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Evidence from nationally representative data:

2000-2010

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ABSTRACT

Existing, largely experimental, evidence on *Progresa/Oportunidades* - one of the largest conditional cash transfers programmes in the world - finds little discernible impact of the programme on child labour in rural areas, close to programme inception. We use nationally representative data on 2.5 million children age 12 to 17 from the ENE/ENOE labour force surveys between 2000 and 2010 together with administrative data on programme take-up by municipality to revisit this evidence. Although increases in school attendance were more pronounced than falls in child labour in response to the programme, we find robust evidence that the programme contributed to a significant, broad-based decline in child labour, especially among younger children (12-14). The overall contribution of this programme to the 8 percentage points fall in child labour observed over this period is estimated to be around 7 percent.

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CONTENTS

1. Introduction

Mexico has witnessed significant progresses towards eliminating child labour and achieving universal primary education enrolment in the last decade. In the period from 2000 to 2010, children's involvement in employment declined from 23.8 to 16 percent and school attendance rose by 8.3 percentage points among 12-17 year-olds. The progress was broad-based, extending to both boys and girls, and to children in both rural and urban areas. Gaps in children's involvement in employment by area of residence and sex diminished over the decade but did not vanish. What were the factors underlying this trends? Were they driven primarily by policy? What was the role played by *Oportunidades*, one of the largest conditional cash transfers programmes in the world?

For this purpose we combine repeated cross-sections from the Mexican ENE and ENOE surveys between 2000 and 2010 with administrative data on programme coverage across Mexican municipalities, and we estimate the impact of the programme based on a differences-in-differences model across municipalities that exploits programme expansion for identification.

Although this is not the first paper to estimate programme effects of *Oportunidades*, previous studies have exploited the random phase-in of the programme across a subset of rural communities or have used non-experimental strategies across selected geographical areas, with obvious limitations of their external validity. By converse, our analysis has the advantage of extending to the whole of Mexico, allowing us to estimate the role played by the programme on the nationwide changes in the incidence of child labour and school attendance over the first decade of the 2000s.

Most of the existing literature tends to find statistically significant positive effects of *Oportunidades* on schooling and smaller on child labour (often not statistically significant). One possible interpretation for these findings is that child labour is overall less sensitive than education to the programme. An alternative interpretation is that very large samples are needed to identify precisely these effects.

In this paper we take up these questions and estimate the effect of *Oportunidades* on children's involvement in work and schooling in an attempt to draw policy lessons from the Mexican experience.

In the absence of random variation in programme assignment across communities nation-wide, we identify programme effects by combining household survey information on children's time use from the ENE/ENOE survey data (that contain information on households' municipality of residence) with administrative information on the year of incorporation of each municipality in the country into the programme and the number of beneficiary households in each municipality by year. We exploit the gradual rollout of the programme across municipalities to derive a differences-in-differences estimator of the programme impact.

To control for the potential correlation between unobserved determinants of children's time use and the timing of programme inception in each municipality, we additionally include in our regressions a very large set of individual and municipal level controls, including state-specific time trends and we also make use of specifications with municipality-specific trends.

Despite not being able to resort to an experimental source of variation, our results validate and further refine earlier findings on the impact of the Mexican flagship Conditional Cash Transfer programme on child labour.

In particular, consistent with earlier findings, we find the *Oportunidades* significantly affected children's time use, with a positive impact on school participation larger than the negative effect on participation in economic activity. In contrast to most of the earlier literature, though, we find that the negative effects of the programme on child labour are statistically as well economically significant.

We estimate that a 10 percentage point increase in the share of beneficiary households increases school attendance by 0.8 percentage points. Given that the majority of the children targeted by the program were attending school, this impact is non negligible. The impact of the program on child work is smaller and equal to about 0.5 percentage points.

Moreover, we find that for girls and older children the increase in school attendance is associated not only with a reduction in child work, but also with a reduction in the share of children neither in school nor in work, explaining why the overall fall in child labour is smaller than the rise in schooling. We also find evidence that the programme effects are concentrated in rural areas and in the first half of the decade, whereas the impact in urban areas and in the second half of the decade is smaller and not precisely estimated.

Back of the envelope calculations allows us to estimate that the programme contributed to around 7 percent of the fall in child labour and 11 percent of the rise in school attendance observed over this period in Mexico.

Although this effect is far from negligible, our estimates suggest conditional cash transfer programmes alone are not sufficient for eradicating child labour, albeit they appear to be a necessary instrument.

The structure of the paper is as follows. Section 2 describes the main characteristics of the programme. Section 3 presents the relevant economic literature on the impact of the programme on children's school and work participation. Section 4 introduces the data and some descriptive evidence on children's activities. Section 5 discusses the specification and identification of the empirical model. Section 6 presents the regression results, while section 7 discusses the results and concludes.

2. Description of the programme

The Mexican programme for Education, Health and Nutrition known as *Oportunidades*, and formerly named *Progresa*, was created by the Federal government in 1997 and it is still in operation, representing the mainstay of the country's safety-net policy. As of 2012, the programme covered over 5.8 million households in all of the country's 2,456 municipalities. *Oportunidades* is a multisectoral programme based on the assumption that addressing all dimensions of human capital simultaneously has greater social returns than addressing them in isolation.

While the programme includes education, health, and nutrition components, we focus on the education component, consisting of a means-tested conditional cash transfer to eligible poor households conditional on children's regular school attendance.[1] Households receive a cash transfer for each child who regularly attends school and benefits are typically paid to the female beneficiary (Parker et al., 2009).[2] [3] The programme initially covered children under 18 years of age and between third grade of primary education and third grade of lower secondary education. In 2001 the programme was extended to individuals (under 22 years of age) enrolled in the whole primary cycle and up to the third grade of upper secondary education.

The education grant increases with the grade attended by the child, and in secondary education the amount transferred is approximately 13% higher for girls than for boys. Table A1 in the appendix presents the values of the transfer as of 2012: these vary between 165 pesos (US$18.5 at the PPP adjusted exchange rate of 2012) per month for children in the third grade of primary education to 925 pesos (US$ 103.9) and 1,055 pesos (US$118.5) for boys and girls in third grade of higher secondary education. In order to offset any potential incentive on greater fertility, total household transfers are capped to 1,265 pesos (US142.1) per month.

In order to guarantee a credible evaluation of (short-run) programme effects, *Progresa* started as a pilot programme, initially involving a randomised order of phase-in across 506 highly deprived rural localities. Of these localities, 320 entered the programme in October 1998, while the remaining 186 joined by the end of 1999, allowing to credibly estimate (short-run) programme impacts.

Within localities, the selection of households was based on a latent poverty index obtained as a combination (via discriminant analysis) of a set of social and economic indicators collected through a baseline census (ENCASEH). Only households with a poverty index above a given cut-off were eligible for the programme (Skoufias et al., 1999).

1 Beneficiary children also receive some in-kind school supplies.

2 Only children living in the household at the time of incorporation or children born in the household after incorporation are eligible for education transfers. Children fostered into the household at a later date are not eligible for participation in these grants.

3 Children are allowed to fail and repeat a grade at most once.

Given evidence of successful programme impacts (see below) the programme was scaled up, gradually extending to other rural localities (starting from 2000) and to semi-urban and urban localities (starting in 2001 and 2002 respectively).

In the non-experimental phase that followed, the selection of both urban and rural localities - a much finer geographical area than municipality (as of 2010, there were almost 196,000 localities in the country)- was realized through a marginality index (índice de marginación), based on a set of locality-level socio-economic indicators derived from the population census. Only localities with a level of marginality above a certain threshold were allowed into the programme.[4] The increase in the coverage of the programme led it to serve localities with a lower marginality index. The marginalization index was used as a criteria for prioritizing areas of intervention as the programme expanded. (see Section 4).

The selection of households into the programme in non-experimental communities is based on a household poverty index, similar to that already described for the pilot localities.[5] [6]

4 Evidence in Azuara (2011) shows a clear discontinuity in the probability of a locality being assigned to the programme (as of 2000 and 2005) as a function of the 1995 marginality index. Unfortunately, we have been unable to reproduce this analysis as we have no information on locality eligibility (but only municipality eligibility) prior to 2010. Alix-Garcia et al. (2013) also claim to find a discontinuity in the probability of a locality being assigned to the programme (between 1997 and 2003) and the 1995 marginalization index, although their graphical analysis is much less suggestive of a true discontinuity than Azuara's.

5 Once admitted to the programme, beneficiary families can remain in the programme for a number of year that has been increasing over time (3 years up to 2013, 5 years from 2013 and 8 years from 2014) without verification of their economic status. After this period, a re-interview takes place and the beneficiary status can be transformed for three additional years into partial beneficiary status called EDA, Esquema Diferenciado de Apoyos, which provides secondary and high school educational grants, but excludes primary school scholarships and cash transfers for food (Parker et al., 2008). After three years in EDA, households are dropped from the programme.

