**-.0113**	.0061
*Oportunidades*_wave5	.0008	-.0042	.0007	.0204
*Oportunidades*_wave6	.0004	-.0129	-.0028	.0124

The CCT program also appears to have a negative effect on child labor. The size of the effect is similar to that of CONAFE, but it can only be identified for some of the waves considered in this study.

The impact of both programs seems to be larger for the subgroup of older children for both age definitions used here. This is not surprising given that in Mexico primary school attendance is almost universal and that very few young children combine school and work. For these groups of children, we disentangle the impact the two programs on the child's probability of belonging to each of the four sub-categories of children's activities mapped by the bivariate probit.

The results are presented in Table 8 and Table 9, for the sample of children split by age and potential grade, respectively. The CONAFE program appears to have been effective in shifting children away from working (especially working only) to school, by increasing school as the sole

Table 8
Age 12-16. Marginal Effects for Sub-Categories of Working and Schooling

	Work & School	School Only	Work Only	No Work & No School
CONAFE	**-.0035**	**.0214**	**-.0129**	-.0050
*Oportunidades*_wave1	0.0001	**.0577**	**-.0149**	**-.0428**
*Oportunidades*_wave2	0.0012	**.0270**	-.0051	**-.0231**
*Oportunidades*_wave3	0.0004	**.0692**	**-.0172**	**-.0524**
*Oportunidades*_wave4	0.0023	**.0387**	-.0065	**-.0344**
*Oportunidades*_wave5	0.0019	**.0686**	**-.0148**	**-.0556**

See comments to table 3.

Table 9
Secondary School Aged Children. Marginal Effects for Sub-Categories of Working and Schooling

	Work & School	School Only	Work Only	No Work & No School
CONAFE	**-.0024**	**.0215**	**-.0134**	-.0056
*Oportunidades*_wave1	.0033	**.0410**	-.0072	**-.0371**
*Oportunidades*_wave2	**.0080**	**.0249**	.0071	**-.0401**
*Oportunidades*_wave3	**.0076**	**.0462**	-.0014	**-.0523**
*Oportunidades*_wave4	**.0116**	**.0353**	.0088	**-.0558**
*Oportunidades*_wave5	**.0088**	**.0373**	.0037	**-.0498**

activity by two percentage points. Conversely, the impact of *Oportunidades* on school attendance seems to have been generated mainly by reducing the probability of a child being "idle" (neither in school nor working) rather than by reducing child labor. Given the relatively small number of children in some of the categories, such results must however be considered with some caution.

Our analysis has focused on the impact of the two programs on child labor and school attendance, thus assessing the impact of the two programs on the flow of human capital accumulation. However, in order to assess whether CONAFE also affects the stock of investment in human capital and not only the attendance rate, we estimate its impact on the grades completed by children aged 8-16. We employed an ordered probit to estimate our model, as grade completion does not lend itself to the use of a linear metric. The explanatory variables and the approach used to identify the program effects are the same described above. The results of the estimates are presented in Table 8, while Table 9 contains the marginal effects.

Table 10
Years of Education. Coefficients of Ordered Probit Analysis

	Years of education
CONAFE	0.056
	(5.99)***
*Oportunidades*_wave1	**0.061**
	(3.07)* **
*Oportunidades*_wave3	**0.024**
	(1.15)
*Oportunidades*_wave5	**0.118**
	(5.67)* **

Observations: 89,340.

Table 11
Marginal Effects on the Probability of Completing Grades

	Grade=5	Grade=6	Grade=7
	Marginal effects	Marginal effects	Marginal effects
CONAFE	0.003	0.011	0.004
*Oportunidades*_wave1	0.003	0.013	0.004
*Oportunidades*_wave3	0.001	0.005	0.002
*Oportunidades*_wave5	0.004	0.020	0.007

Note: Number in cells are the marginal effect of CONAFE and *Oportunidades*, on the dependent variable, probability of reaching N years of education. E.g the first cell number is the marginal effect of CONAFE is equal to: d(Y=5)/d(CONAFE).

We are particularly interested in the ability of the intervention to make a child complete primary school, as this obviously greatly increases the probability of continuing on in secondary education. For this reason, we present the marginal effects for the grades around primary school completion. As it is easy to see, improved school quality successfully increases primary school completion. The chances of completing the primary school are between one and two per cent higher for those children attending a school treated by CONAFE. The impact of *Oportunidades* is very similar in magnitude to that of CONAFE. (Tables 10 and 11).

