# The Medium-Term Impact of a Conditional Cash Transfer Program on Child Physical and Cognitive Development: Evidence from Progresa

Arturo Aguilar*

October 19, 2012

Preliminary - Please do not cite

**Abstract**

A growing literature has shown the importance of early child development towards social and economic success later in life. Conditional cash transfer programs (CCTs) have been successfully implemented in developing countries with the purpose of reducing social inequality by creating incentives for poor households to invest in human capital. However, little evidence exists to show if CCTs improve children's early physical and cognitive development. This question is relevant since CCTs long-term effectiveness relies, to a large extent, on the returns that children will obtain from the human capital investments promoted by the program. This paper uses data from the Mexican Progresa experiment and its 2003 follow-up survey to test if Progresa's exposure during critical stages of early life had medium-term effects. No evidence of significant effects on physical and cognitive development outcomes (objectively measured) is found on preschool children five years after the start of the program. This contrasts with previous evidence presented in the literature. Given the considerable lag of these children's development, the results raise concerns about the CCTs long-term effectiveness to reduce poverty and close the inequality gap.

*Instituto Tecnológico Autónomo de México (ITAM). Contact e-mail: arturo.aguilar@itam.mx

*"The family is the major source of inequality in American society, in most societies"*
- James Heckman

# 1 Introduction

Early life stages are recognized as critical towards human development. Physical and cognitive development are highly sensitive to experiences and investments during this period (Shonkoff and Phillips 2000). The adequate development of these qualities has been proven to be a strong predictor of later schooling and life success (Breslau et al. 2001; Currie and Thomas 2001; Nikolov 2011). Tying these pieces together, a growing body of research has shown that conditions early on life (in-utero and during the first years of life) tend to have long term consequences on various socio-economic indicators (Almond 2006; Almond and Mazumder 2011; Case and Paxson 2008; Maccini and Yang 2009). Therefore, interventions that attempt to benefit children born (or to be born) on disadvantaged settings are relevant to compensate for their initial adverse conditions.[1] Failing to correct these initial inequalities might result in a persistent (or even divergent) gap in various socio-economic dimensions throughout life (Cunha and Heckman 2006; Heckman 2006). In developing countries, the exposure of children to poverty, malnutrition, poor health, and unsupportive home environments make of this problem a great concern (Grantham-McGregor et al. 2007).

Conditional cash transfer programs (hereon CCTs) have become increasingly popular policies to fight poverty transmission and inequality. Generally, CCTs' main focus is the promotion of health, nutrition, and schooling, mainly of young household members. To encourage poor households to meet these investments, they are established as conditions to receive a cash transfer that allows them to ease credit constraints.[2] A vast literature

[1]See Cunha and Heckman (2006) for a review of early childhood intervention programs in the U.S. Examples of programs targeting preschool children that have been implemented in the developing world include: providing nutritional supplements and stimulation to 9-24 month old stunted children in Jamaica (Grantham-McGregor et al. 1991, 1997; Walker et al. 2000); and nutritious food supplements on villages with high incidence of malnutrition in Guatemala (Maluccio et al. 2009).

[2]CCTs generally consist on cash transfers delivered to poor households conditional on compliance with a set of human capital investment requirements. The conditions apply mostly to children and range from mandatory educational enrollment, regular health monitoring to pre- and post-natal care (Fizbein and

exists showing the positive impacts that CCTs have had in several dimensions (see Parker et al. (2008) for a review of the literature). However, few papers have analyzed whether CCTs amend (at least partially) inequalities that arise early in life. If these initial gaps are not reduced, the benefits that CCTs have been shown to provide, like health improvements and education attainment, might not be sufficient to reduce socio-economic disparities.

This paper investigates the medium-term effects of exposure during early stages of life to the PROGRESA-Oportunidades CCT program[3] (hereon Progresa) on children's physical, cognitive, motor skill, and behavioral development. The outcomes included in the paper are mostly objective, obtained mainly with anthropometric measures and standardized tests. Also, a methodology to isolate the contribution of the cash transfer component from that of the conditionalities[4] is proposed using a regression discontinuity design.