6 In rural areas the poverty score is computed for all households using information derived from a specific census. For cost reasons this census is not carried out in urban areas and a system of voluntary sign-up is adopted. Household can apply in person for the programme during a two-month enrolment period at ad hoc sign-up offices (Behrman et al., 2012). After a first qualifying test at the offices, households receive a home visit to verify socio-economic information that is the basis of the discriminant analysis used to determine the household eligibility (Parker et al, 2008).

3. Existing Evidence

The literature on the impact of conditional cash transfer (CCT) programmes on welfare, health, schooling, and employment has expanded parallel to their expansion around the world.

Recently, De Hoop and Rosati (2013) review the literature on the impact of cash transfers schemes on children's work and find that cash transfers tend to reduce children's work, particularly if the prevalence rate is high. However, they also find that reductions in children's work are generally smaller than increases in school participation. The reduction in participation into economic activities is typically higher among boys, whereas girls experience stronger reductions in involvement in household chores.

• The impact of Oportunidades on children's school attendance and work participation

Most of the literature (with the exception of Behrman et al. 2011, 2012) exploits the randomized order of phase-in across selected rural areas at the time of initial inception of the programme. The main results of these studies, together with some details about data, samples, variables definition, and identification strategy are presented in Appendix Table A2. We focus on estimates that refer, where possible, to age groups similar to the one we focus on in this paper, i.e. children aged 12 to 17. In bold we report estimates that are significant at least at 10% significance level.

Skoufias and Parker (2001) use data from the 1997 Survey of Household Socioeconomic Characteristics (ENCASEH) and the subsequent Evaluation Survey (ENCEL) to estimate an intent-to-treat effect of the programme in the first year of programme implementation on children's aged 12 to 17 activity patterns using a differences-in-differences regression approach across eligible households in treatment and control communities. Children are classified as working if they indicate that they worked in the week prior to the interview (whether paid or unpaid). Authors' estimates suggest a greater increase in school attendance in response to the programme among girls and a greater fall in child labour among boys. The estimated impacts on school attendance are 4.3 and 7.8 percentage points respectively. The estimated programme impacts on children's employment are -3.2 percentage points for boys and -1.8 for girls, although estimates are not statistically significant at conventional levels for either group.[7] [8]

Schultz (2004) uses the 1997 ENCASEH and ENCEL surveys up to November 1999 to estimate the reduced-form impact of the conditional cash transfer scheme

7Dubois et al. (2012) also find that the increase in schooling largely displaces child labour among boys but not among girls.

8 An interesting paper in this area is De Janvry et al. (2006) that explores whether cash transfers protect children from household-level shocks. Their main finding is that, while conditional cash transfers diminish the risk that children leave school as a result of such shocks, no such protective effect can be observed for child labour, largely due to irreversibility in schooling choices.

on school participation and work. Schultz's contribution lies in examining the impact of *Oportunidades* by highest school grade completed by the child. He finds the largest impact of *Oportunidades* among children in secondary school, with an estimated programme impact on schooling of 6 percentage points for boys and 9 percentage points for girls. The measure of children's work includes children who "worked", "produced something that was sold in the market", or were "engaged in any housework". Again, estimates on work are of the opposite sign of - and about half in magnitude as - the estimates on schooling and they are not statistically significant at conventional levels.[9]

Behrman et al. (2011) provide non-experimental estimates of the longer-run impact of exposure to *Oportunidades*. They first link the 1997 ENCASEH data with a follow-up survey conducted in 2003 which covered all households in the original sample of 506 experimental (treatment and control) communities as well as a new group of 152 communities that, as of 2003, were not yet part of the programme. These additional communities were selected by matching community-level characteristics observed in the 1995 and 2000 censuses to the community level characteristics of the original experimental communities Using a differences-in-differences model, they measure the impact of 5.5 years of exposure and find a significant decrease of 14 percentage points in the probability of working among boys aged 15 to 16 (but no effects among girls or older children).

Behrman et al. (2012) focus on urban areas and adopt a non-experimental matching procedure. The analysis is based on three waves of data: a baseline survey 2002 (before the intervention started) and two follow-up waves in 2003 and 2004 respectively, from all households in each of the intervention and control housing blocks. Children are categorized as employed if they report to have worked the week before the survey or to have a job but not have worked in the reference week. They estimate that the programme is associated with a 12 percentage points reduction in the employment participation of boys aged 12 to 14 as of 1997.10 Surprisingly the estimated negative effect for boys on work is much larger than the positive effects on schooling. For girls they find small and generally statistically insignificant effects on both schooling and work.

Buddelmeyer and Skoufias (2004) investigate whether village-level spillovers exist, due to peer or to anticipation effects. They do so by examining changes in outcomes among non-eligible households in experimental treatment and

9 Schultz also presents instrumental variable estimates of the effect of school enrolment on child labour, where school enrolment is instrumented with programme assignment. Estimates indicate that school enrolment decreases work by -18.8 and -38.9 percentage points for primary and secondary school boys, respectively. Effects among primary and secondary school girls are -14.8 and -46.3 percentage points, respectively. Taking into account his estimates of the impact of the programme on school enrolment (0.009 and 0.008 for primary school girls and boys), this IV estimates indicate a minuscule reduction in the probability of work, on the order of -0.14 and -0.15 percentage points for primary school girls and boys respectively as a result of programme exposure. Figures for secondary school children are -4.3 and -2.4 percentage points for girls and boys respectively.

10The authors report estimates for three different bandwidths of the local linear matching estimator (0.2, 0.3, and 0.4). The estimates reported in Table A2 refer to a bandwidth of 0.3. RD estimates using different bandwidths are similar.

control communities. Using the definition of work as in Skoufias and Parker (2001), they find no evidence of economically or statistically significant effects among the ineligible.

The existing evidence points to positive significant effects of the programme on schooling, especially among girls, for whom the amount of the grant was the largest. Evidence on the impact of the programme on child labour though, is weak, or at least inconclusive.[11]

11 De Hoop et al. (2013) revisit Skoufias and Parker's (2001) experimental evidence about the impact of Oportunidades on children's activities in rural pilot communities at the time of programme inception and they find evidence of a significant fall in child labour among young boys (aged 12 to 14).

4. Data and descriptive evidence

We use quarterly data from the Mexican labour force surveys from 2000 to 2010: the *Encuesta Nacional de Empleo* (ENE) until 2004 and its successor, the *Encuesta Nacional de Ocupacion y Empleo* (ENOE) from 2005 to 2010. Both ENE and ENOE 12 are nationally representative quarterly surveys that collect information on demographic, economic, and occupational characteristics of all individuals aged 12 and above.

Both surveys have a quarterly frequency and use a multistage stratified sampling procedure to provide estimates of labour force and other socioeconomic indicators that are representative of the entire country. Each year the sample includes observations from the largest cities (*ciudades autorepresentadas*) and from a sample of smaller areas. The data includes information on households' municipality of residence. The number of municipalities in the sample increase from 577 in 2000 to 1,038 in 2010 (out of a total number of municipalities in the country of 2,443 as of 2000 and 2,456 as of 2010), as geographical coverage increases.

We complement these data with information on the number of households (but not the number of beneficiary children which is not collected) participating to the programme in each municipality as of September-October of each year. These data, available from 2000 onwards, come from the archive of beneficiary households (*Padrón de hogares beneficiarios*) administered by the National Coordination of *Oportunidades*' Human Development Programme dependant of SEDESOL (*Secretaría de Desarrollo Social*).

We focus on the effect of the programme on children between 12 and 17 years of age because the labour force surveys do not collect information about participation in economic activity for individuals below 12 years of age and because the bulk of the *Oportunidades* programme is targeted to children aged less than 18 and enrolled in school between the third grade of primary (about age 8) and the third grade of upper secondary education (about age 18). Our data spans over an 11-year period between the second quarter of 2000 and the last quarter of 2010, for a total of 2,494,755 child observations.

We use the 2000 census and 2005 population count (*Conteo de Población y Vivienda*) to predict population in each quarter in each municipality via simple linear interpolation. We use this predicted number of households to derive the share of households participating in each municipality.

We further complement these data with information on access to and quality of schools at the municipality level collected by the *Secretaría de Educación Pública* (SEP). We use two indicators: the student to teacher ratio in secondary schools and the share of *telesecundaria* schools over the total number of secondary schools.

The student to teacher ratio is a standard measure of school quality, whereby a higher number of pupils per teacher is typically symptomatic of underfunded

12 ENOE derives from the consolidation of ENE and the Encuesta Nacional de Empleo Urbano (ENEU) that for over twenty years collected information on the employed and unemployed population.

and possibly low quality schools. The *telesecundaria* project - a TV-aided lower secondary school learning programme - was launched in 1968 and since then it has been instrumental to bringing access to education and reducing the drop-out rate in rural and highly marginalized areas (see Calderoni, 1998 for further details). A higher ratio of *telesecundaria* schools to total secondary schools is a likely indicator of limited access to high quality education.