5. Conclusions

The results of the impact assessment presented in this paper clearly show that quality of education does not only matter for learning achievements, but it is also relevant for increasing school attendance. This result constitutes new evidence, as most studies has concentrated on the effect of school quality on learning achievements. This conclusion, it must be stressed, also holds when

large demand side policies are in place. Supply side interventions, and those aimed at improving school quality in particular, appear then to be an important complement to demand side interventions. Improved school quality not only increases attendance, but also reduces involvement of children in work. Quality of education, hence, is important for increasing human capital investment by keeping children in school and away from work. In the case of Mexico, where the majority of working children also attend school, the observed impact implies that parents value quality of education: when they observe an improvement in the learning achievements of their children, they increase their involvement in education by reducing their participation to economic activities.

As most children attend primary school and do not begin to work at very young age, the larger effects on school attendance and, especially, on work for older children might also be an indication of a lock-in effect. Children that attend improved primary schools are more likely to continue in their studies and not to be working.

While the results obtained are suggestive of a relevant impact of supply side policies on child work and school attendance, we must bear in mind that they are relative to a middle income country like Mexico. Generalization of this conclusion would require additional work to be carried out also for low income countries.

As mentioned in the previous sections, it is difficult to compare the relative effectiveness of the two programs considered here given their different scope and size. However, from the estimate it emerges that while supply side policies do have an impact on school attendance, demand side interventions like CCT appear to be more effective. The situation looks different in the case of children's work, where quality enhancing interventions are at least as effective as demand side policies in reducing children's involvement in economic activities.

Of course, more analysis is required in this area both in terms of assessing the relative cost efficiency of the different interventions and of more in depth testing of the results in terms relative impact of the policies.

References

Bando, Rosangela G., Luis Felipe López-Calva and Harry A. "Chile Labor, School Attendance, and Indigenous Households: Evidence from Mexico." Policy Research Working Paper Series 3487. Washington, D.C.: World Bank, 2005.

Coady, David, and Susan Parker. "Cost-Effectiveness Analysis of Demand- and Supply-Side Education Interventions: The Case of PROGRESA in Mexico." *Review of Development Economics* 8, no. 3 (August 2004): 440-51.

Gertler, Paul, Harry Patrinos, and Marta Rubio-Codina. "Empowering Parents to Improve Education: Evidence from Rural Mexico." Policy Research Working Paper Series 3935. Washington, D.C.: World Bank, 2006.

Guarcello, Lorenzo, and Furio Camillo Rosati. "Does School Quality Matters for Working Children?." Understanding Children's Work Working Paper Series. Rome: ILO, UNICEF, World Bank, 2007. Available online at: http://www.ucw-project.org/ucw/washington_april2407/rosati.pdf.

Handa, Sudhanshu. "Raising Primary School Enrolment in Developing Countries: The Relative Importance of Supply and Demand." *Journal of Development Economics* 69, no.1 (October 2002): 103-28.

Handa, Sudhanshu, and Benjamin Davis. "The Experience of Conditional Cash Transfers in Latin America and the Caribbean." *Development Policy Review* 24, no. 5 (September 2006): 513-36.

López-Acevedo, Gladys. "Learning Outcomes and School Cost-Effectiveness in Mexico: The PARE Program." Policy Research Working Papers Series 2128. Washington, D.C.: World Bank, 1999.

Nigenda, Gustavo, and Luz María González-Robledo. "Lessons Offered by Latin American Cash Transfer Programs, Mexico's Oportunidades and Nicaragua's SPN. Implications for African Countries." Department for International Development (DFID), Health Systems Resource Center. London: DFID Health Systems Resource Center, 2005.

Raju, Dhushyanth. "The Effects of Conditional Cash Transfer Programs on Child Work: A Critical Review and Analysis of the Evidence." Human Development Network Social Protection Working Paper Series. Washington, D. C.: World Bank, 2006.

Skoufias, Emmanuel, and Susan Parker. "Conditional Cash Transfers and Their Impact on Child Work and Schooling: Evidence from the PROGRESA Program in Mexico." *Economía* 2, no. 1 (Fall 2001): 45-86.

Schultz, Paul T. "School Subsidies for the Poor: Evaluating the Mexican Progresa Poverty Program." Economic Growth Center Discussion Paper No. 834. New Heaven: Yale University, 2001.

Shapiro, Joseph, and Jorge Omar Moreno-Treviño. "Compensatory Education for Disadvantaged Mexican Students: An Impact Evaluation Using Propensity Score Matching." Policy Research Working Paper Series 3334. Washington, D.C.: World Bank, 2004.

Universidad Iberoamericana, and Centro de Investigación y Docencia Económicas A.C. Mexican Family Life Survey (MFLS) 2002. Available online at: http://www.radix.uia.mx/ennvih/.