Previous work that analyzed Progresa's medium-term effects during early childhood, (Neufeld et al. 2005) found positive effects in anthropometric outcomes by comparing the original experimental localities with a new set of control localities added in 2003.[5] No effects were found using the experimental localities and the initial randomization. The authors argue that since children from the control localities began to receive the program just one year and a half after the original treatment, they catch-up in anthropometric development. Using a similar strategy, Fernald and Gertler (2005) found positive medium-term

Schady 2009).

[3]Mexico's PROGRESA-Oportunidades is the most widely known CCT program because of the academic dissemination of its results. Its data is a panel collected in several waves between 1997 and 2008. The data is publicly available and covers various topics. PROGRESA-Oportunidades has had a big impact towards CCTs expansion to other countries (Mexican Ministry of Development 2012a).

[4]PROGRESA-Oportunidades cash transfers are conditional on children's school attendance and household members attendance to health check-ups; parents are required to attend community meetings where information about good health practices is distributed; and pregnant women have to attend to at least five medical appointments (Diario Oficial de la Federación 2002)

[5]The original control localities began to receive treatment a year and a half later than treatment localities, making the initial randomization an early versus late treatment comparison. In 2003, 151 new localities were added to serve as an artificial control. These localities are located in the same States as the original experimental localities, but by 2003 they had not been added to the program. Matching methods based on locality observable characteristics were used to find similar localities to the original ones.

effects on motor skill development, but none on cognitive abilities.

Identifying the contribution of the cash and the conditionalities components is relevant from a policy perspective since the administrative costs of verifying the conditionality are not negligible. This problem motivated recent work that compares conditional versus unconditional programs (Baird et al. 2011; de Brauw and Hoddinott 2011; Bursztyn and Coffman 2012). Using anthropometric and cognitive outcomes, Fernald et al. (2008) claim that larger cash transfers are associated with better early child development in these dimensions. Using Progresa data, they estimate a linear relation of the accumulated cash transfers received by the household with children's outcomes. They restrict their sample to children living in households that have received cash transfers at least one month before they were born. Given this restriction, they argue that the results reflect the association between cash transfers and outcomes, since all the children had been exposed to the conditionalities. In a follow-up paper, Manley et al. (2012) found similar results using potential cash transfers[6] as instrument for actual transfer amounts received.

In related work, Paxson and Schady (2010) used a randomized intervention at the local level in Ecuador and found modest but positive effects of *Bono de Desarrollo Humano* program's cash transfers on children's physical, cognitive and socio-emotional development (with the poor being more benefited). Macours et al. (2012) used a Nicaraguan randomized intervention, *Atención a Crisis*, that distributed cash and child-care information on households with children aged 0-5. They found positive effects on cognitive development 9 months after the initial treatment and up to two years after the program ended. Further evidence from their study suggests that the effects are mainly due to the information distributed to households rather than the cash component. Garcia and Hill (2010) find positive effects of the Colombian conditional cash transfer program *Familias en Acción* on rural children's primary school achievement.

This paper employs data from the Progresa evaluation surveys. Five years after Pro-

[6]The potential transfers are estimated based on the program's rules and each household's demographic composition, randomly given treatment status, and children's school attendance.

gresa's initial randomization, a follow-up survey was collected in 2003. This survey includes objective indicators of anthropometric, cognitive, motor skills, and health development from children aged 2 to 6. The data is longitudinal and it can be related to previous surveys, including the 1997 baseline, the 1998-2000 bi-annual follow-ups, and Progresa's administrative information about cash transfers.

The main findings in this paper contrast with previous results from the literature. First, using the original randomization localities, the average effects of being born in an early-treatment locality (original treatment) with respect to a late-treatment locality (original control) are estimated.[7] Birth at early-treatment localities would provide more exposure to health care, plus cash transfers on average $635 and $820 Mexican pesos higher during pregnancy and first year of life,[8] respectively (these amounts are equivalent to a 8.6% and 9.3% increase in the value of household's food consumption, respectively). No advantage of being born in an early-treatment locality is found for any of the outcomes analyzed.