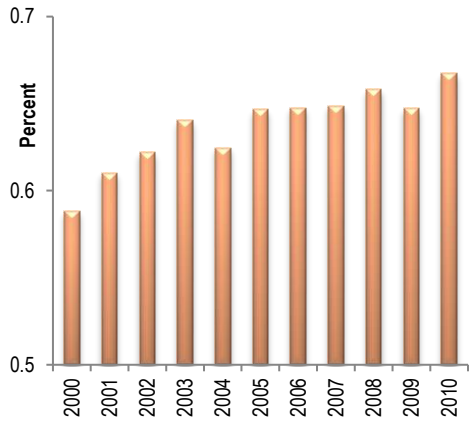
For the purpose of our analysis, we define children's work as involvement in economic activity that take place both inside and outside the household for pay or not. Children are defined as working if they worked at least one hour in the week preceding the survey. We break down children's work into two groups, namely children working for a wage and not working for a wage. The first includes all children who work for a salary, while the latter group is composed of unpaid workers, self-employed and a small number of employers.

Unfortunately, in the survey there is no direct information about school attendance or enrolment for the whole 2000-2010 period. A specific question about school attendance is available only starting in 2005 (in the ENOE), whereas, for the whole period, there is a much more general question about the amount of time devoted to study during the week preceding the interview. In this paper, we consider a child as attending school if he reports a positive amount of time devoted to study during the week preceding the interview.[13]

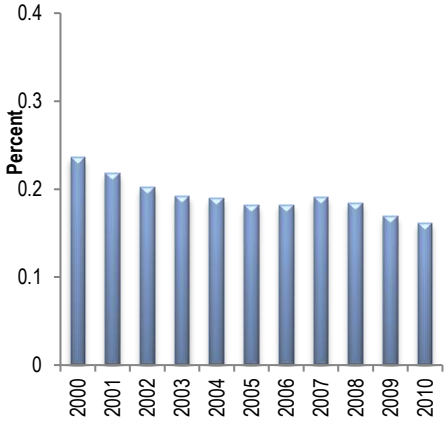
13 We have used information from 2005 to 2010 to cross-validate this proxy-measure of school attendance. Figure A2 in the appendix reports (on the vertical axis) municipality X time averages of the residuals from a regression of the variable "whether a child devoted any time to study last week" on additive time and municipality dummies and (on the horizontal axis) municipality X time averages of the residuals from a similar regression where the dependent variable is "school attendance". A regression line is also superimposed to the data. It is evident that, despite some variation in the data, our measure of school attendance captures trends in school participation across municipalities rather well.

Figure 1. ***Trends of school and economic activity participation - 2000-2010***

(a) School participation - children aged 12-17



(b) Economic activity participation - children aged 12-17



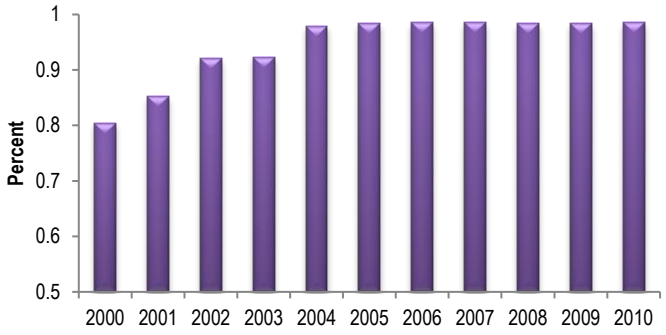
Source: Authors' computations on ENE/ENOE data, 2000-2010.

We also investigate the impact of the programme on four mutually exclusive activities that derive from the combination of work and school, namely work only, school only, work and school, and neither in work nor in school (or idle, for the sake of simplicity) and we examine the effect separately for children working for a wage and not working for a wage.

We finally investigate children's involvement in household chores based on a question about the time devoted to household chores in the reference week.

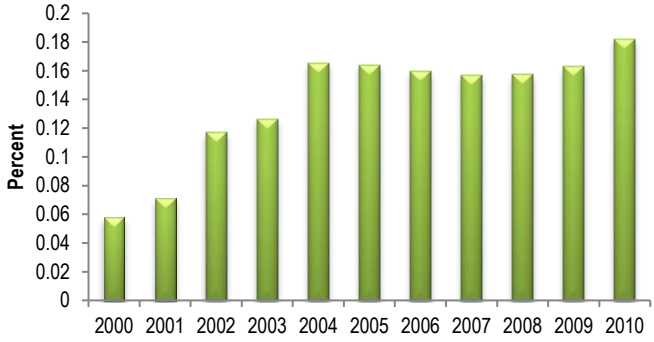
Figure 1 illustrates the trends in participation in school and economic activity of children aged 12 to 17 over the decade 2000-2010. Data are weighted by sampling weights. School participation increases by about 8 percentage points, from about 59 percent in 2000 to over 66 percent in 2010, while children's work falls by around the same amount, from 24 percent in 2000 to 16 percent 10 years later.

Figure 2. **Share of municipalities covered by Oportunidades - 2000-2010**



Source: Authors' computations on Census and Conteo data and Padrón de hogares beneficiarios, 2000-2010.

Figure 3. **Share of Oportunidades beneficiary households - 2000-2010**



Source: Authors' computations on Census and Conteo data and Padrón de hogares beneficiarios, 2000-2010.

Figures 2 and 3 present trends in programme coverage. We define a municipality as covered if at least one of its localities is part of the programme. Recall that there are on average 80 localities per municipality (although obviously urban municipalities have a much greater number than rural ones[14]).

Although by 2000 the programme was already well under way, coverage was far from universal, with 20 percent of the municipalities in our sample with no locality in the programme. Coverage increased over time and was essentially universal by the end of the period of observation, meaning that all municipalities had a least one programme locality (Figure 2).

As a result of programme expansion across localities, the average share of households with children between 12 and 17 years of age covered by the programme across municipalities increased drastically over the period, from 5.8 to 18.3 percent. Most of the increase took place between 2000 and 2004. A modest slowdown followed between 2005 and 2007 – due to a cap on the

14 Mexico City (or Federal District) for example comprises 558 localities as of 2010.

number of programme households in the face of increasing population - and a further steady increase started from 2008, as this cap was removed in 2010 (Figure 3).[15]

Table 1. **Average outcomes of children aged 12-17, 2000-2010**

	School	Work	Work only	School only	Work and school	Idle	Household chores	Working for wage	Not working for wage
All	63.8	19.0	12.7	57.6	6.3	23.5	81.1	11.2	7.8
Gender									
Male	63.5	25.8	17.5	55.2	8.2	19.0	71.4	15.1	10.6
Female	64.2	12.1	7.8	60.0	4.2	28.0	91.1	7.1	4.9
Area									
Rural	61.2	22.8	15.4	53.7	7.4	23.4	80.9	12.0	10.8
Urban	67.2	14.0	9.3	62.5	4.7	23.5	81.4	10.1	3.9
Age									
12	76.8	6.9	2.6	72.5	4.3	20.6	81.1	2.1	4.8
13	74.0	10.1	4.7	68.7	5.3	21.2	81.9	3.9	6.2
14	70.0	14.7	8.2	63.4	6.5	21.9	82.1	6.9	7.8
15	61.3	21.1	14.0	54.3	7.1	24.7	81.5	12.1	9.0
16	53.0	28.2	21.0	45.9	7.2	26.0	80.5	18.6	9.6
17	46.0	34.4	27.2	38.7	7.2	26.8	79.5	24.8	9.7
Head Education									
No schooling	51.5	29.5	22.4	44.4	7.1	26.0	79.8	17.2	12.4
Primary	60.5	21.9	15.0	53.6	6.9	24.5	80.6	13.0	8.9
Secondary	72.5	11.5	6.2	67.2	5.3	21.3	82.2	6.8	4.8

Source: Authors' computation on ENE/ENOE data, 2000-2010. Data are weighted by sampling weights.

Table 1 presents additional descriptive statistics. The table reports (weighted by sampling weights) average school and work participation, together with involvement in the four mutually exclusive activities, household chores, and the two work categories (working for a wage and not working for a wage) among children aged 12 to 17 between 2000 and 2010. 16 On average, school participation is higher among girls and in urban areas (defined as those with population higher than 250,000). It drops with child's age from 77.6 percent at age 12 to 48 percent at age 17, while it increases as the household head's level of education rises, from about 51.5 percent among children in households headed by individuals with no schooling up to 72.5 percent among children with household heads with secondary or higher education. Work participation is higher among boys than girls and in rural compared to urban areas and it

15Figure A1 in the Appendix shows that the number of beneficiary households nationwide peaked at 5 million in 2004 and stayed constant at that level up to 2008. This explains while in the face of population growth, take-up rates fell slightly starting in 2005. In 2010 there was an expansion of the programme coverage and it reached 5.8 million households.

16 Descriptive statistics on all other variables used in the analysis are presented in Table A3 in the Appendix.

increases as children grow older. On average, fewer than one in fifteen children are engaged in economic activity at age 12, whereas by age 17 this number is higher than one in three. Participation in work also decreases with the level of education of the household head (from 29.5 to 11.5 percent).

About 11 percent of children aged 12 to 17 working for a wage as opposed to 7.8 percent not working for a wage. The distribution of children working for a wage and of children not working for a wage by gender, age, and household head's education groups is similar to the overall patterns of work involvement, whereas we observe only a small difference in the average share of children working for a wage between rural and urban areas (12 versus 10.1 percent, respectively).

The combination of work and school displays different patterns by age and gender. We observe that, compared to girls and children in urban areas, boys and children in rural areas are more likely to combine work and school. The probability of combining work and school also increases with the child's age, but it does not show a clear-cut pattern by household head's educational level. The probability of being involved neither in economic activity nor in school (idle) is higher among females and it rises with age, from 20.6 percent at the age 12 to over 26.8 percent at the age of 17, and it decreases with the household head's education level.

Girls are typically assigned to domestic activities and Mexico is no exception to this: they are about 20 percentage points more likely to perform household chores relative to their male siblings. We do not find a large rural/urban differential with respect to engagement in household chores.

5. Model identification and specification

Let Y_{imt} indicate the activity performed by child i in municipality m at time t expressed as a linear function of whether the Oportunidades programme exists at time t in municipality m (T_{mt}), of the participation of child i in the Oportunidades programme at time t in municipality m (p_{imt}), of a vector of observed individual child and household level characteristics (C_{imt}) and municipality level variables (M_{mt}) plus additive time and municipality effects:

$$Y_{imt} = a + bp_{imt} + gT_{mt} + C_{imt}'d + M_{mt}'q + d_m + d_t + e_{imt} \quad (1)$$

where ε_{imt} indicates the idiosyncratic term.

The coefficient on pimt, , captures the average impact of *Oportunidades* among those who effectively participated, or, in programme evaluation terms, the average treatment effect on the treated.

In addition to the effects among the treated, general equilibrium effects can manifest in treatment communities due to supply side interventions (e.g. school construction) that affect both treated and untreated children or to changes in aggregate child labour supply at the community level that affect the incentives to engage in child labour. Additional effect might manifest on both beneficiary and non-beneficiary children through the existence of informal networks (Angelucci and De Giorgi, 2009). These effects are identified by the coefficient on T_{mt}.

Both these parameters can in principle be estimated consistently through OLS, provided that the error term is uncorrelated with the regressors. The model attempts to control for any potential correlation between the error term and the regressors through a highly saturated specification. In addition to time (year X quarter) and municipality fixed effects, that account for unobserved time invariant municipalities unobserved differences in children's activity as well as for common macro effects, the model includes a large set of individual and household characteristics.

Individual characteristics include child age and age squared, gender, a dummy for being the eldest (cohabiting) child in the household, household size, the number of children between 0 and 4 years of age and between 5 and 14 years of age in the household, a dummy for female headed households, educational attainment and sector of employment of the household head, a dummy for whether the household is in moderate poverty (per capita household labour income – the only source of income that is measured in the surveys - net of children income, below the $2 a day international poverty line computed at 2005 prices), and a dummy for location of residence (urban vs. rural areas).

Equation (1) also includes a vector M_{mt} of municipality characteristics that include proxies for access to secondary quality education (see section 4) and municipal level adult (ages 25 to 55) unemployment rate, which is meant to capture adult labour market conditions that might affect parents' decision about children activity or proxy for children's labour market opportunities.

We also include municipal level indicators of poverty and earnings inequality. For this purpose, we include the share of households living on less than $2 a day at 2005 international prices, plus the decile dispersion ratio, defined as the ratio between the average income of the richest five percent and that of the poorest 25 percent of the working population. Again we use only labour income to derive these measures as we do not have information on other sources of income.

To further account for potential unobserved determinants of children's activities that might be correlated with differential trends in exposure and coverage across municipalities, we finally include state-specific linear trends that account for differential trends in children's activity across states due for example to state specific policies or state specific changes in economic circumstances.

One last point is that we do not observe individual participation in the programme. We do observe however a number of variables that are correlated with participation including age, household poverty status, the share of poor in each municipality. Let $p_{mt}^{N} = p_{imt} - p_{mt}$ be the individual deviation from the municipality level mean of programme participation – which is known. We follow Glewwe and Kassouf (2012), and we approximate individual level participation through a function of municipality level participation, of children and household characteristics plus time and municipality fixed effects. In formulas:

$$p_{imt} - p_{mt} = h + C_{imt}'w + M_{mt}'y + n_m + n_t + u_{imt} \quad (2)$$

Substituting Eq. (2) into Eq. (1), we obtain:

$$Y_{imt} = \tilde{a} + bp_{mt} + gT_{mt} + C_{imt}'\tilde{d} + M_{mt}'\tilde{q} + f_m + f_t + \tilde{e}_{imt} \quad (3)$$

Equation (3) is essentially a differences-in-differences model that compares changes in children's outcomes over time as the programme is introduced or scaled up in their municipality of residence to changes in outcomes in municipalities that remain out of (in) the programme or where take-up is unchanged.

Consistent with the discussion in Section 4, the variation in municipality-level participation (Tm) and take-up (pmt) is driven by the gradual inclusion of localities into the programme, as the criteria for eligibility of localities become more generous over time. This variation is arguably exogenous to household choices and, for this reason, it should allow to consistently estimate programme effects.

To summarize, the variable "share of households receiving *Oportunidades* cash transfers" (pmt) measures the direct effect of the programme on participants, while the variable (Tmt) "existence of *Oportunidades*" captures spillover effects. The sum of the two coefficients gives an estimate of the average treatment effect.

One challenge to the identification strategy is mean-reversion, whereby the time of incorporation is correlated with baseline levels of child labour and trends in child labour are correlated with the initial levels. To rephrase, the challenge here is that municipalities exposed at an earlier stage and where the increase in programme take-up was the largest might have been the ones where child labour was the highest and hence would have fallen the most, irrespective of the programme. The inclusion of a very large set of controls should in principle be sufficient to eliminate this source of bias in the OLS estimates. As a further robustness check, however, we also present regressions that include municipality level trends, which are meant to absorb any linear correlation between changes in take-up and outcomes.

6. Estimates

This section presents OLS estimates of the linear probability model (3) that measures the impact of *Oportunidades* on children's participation in economic activity, school attendance, the four mutually exclusive activities described above, household chores, and children working for a wage and children not working for a wage. We also investigate the existence of heterogeneous effects by gender, age, parental education, time, and area of residence.

• Main regression results

Table 2 reports OLS estimates of three different specifications of equation (3) for school and work outcomes: the first includes the two variables of interest capturing the effect of *Oportunidades* in addition to municipality and time fixed effects, and state-specific linear trends; the second includes additionally individual-level characteristics; the third also controls for municipality-level characteristics. The full set of coefficients for the regression where school or work are the dependent variables are reported in Table A4 in the Appendix. Standard errors are clustered by municipality.

The first row of columns (1) and (4) reports the results relative to the impact of the programme on school attendance and work participation. The estimated coefficients indicate that a one percentage point increase in the share of beneficiary households in municipalities covered by the programme increases the probability of school attendance by 13.6 percentage points and reduces the probability of work participation by 8.7 percentage points, respectively. Columns (2) and (5) indicate the estimated effect of the programme is reduced to 9.2 and -4.8 percentage points, (respectively for school attendance and child work) when we control for individuals and household level characteristics (age, gender, household structure, household head's educational attainment and sector of employment, and household poverty status). This seems to indicate that some of the observed changes are associated with changes in the individual and household characteristics correlated with the expansion of the program, rather than to effect of the program itself. Columns (3) and (6) report the impact of the programme when municipality-level covariates (adult unemployment rate, poverty and inequality indicators, and secondary school quality and access indicators) are included. The estimated coefficients indicate that a one percentage point increase in the share of beneficiary households in municipalities covered by the programme increases the probability of school attendance by 8.5 percentage points and reduces the probability of work participation by 5.1 percentage points.