Second, the paper employs the random difference of the phase-in of the original localities (April 1998 versus November 1999) and the children's date of birth to investigate if there are medium-term effects from exposure to the program during different stages of early child development. For example, children born in early-treatment localities between January 1999 and October 1999 would have been exposed to the program during all their in-utero development as opposed to those born in late-treatment localities. No conclusive evidence of benefits in any of the outcomes is found using this approach.

Third, this paper evaluates if the no effect results are explained because the children from the late-treatment localities catch-up with those in early-treatment as argued in Neufeld et al. (2005). A regression discontinuity (RD) design is implemented using Pro-

[7]The original treatment localities began to receive the benefits or the program in April 1998 and the control localities in November 1999. The outcomes analyzed in this paper are collected between September and November 2003.

[8]Transfers during pregnancy are those received during the ten months previous to the child's birth. Transfers received during the first year of life are those received during the 12 months after the child's birth (including the month of birth)

gresa's eligibility rule based on a proxy means test. According to Progresa's rules, once a locality is added to the program, households are not assessed for inclusion/removal until three years after.[9] By restricting the observations to treatment localities, it is shown that the proxy means eligibility discontinuity remains from the start of the program (April 1998) until three years after. No benefits from the program are found by comparing the outcomes of children just before and after the discontinuity in the proxy means score. This result contrasts with the catch-up hypothesis proposed.

Finally, a method to isolate the effects of increases in cash transfers is proposed. This method takes advantage of discrete changes for the educational cash transfers specified in Progresa's rules. A large increase occurs between 2nd and 3rd grade, where the transfer per student attending school changes from $0 to $70 Mexican pesos per month (October 1998 cash transfer amounts). By restricting the sample to children born while the household's oldest sibling's age is such that he/she should be just before or after 3rd grade, two groups are constructed. An exogeneity test shows that, other than differences in cash transfers, these two groups are similar in terms of baseline observable characteristics (except for parents age and household size). Cash transfer increases for being over the discontinuity are equal to $314 and $649 Mexican pesos during pregnancy and first year of life. No conclusive evidence of impacts of increasing cash transfers on medium-term physical, cognitive, and motor skill development are found.

Overall, the results do not find conclusive evidence of medium-term effects on preschool children's anthropometric, cognitive, and motor skill development for exposure to Progresa during early stages of life. Progresa does not seem to correct considerable initial disadvantages of children born on poor settings. If the initial disadvantage results in lower returns to human capital investments, then the findings of this paper suggest that Progresa could be less effective reducing poverty and inequality on the long-run.

The remainder of the paper is organized as follows: *Section 2* provides some context

[9]This was done to avoid households from close-by localities to migrate to recipient localities in order to be added to the program.

about Progresa; *Section 3* describes the data used; *Section 4* details the empirical specifications; *Section 5* presents the results; and, finally, *Section 6* concludes.

## 2 Progresa description and its effects on early childhood

Mexico's PROGRESA-Oportunidades program is a basic reference among CCT programs. Progresa was created with the purpose of "supporting poor households to foster the capacities of their members and expand their alternatives to reach higher levels of wellbeing by improving their options to access education, health and nutrition[10] (Diario Oficial de la Federación 2002)." Its strength lies in a solid institutional foundation and a rigorous evaluation design that makes it possible to objectively assess its results under high standards (Levy 2006).

### 2.1 General description

Progresa started in August 1997. Nowadays, it is the most comprehensive poverty reduction program in Mexico. By 2012, it reached a coverage of 5.8 million households (23% of the Mexican households) and it is expected to be extended to 6.5 million within the next years (Mexican Ministry of Development 2012b). For 2012, the approved budget for the program amounts 63.9 billion Mexican Pesos (0.4% of 2011 Mexico's GDP) (Diario Oficial de la Federación 2011).