Table 2. **Oportunidades and children's school and work outcomes**

VARIABLES	(1) School	(2) School	(3) School	(4) Work	(5) Work	(6) Work
Share of households w/Oportunidades	0.136***	0.092***	0.085***	-0.087***	-0.048*	-0.051**
	(0.035)	(0.032)	(0.032)	(0.029)	(0.025)	(0.025)
Existence of Oportunidades	-0.007	-0.006	-0.005	-0.001	-0.001	-0.001
	(0.007)	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)
Individual and household characteristics	N	Y	Y	N	Y	Y
Municipality characteristics	N	N	Y	N	N	Y
Municipality fixed effects	Y	Y	Y	Y	Y	Y
Time (year X quarter) fixed effects	Y	Y	Y	Y	Y	Y
State-year linear trends	Y	Y	Y	Y	Y	Y
R-squared	0.114	0.190	0.190	0.037	0.158	0.158

*Standard errors in parenthesis are clustered at the municipality level. *** Significant at 1 percent, significant at 5 percent, significant at 10 percent. Number of observations: 2,494,755.*

To understand the magnitude of these results, the estimates in Table 2, columns (3) and (6), imply that an increase of 10 percentage points in the fraction of households covered by the programme in a given municipality leads to an increase in school attendance rates of around 0.8 percentage points and to a reduction in child labour of around half as much. On average one out of 12 (1/0.8) treated children would have not attended school absent this programme expansion. Similarly, one out of 20 (1/0.5) programme children would have worked. Unsurprisingly given the design, and in line with previous results, the programme covered a large fraction of children already attending school, although it clearly had a sizeable and significant effect on out of school children.

The second row of Table 2 illustrates that there are no statistically and economically significant general equilibrium effects of Oportunidades within the municipalities involved into the programme.

We use the saturated specification in columns (3) and (6) of Table 2 to estimate the impact of the programme on the combinations of school and work activities, on household chores, and on the share of children working for a wage and of children not working for a wage.

Table 3 shows that the reduction in children's probability of work participation is largely ascribable to a fall in the probability of working only (column (1)) rather than to an increase in the probability of combining work and school (column (3)). We also observe a reduction of about 2.4 percentage points in the probability of being idle (neither in school nor in work) but the coefficient is not precisely estimated. Column (5) illustrates the effect of the programme on the probability of being involved in household chores: the effect estimated at 2.6 percentage point but it is not statistically significant.

Table 3. **Oportunidades and children's activity**

VARIABLES	(1) 12-17 Work only	(2) 12-17 School only	(3) 12-17 Work and school	(4) 12-17 Idle	(5) 12-17 Household chores	(6) 12-17 Working for wage	(7) 12-17 Not working f or wage
Share of households w/Oportunidades	-0.062***	0.074**	0.011	-0.024	-0.026	0.002	-0.053**
	(0.019)	(0.033)	(0.014)	(0.027)	(0.042)	(0.015)	(0.021)
Existence of Oportunidades	0.002	-0.002	-0.003	0.003	0.027	-0.001	-0.000
	(0.003)	(0.006)	(0.003)	(0.006)	(0.020)	(0.002)	0.003)
R-squared	0.151	0.186	0.038	0.113	0.190	0.127	0.087

All specifications include all set of individual, household and municipality controls (see text for details), additive municipality, year times quarter fixed effects plus linear time trends interacted with state dummies. See also notes to Table 2.

Columns (6) and (7) show how the probability of working for a wage and not working for a wage changed because of the programme. The reduction in the probability of participation to economic activity is entirely ascribable to a fall in the probability of not working for a wage, while the probability of working for a wage did not undergo any substantial change. This presumably reflects the circumstance that children not working for a wage are much more responsive to changes in the incentives to attend school, possibly due to the lower returns and to the greater flexibility relative to salaried work.

As a further robustness check we have additionally included in our regressions municipality-level linear time trends. The specification is quite saturated and identification is based on differential changes across municipalities around such linear trends. Results are reported in Table 4. It is reassuring that point estimates are very similar to those in Tables 2 and 3, although admittedly the inclusion of linear trends reduces the statistical significance of the estimates.

Table 4. **Oportunidades and children's activity – models with municipality time trends**

VARIABLES	(1) 12-17 School	(2) 12-17 Work	(3) 12-17 Work only	(4) 12-17 School only	(5) 12-17 Work and school	(6) 12-17 Idle	(7) 12-17 Household chores	(8) 12-17 Working for wage	(9) 12-17 Not working for wage
Share of households w/Oportunidades	0.059	-0.047	-0.042*	0.064	-0.004	-0.017	0.004	0.010	-0.057**
	(0.040)	(0.029)	(0.022)	(0.041)	(0.016)	(0.033)	(0.061)	(0.016)	(0.025)
Existence of Oportunidades	0.004	-0.001	0.000	0.005	-0.001	-0.004	0.051**	-0.003	0.002
	(0.007)	(0.005)	(0.003)	(0.007)	(0.004)	(0.006)	(0.025)	(0.002)	(0.003)
R-squared	0.193	0.161	0.153	0.189	0.040	0.116	0.196	0.129	0.091

All specifications include all set of individual, household and municipality controls (see text for details), additive municipality, year times quarter fixed effects plus linear time trends interacted with municipality dummies.

See also notes to Table 2.

- **Heterogeneous effects**

In this section we look at the existence of any differential effect of the programme on children by individual, household, and municipality characteristics. As mentioned in Section 2, the programme started in highly deprived rural localities and it gradually was expanded to semi-urban and urban areas. Moreover, the grant is slightly higher for girls than for boys to reflect the differential enrolment rates by gender in lower secondary education. The literature exploiting the experimental variation in the data has found that the programme had differential effects by school grade and age, whereby children transiting from primary to secondary education benefitted the most from treatment. Results on the heterogeneous effect of the programme on children's activities by gender, area of residence, age group, household head's educational level, and time period are reported in this section.

Differentials results by gender are presented in Table 5, where we revert to a specification without linear trends by municipality (as we did in Tables 2 and 3). Starting with the effect of the programme among boys, we observe a statistically significant fall in the probability of work (-5.8 percentage points), and a similar increase in the probability of school (5.6 percentage points), although the latter effect is not statistically significant. The fall in the probability of work among boys is mainly explained by a reduction in the probability of working only (-6.9 percentage points), while the probability of combining work and school increases a little as a result of the cash transfer. The programme also appears to increase the probability of being neither in work nor in school among boys, albeit the impact is not statistically significant. As for the whole sample, the probability of a boy not working for a wage drops substantially (-6.7 percentage points), whereas we find no effect on the probability of working for a wage.

Table 5. **Oportunidades and children's activity outcomes. Heterogeneous effects by gender**

VARIABLES	(1) School	(2) Work	(3) Work only	(4) School only	(5) Work and school	(6) Idle	(7) Household chores	(8) Working for wage	(9) Not working for wage
Male									
Share of households w/Oportunidades	0.056	-0.058*	-0.069***	0.045	0.011	0.013	0.007	0.009	-0.067**
	(0.035)	(0.032)	(0.026)	(0.037)	(0.021)	(0.026)	(0.055)	(0.022)	(0.028)
Existence of Oportunidades	-0.008	-0.003	0.003	-0.002	-0.006	0.005	0.034	-0.001	-0.002
	(0.007)	(0.005)	(0.004)	(0.007)	(0.004)	(0.006)	(0.025)	(0.003)	(0.004)
Female									
Share of households w/Oportunidades	0.115***	-0.045*	-0.055***	0.105***	0.010	-0.060*	-0.053	-0.001	-0.044**
	(0.035)	(0.027)	(0.021)	(0.036)	(0.012)	(0.033)	(0.041)	(0.016)	(0.022)
Existence of Oportunidades	-0.002	0.002	0.002	-0.002	-0.000	0.000	0.019	0.000	0.001
	(0.007)	(0.004)	(0.003)	(0.006)	(0.002)	(0.006)	(0.017)	(0.003)	(0.002)
R-squared	0.192	0.182	0.173	0.189	0.045	0.125	0.220	0.140	0.115
Test equality of Male/Female Share coeff. (P-value)	0.231	0.756	0.678	0.238	0.977	0.085	0.383	0.702	0.513

See also notes to Table 3.

Results for girls point to a large impact of the programme on the probability of school participation (11.5 percentage points), possibly due to the fact the grant was somewhat larger for girls, and to a reduction of -4.5 percentage points in the probability of work participation (the difference between boys and girls are not statistically significant). The increase in the probability of school participation is ascribable to a reduction in the probability of work only (-5.5 percentage points) and in the probability of being neither in work nor in school (-6 percentage points). This last result contributes to explaining why we observe a greater increase in school participation compared to the fall in child labour.

Although the coefficient is not precisely estimated, column (7) indicates that the programme reduces the probability of girls being involved in household chores (-5.3 percentage points) from a baseline level of 87.4 percent.

Table 6 reports the heterogeneous effects by area of residence. The estimates indicate that *Oportunidades* has a strong and statistically significant impact among children living in rural areas (defined as municipalities with population up to 250,000 in 2000). Here the probability of school participation increases by 7.9 percentage points as a result of the cash transfers scheme, and the probability of work participation decreases by -4.7 percentage points. These changes are ascribable to the programme-induced variation in the probability of working only (-5.2 percentage points) and of attending school only (7.3 percentage points) rather than to the probability of combining work and school

(0.5 percentage points). We also observe a reduction in the probability of being neither in school nor in work (-2.6 percentage points), but the effect is not statistically significant. The decrease in the probability of work is accounted by the reduction in the probability of not working for a wage (-5.1 percentage points) rather than by a change in the probability of working for a wage. The effects for urban areas are typically of the same sign as - but smaller in magnitude than - those for rural areas, and typically they are not statistically significant. However, results at the bottom of Table 6 show that we cannot reject the null of equality of the estimates across areas.

Table 6. **Oportunidades and children's activity outcomes. Heterogeneous effects by area of residence**

VARIABLES	(1) School	(2) Work	(3) Work only	(4) School only	(5) Work and school	(6) Idle	(7) Household chores	(8) Working for wage	(9) Not working for wage
Rural									
Share of households w/Oportunidades	0.079**	-0.047*	-0.052***	0.073**	0.005	-0.026	-0.008	0.005	-0.051**
	(0.036)	(0.026)	(0.020)	(0.037)	(0.015)	(0.030)	(0.036)	(0.015)	(0.024)
Existence of Oportunidades	0.005	-0.006	-0.001	0.010	-0.005	-0.004	0.015	-0.003	-0.003
	(0.009)	(0.007)	(0.004)	(0.008)	(0.006)	(0.007)	(0.013)	(0.004)	(0.005)
Urban									
Share of households w/Oportunidades	0.056	-0.044	-0.013	0.087	-0.031	-0.043	-0.202	0.028	-0.071**
	(0.080)	(0.060)	(0.045)	(0.080)	(0.030)	(0.073)	(0.348)	(0.042)	(0.036)
Existence of Oportunidades	-0.007	-0.004	-0.000	-0.003	-0.003	0.007	0.029	-0.002	-0.002
	(0.008)	(0.004)	(0.003)	(0.008)	(0.003)	(0.007)	(0.030)	(0.003)	(0.003)
R-squared	0.191	0.161	0.154	0.188	0.040	0.115	0.192	0.127	0.093
Test equality of Rural/Urban Share coeff. (P-value)	0.798	0.964	0.424	0.877	0.286	0.833	0.578	0.610	0.644

See *Note* to Table 3.

Most of the studies exploiting the initial randomized experiment (see, for example, Schultz, 2004) find the largest effect of the programme in terms of school participation among children transiting from primary to lower secondary education (typically age 12). Unfortunately, we are not able to investigate whether such effect of the programme is confirmed, as our data include only children aged 12 and above. However, we look at the existence of a differential impact of the programme on two subgroups of children, namely children aged 12 to 14, the normal age for enrolment in lower secondary education, and children aged 15 and 17, the normal age for enrolment in upper secondary education.

Table 7. **Oportunidades and children's activity outcomes. Heterogeneous effects by age**

VARIABLES	(1) School	(2) Work	(3) Work only	(4) School only	(5) Work and school	(6) Idle	(7) Household chores	(8) Working for wage	(9) Not working for wage
12-14									
Share of households w/Oportunidades	0.053	-0.058**	-0.056***	0.055	-0.002	0.003	-0.033	-0.004	-0.054**
	(0.037)	(0.024)	(0.015)	(0.039)	(0.017)	(0.032)	(0.046)	(0.011)	(0.022)
Existence of Oportunidades	-0.007	-0.000	0.003*	-0.004	-0.003	0.004	0.034	0.002	-0.002
	(0.007)	(0.003)	(0.002)	(0.006)	(0.003)	(0.006)	(0.023)	(0.002)	(0.002)
15-17									
Share of households w/Oportunidades	0.127***	-0.046	-0.073**	0.100***	0.028*	-0.054*	-0.020	0.004	-0.049**
	(0.035)	(0.031)	(0.029)	(0.034)	(0.016)	(0.028)	(0.040)	(0.024)	(0.025)
Existence of Oportunidades	-0.004	-0.001	0.002	-0.001	-0.003	0.002	0.019	-0.002	0.001
	(0.007)	(0.005)	(0.004)	(0.006)	(0.003)	(0.005)	(0.018)	(0.004)	(0.003)
R-squared	0.208	0.174	0.176	0.201	0.041	0.124	0.195	0.146	0.092
Test equality of 12-14/15-17 Share coeff. (P-value)	0.143	0.757	0.602	0.384	0.205	0.179	0.827	0.773	0.886

See also notes to Table 3.

**** p<0.01, ** p<0.05, * p<0.1*

The results, reported in Table 7, indicate that the programme reduces the probability of work among younger children (aged 12 to 14) by 5.8 percentage points and increases the probability of attending school by 5.3 percentage points (although this last effect is not statistically significant). For children aged 15 to 17 the treatment increases the probability of school participation by 12.7 percentage points. This operates through a reduction in both the probability of work participation (-4.6 percentage points, not significant at conventional levels) and of being idle (-5.4 percentage points). Part of the increase in schooling is accompanied by an increase in the probability of combining work and school (2.8 percentage points).

In sum, although the programme has a larger effect on schooling among elder than among younger children, this does not translate into a greater fall in work participation. Work participation appears to constrain school attendance among children aged 12-14 and the programme is successful in incentivizing school attendance and simultaneously reducing work participation among this group of children.

As school dropout is pronounced among children age 15-17, and because a non-negligible fraction of these children are inactive, the impact of the programme on schooling is larger in this age group but this does not translate into an equal fall in work participation, as for many of these children (largely girls) the probability of being idle decreases as a result of the programme.

Table 8. **Oportunidades and children's activity outcomes. Heterogeneous effects by level of education of household head**

VARIABLES	(1) School	(2) Work	(3) Work only	(4) School only	(5) Work and school	(6) Idle	(7) Household chores	(8) Working for wage	(9) Not working for wage
No education									
Share of households w/Oportunidades	0.110**	-0.021	-0.051	0.080*	0.030	-0.059	-0.019	0.040	-0.061*
	(0.045)	(0.039)	(0.032)	(0.045)	(0.021)	(0.037)	(0.037)	(0.025)	(0.034)
Existence of Oportunidades	-0.010	-0.007	0.001	-0.001	-0.009**	0.008	0.023	-0.010**	0.003
	(0.008)	(0.007)	(0.006)	(0.007)	(0.004)	(0.007)	(0.021)	(0.005)	(0.005)
Primary									
Share of households w/Oportunidades	0.029	-0.058*	-0.030	0.056	-0.028	0.001	-0.025	0.012	-0.069**
	(0.041)	(0.034)	(0.028)	(0.041)	(0.019)	(0.033)	(0.045)	(0.020)	(0.028)
Existence of Oportunidades	-0.007	-0.004	-0.000	-0.003	-0.003	0.007	0.029	-0.002	-0.002
	(0.008)	(0.006)	(0.004)	(0.008)	(0.003)	(0.007)	(0.023)	(0.004)	(0.004)
Secondary or higher									
Share of households w/Oportunidades	0.046	-0.010	-0.025	0.031	0.015	-0.021	-0.034	-0.008	-0.002
	(0.039)	(0.027)	(0.019)	(0.042)	(0.018)	(0.033)	(0.071)	(0.018)	(0.019)
Existence of Oportunidades	-0.008	0.002	0.004	-0.007	-0.002	0.005	0.024	0.003	-0.002
	(0.007)	(0.004)	(0.003)	(0.007)	(0.003)	(0.006)	(0.021)	(0.002)	(0.002)
R-squared	0.203	0.143	0.150	0.194	0.037	0.110	0.132	0.122	0.086
Test equality of no education/ primary Share coeff. (P-value)	0.182	0.477	0.616	0.699	0.041	0.221	0.919	0.384	0.845
Test equality of no education/secondary or higher Share coeff. (P-value)	0.752	0.267	0.890	0.666	0.105	0.632	0.916	0.459	0.043
Test equality of primary/secondary or higher Share coeff. (P-value)	0.286	0.819	0.485	0.428	0.590	0.445	0.854	0.119	0.128

See also notes to Table 3.

In Table 8 we investigate the differential impact of *Oportunidades* according to the educational level of the household head. Unsurprisingly, children in households whose head has no formal schooling display the largest impact in terms of the probability of school participation (11 percentage points compared with 2.9 and 4.6 percentage points for children in households headed by someone with at least one year of primary education and with secondary education or above, respectively). On the contrary, the effect of the probability of participation in economic activity is larger among children in households with a primary educated head (-5.8 percentage points and statistically significant,

that compares with -2.1 and -1 percentage points among children in households headed by individuals with no schooling and with secondary education or above, respectively). Typically, effects among children of highly educated household heads are small and statistically insignificant.

Table 9. **Oportunidades and children's activity outcomes. Heterogeneous effects by time period**

VARIABLES	(1) School	(2) Work	(3) Work only	(4) School only	(5) Work and school	(6) Idle	(7) Household chores	(8) Working for wage	(9) Not working for wage
2000-04 Share of households w/Oportunidades	0.105**	-0.035	-0.057**	0.082*	0.022	-0.048	-0.054	0.015	-0.047*
	(0.006)	(0.004)	(0.003)	(0.006)	(0.003)	(0.005)	(0.021)	(0.003)	(0.003)
Existence of Oportunidades	-0.008	-0.003	0.001	-0.004	-0.004	0.007	0.023	-0.001	-0.002
	(0.050)	(0.031)	(0.025)	(0.049)	(0.021)	(0.041)	(0.064)	(0.019)	(0.026)
2005-10 Share of households w/Oportunidades	-0.026	-0.014	0.004	-0.007	-0.019	0.022	0.057*	-0.040	0.027
	(0.050)	(0.034)	(0.028)	(0.048)	(0.021)	(0.038)	(0.034)	(0.024)	(0.026)
Existence of Oportunidades	-	-	-	-	-	-	-	-	-
R-squared	0.184	0.147	0.138	0.178	0.041	0.113	0.164	0.113	0.084
Test equality of 2000-04/2005-10 Share coeff. (P-value)	0.063	0.682	0.106	0.191	0.170	0.214	0.128	0.078	0.045

See also notes to Table 3.

The first row of columns (3) to (6) sheds some light on the differential impact of the programme on children's activities depending on the household head's level of education. Among children from households headed by persons with no formal education, the overall increase in the probability of attending school is accompanied by an increase in the probability of school only (+ 8 percentage points) and of combining school and work (+3 percentage points, not statistically significant), as well by a reduction in the probability of being neither in work nor in school (-5.9 percentage points, not statistically significant). Among children in households headed by individuals with primary education, the increase in the probability of school participation is instead ascribable only to a reduction in the probability of work, whereas there are virtually no changes in the probability of being idle. Unsurprisingly, we do not find statistically significant effect of the programme on the activities of children from households headed by individuals with secondary or higher education.

Separate estimates for the sub-periods 2000-2004 and 2005-2010 are reported in Table 9. These show that programme effects are concentrated in the first half of the decade. The estimated coefficient on the probability of school participation indicates a reduction by 10.5 percentage points due to a reduction in the probability of being idle (-4.8 percentage points, not statistically

significant) and to an increase in the probability of combining work and school (2.2 percentage points, not statistically significant). The programme is estimated to reduce the probability of work participation by 3.5 percentage points, not statistically significant, whereas the probability of work only drops by 5.7 percentage points. Point estimates for the second half of the decade are lower in absolute value compared to the first half and never statistically significant (with the exception of involvement in household chores that somewhat surprisingly seem to increase in response to the programme). Although this might suggest that programme effects dilute over time, an alternative interpretation is that the absence of meaningful variation in programme take-up across municipalities in the second half of the decade (see Figure 3) prevents us from obtaining statistically significant estimates. Indeed, results at the bottom of the table show that programme estimates across sub-periods are by and large not statistically different from one another.

7. Concluding remarks and policy considerations

Mexico's *Oportunidades* programme was one the first CCT schemes to be launched worldwide. Due to the design of the randomized experiment, most of the existing studies have focused on the short-term impact of the programme, particularly in rural areas, and less attention has been paid to the impact of the scheme nation-wide and to its impact over a longer run.

Using national representative labour force surveys data for the decade 2000-2010, and a quasi experimental identification strategy that exploits the gradual roll-up of the programme across municipalities, we confirm earlier findings that Oportunidades increased school attendance, and we complement this finding by identifying a significant reduction in children's participation in employment.

Our baseline estimates imply that a 10 percentage points rise in programme take-up in a given municipality led to a fall in the fraction of children in work of around 0.5 percentage points and a rise in school attendance of around 0.8 percentage points.

Results for girls point to a large impact of the programme on school participation. However, the effect on girls' work participation is smaller compared to boys' as the cash transfer scheme also pulled girls out of inactivity and household chores into school.

Similarly, although the programme had a larger effect on schooling among elder than among younger children, it did not translate into a greater fall in employment in this group. This might be due to the fact that older children are significantly more likely to drop out of school. For younger, 12-14 years old, children, work participation appears to constrain school attendance and the programme was successful in incentivizing school attendance and simultaneously reducing work participation among this group of children.

By combining changes in programme expansion and outcomes with regression estimates, we estimated that between 2000 and 2010 the programme contributed to around 7 percent of the observed (8 percentage points) fall in child labour.[17] This result is smaller than our estimates of the programme contribution to the rise in schooling over this period that is 11 percent. [18]

Results across sub-groups by age, gender, and residential status are similar, with a contribution of the programme of between 3 percentage points (in urban areas) and 11.5 percentage points (for children aged 12-14).[19]

These results suggest that, although conditional cash transfers programmes alone are unlikely to lead to an eradication of child labour and the achievement

17 This number is simply obtained by multiplying the average increase in the fraction of programme households (11.1 percentage points) times the coefficient in Table 2, row 1, column (6) (-0.51 percentage points) and dividing it by the overall fall in child labour (-7.7 percentage points).

18 Results are larger (about double) if we use unweighted means.

19 The largest single factor explaining the fall in child labour and the rise in schooling is improvements in parental education, that likely also proxy for improvements in parents' socio-economic status.

of universal education, these programmes appear to be key instruments towards the achievements of these goals.

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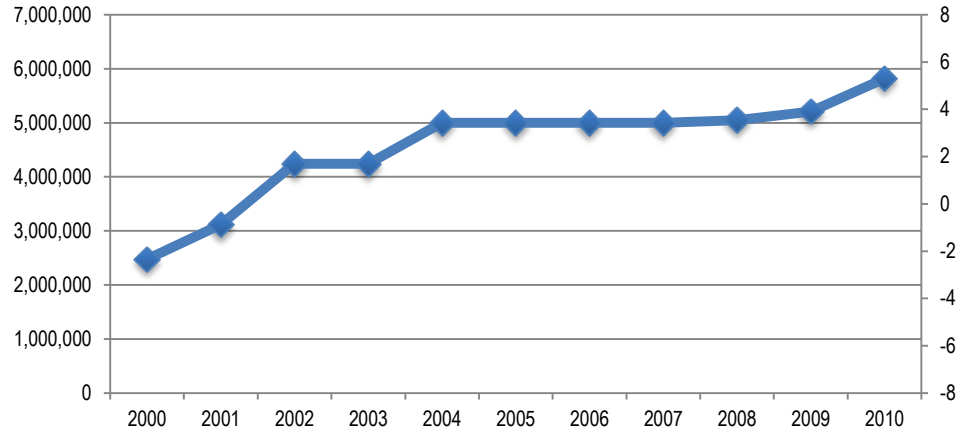
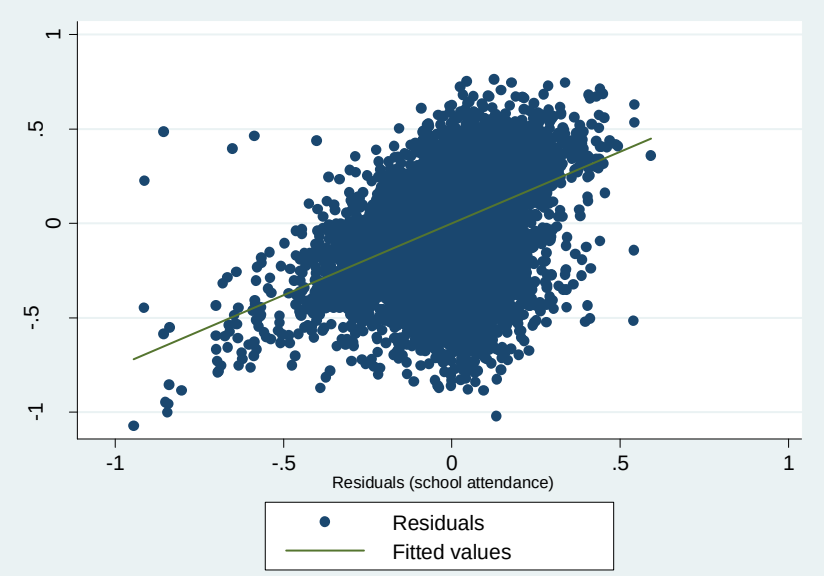
Appendix

Figure A1. **Number of Oportunidades beneficiary households, Mexico 2000-2010**



Source: Padrón de hogares beneficiarios, 2000-2010.

Figure A2. **Residuals of variable "whether a child devoted any time to study last week" versus residuals from school attendance variable**



The vertical axis reports the averages by municipality and time of the residuals from a regression of the variable "whether a child devoted any time to study last week" on additive time and municipality dummies. The horizontal axis reports residuals from a similar regression where the dependent variable is "school attendance". Regressions refer to the period 2005 to 2010. A regression line is also superimposed to the data.
Source: authors' computation on ENOE data, 2005-2010.

Figure A3. **Table A1. Monthly Education Cash Transfer, July-December 2012**

	Primary	
grade 3	165.00 (18.5)	
grade 4	195.00 (21.9)	
grade 5	250.00 (28.1)	
grade 6	330.00 (37.1)	
	Lower Secondary	
	Male	Female
grade 1	480.00 (53.9)	510.00 (57.3)
grade 2	510.00 (57.3)	565.00 (63.5)
grade 3	535.00 (60.1)	620.00 (69.7)
	Upper Secondary	
	Male	Female
grade 1	810.00 (91.0)	930.00 (104.5)
grade 2	870.00 (97.7)	995.00 (111.8)
grade 3	925.00 (103.9)	1,055.00 (118.5)

Note: Values are in nominal Pesos. USD$1 = 8.9 Mexican Pesos (PPP as of 2012).
Source: Reglas de Operacion 2013 available at www.oportunidades.gob.mx.

Figure A4. **Table A2. Existing estimates of the impact of Oportunidades on school attendance and work participation**

Reference	Period	Geog. Coverage	Gender	Age /Educ. group	School		Work		Estimation strategy	Experimental	Sample	Work Definition	Data
					Coeff.	S.E./T-stat/P-value	Coeff.	S.E./T-stat/P-value					
Skoufias and Parker (2001)	1997-1998	Rural	Male	12-17	0.043	T=2.400	-0.032	T=-1.600	Diff-in-Diff	Yes	A		ENCASEH 1997 and ENCEL 1998
			Female	12-17	0.078	T=4.300	-0.018	T=-1.700					
Buddelmeyer and Skoufias (2004)	1997-1998	Rural	Male	12-16	0.050	SE=0.017	-0.037	SE=0.023	Diff-in-Diff	Yes	A		ENCASEH 1997 and ENCEL 1998
			Female	12-16	0.086	SE=0.017	-0.034	SE=0.017					
			Male	12-16	0.005	SE=0.022	0.005	SE=0.019	RDD				
			Female	12-16	0.054	SE=0.024	-0.008	SE=0.012					
Schultz (2004)	1997-1999	Rural	Male	primary school	0.008	P=0.002	-0.013	P=0.170	Triple Diff	Yes	C		ENCASEH 1997 and ENCEL 19989
				secondary school	0.062	P=0.003	-0.022	P=0.190					
			Female	primary school	0.009	P=0.003	-0.004	P=0.690					
				secondary school	0.092	P=0.000	-0.041	P=0.024					
Behrman et al. (2011)	1997-2003	Rural	Male	15-16	-	-	-0.140	SE=0.040	Diff-in-Diff Matching	No	A		ENCASEH 1997 and ENCEL 2003
				17-18	-	-	0.060	SE=0.040					
			Female	15-16	-	-	0.010	SE=0.030					
				17-18	-	-	-0.010	SE=0.040					
Behrman et al. (2012)	2002-2004	Urban	Male	12-14	-0.030	SE=0.031	-0.124	SE=0.036	Diff-in-Diff Matching	No	B		ENCEL urban 2002,2003, and 2004
				15-18	-0.026	SE=0.048	-0.051	SE=0.082					
			Female	12-14	0.001	SE=0.033	-0.010	SE=0.028					
				15-18	0.012	SE=0.062	0.004	SE=0.092					

Note: A: includes paid or unpaid work, including work in the family business. B: Only includes work for pay. C: Same as A with the addition of domestic activities.

Figure A5. **Table A3. Descriptive Statistics - individual, household, and municipality level characteristics.**

VARIABLE		Mean	Std. dev.
Oportunidades	Share of beneficiary households	0.179	0.213
	Share of municipalities covered	0.889	0.314
Individual characteristics	Female	0.495	0.500
	Age	14.457	1.701
	Age Squared	211.898	49.320
Household characteristics	Household size	5.518	2.024
	Siblings 0-4	0.318	0.622
	Siblings 5-14	1.685	1.265
	Eldest child	0.125	0.331
	Female Head	0.071	0.257
	Missing female head	0.004	0.065
Household Poverty	Poor household (labour income<2PPP$ a day)	0.205	0.404
	Missing household poverty	0.147	0.354
Education of household head	No schooling/up to incomplete primary	0.205	0.404
	Primary	0.344	0.475
	Lower secondary	0.207	0.406
	Upper secondary and above	0.223	0.416
	Missing education	0.021	0.142
Household head sector of employment	Agriculture	0.171	0.376
	Manufacturing	0.130	0.337
	Construction	0.092	0.290
	Trade	0.124	0.329
	Services	0.267	0.442
	Other	0.056	0.231
	Not employed	0.000	0.016
	Missing sector	0.159	0.366
Local Labor Market	Adult unemployment rate	3.700	2.226
Poverty and Inequality	Decile Dispersion ratio	7.893	20.594
	Missing Decile Dispersion ratio	0.018	0.134
	Share of poor households in the community	0.095	0.179
Secondary school quality and access	Student/Teacher ratio	17.744	3.635
	Missing Student/Teacher ratio	0.001	0.025
	Telesecundaria/Secondary school ratio	0.367	0.302
	Missing Telesecudaria/Secondary school ratio	0.047	0.211

Figure A6. **Table A4. Oportunidades and children's school and work outcomes - full specification**

	VARIABLE	(1) 12-17 School	(2) 12-17 Work
Oportunidades	Share of households w/Oportunidades	0.085***	-0.051**
		(0.032)	(0.025)
	Existence of Oportunidades	-0.005	-0.001
		(0.006)	(0.004)
Individual characteristics	Female	0.013***	-0.124***
		(0.001)	(0.004)
	Age	0.150***	-0.109***
		(0.007)	(0.009)
	Age squared	-0.007***	0.006***
		(0.000)	(0.000)
Household characteristics	Household size	0.003***	-0.007***
		(0.001)	(0.000)
	Siblings 0-4	-0.052***	0.027***
		(0.001)	(0.001)
	Siblings 5-14	-0.010***	0.022***
		(0.001)	(0.001)
	Eldest child	0.027***	-0.017***
		(0.001)	(0.001)
	Female Head	-0.013***	0.024***
		(0.002)	(0.002)
	Missing Female Head	-0.013*	0.013*
		(0.007)	(0.007)
Household Poverty	Poor household (labour income<2PPP$ a day)	-0.012***	0.021***
		(0.002)	(0.002)
	Missing household poverty	0.002	-0.010***
		(0.002)	(0.002)
Education of household head	Primary	0.070***	-0.053***
		(0.002)	(0.002)
	Lower secondary	0.129***	-0.098***
		(0.004)	(0.003)
	Upper secondary and above	0.188***	-0.148***
		(0.004)	(0.003)
	Missing education	0.071***	-0.020***
		(0.004)	(0.004)
Household head sector of employment	Manufacturing	0.028***	-0.051***
		(0.003)	(0.004)
	Construction	0.005	-0.059***
		(0.003)	(0.004)
	Trade	0.042***	-0.024***
		(0.003)	(0.004)
	Services	0.038***	-0.067***
		(0.003)	(0.003)
	Other	0.049***	-0.097***
		(0.003)	(0.003)
	Not employed	0.113***	-0.311***
		(0.023)	(0.007)
	Missing sector	0.039***	-0.108***
		(0.003)	(0.004)

Figure A6. **Table A4. Oportunidades and children's school and work outcomes - full specification**

	VARIABLE	(1) 12-17 School	(2) 12-17 Work
Local Labour Market	*Figure A7.* Adult unemployment rate	*Figure A8.* - 0.004***	-0.001**
		(0.001)	(0.001)
Poverty and Inequality	Decile Dispersion ratio	-0.000*	0.000
		(0.000)	(0.000)
	Missing Decile Dispersion ratio	0.007	0.016**
		(0.008)	(0.007)
	Share of poor households in the community	-0.028	0.036**
		(0.020)	(0.015)
Secondary school quality and access	Student/Teacher ratio	0.001	-0.000
		(0.001)	(0.001)
	Missing student-teacher ratio	0.041***	-0.126***
		(0.013)	(0.009)
	Telesecundaria/Secondary school ratio	0.012	0.029**
		(0.016)	(0.013)
	Missing telesecundaria ratio	0.009	0.133***
		(0.017)	(0.026)
N. obs.		2,494,755	2,494,755
R-squared		0.190	0.158

*See also notes to Table 2. Additional controls include time (Year*quarter) and municipality fixed effects plus state-specific linear trends.*