Between 1997 and 2000, while the program was being expanded at a national level, a randomized evaluation design was implemented in a subsample of 506 localities that were initially determined as eligible to receive the program. Of the 506 localities, 320 were randomly designed as treatment and 186 as control. The purpose of the experiment was to rigorously estimate the impact of the program on several dimensions, giving Progresa a high academic exposure (Fizbein and Schady 2009).

[10] Author's translation of the original Progresa's main objective.

## 2.2 Components and conditionalities

At the time Progresa began, it consisted of three main components:[11] (i) **education**, that was promoted by providing cash transfers to households for each child enrolled and regularly attending school (at least 85% of turnout); (ii) **nutrition**, that consisted on lump-sum cash transfers[12] and delivery of food supplements (targeted to children and lactating or pregnant women) given to households complying with the health conditionality and attendance to information sessions; and (iii) **health**, that consists of regular check-ups required to all household members, but with higher attendance frequency on children under 5 years old and pregnant or lactating women. Also, the female household head is required to attend regular sessions that distribute information about good health care practices (Hernández et al. 1999).

Cash transfers (educational and nutritional) are delivered to the female head member of the household every two months. Families receive information suggesting them how to use the transfers in order to improve the conditions of its members. However, in practice, households can freely decide how to spend the resources.

To become a Progresa beneficiary, the household has to fulfill the following conditions:[13]

1. Reside in a locality that has been declared as eligible to receive Progresa. Preference was given to the most marginalized localities.[14] Selection was restricted to rural localities (below 2,500 inhabitants) that have access to school and health services

[11] After 2006, additional components were added to the program. This components increased the lump-sum transfers given to the households without establishing additional conditions, except for the elderly people component that is conditional on having a household member over 70 years old present in the household.

[12] Upon delivery of resources, it is suggested to families to use part of the transfers to improve the diet and nutrition of the household members, particularly female and children.

[13] These conditions correpond to the requirements that were valid between 1997 and 2003 when only rural localities (below 2,500 inhabitants) were eligible to receive Progresa. After 2003, urban localities were included in the program and some of the conditions were modified.

[14] A marginality index is calculated every five years by the National Institute of Geography and Statistics (INEGI). The index is obtained through a weighted linear combination of socio-economic indicators at the locality level.

(the conditionalities)(Cruz et al. 1999).

2. Qualify as an eligible household. Eligibility is identified by proxy means test using information collected with a Census in the selected localities. The proxy means test combines household's asset ownership, characteristics of the household head, and household demographic characteristics (Hernández et al. 1999).

3. Attend to the locality meeting that assembles all eligible households to complete their enrollment. In this meeting households receive documentation and guidelines of how to meet the conditionalities and receive the cash transfers[15] (Hernández et al. 1999).

### 2.3 Background on early childhood benefits of Progresa

Some of Progresa's components are intended to directly benefit children at their early stages of development. Women during pregnancy are required to attend at least five checkups and receive nutritional information, as well as iron and nutritional supplements. After delivery, mothers are required to have two additional checkups in which they receive information about child rearing, breastfeeding and family planning. Also, children below the age of five are required to attend health checkups (more frequently than a normal household member) to receive immunizations, early detection of child-common sickness, growth and nutrition assessments, and nutritional supplements (Hernández et al. 1999).

Previous work has found positive impacts of Progresa on children's development during their early stages of life. Utilization of health infrastructure increased (Gertler 2000). Benefits during the pregnancy stage have been shown to result in increments of birth weight (127.3 grams on average) and a decrease in low birth weight incidence (44.5 percent) (Barber and Gertler 2010). The effect seems to be greater for children of higher percentiles of birth weights (Flores-Martinez 2010). Also, an 11% reduction of child mortality has been found, being the effect more pronounced in more marginalized municipalities (Barham 2011).

[15] In theory, during this meeting, members of the community can oppose to certain families being added to the program. In practice, objections were presented in less than 0.1% of the cases (Skoufias et al. 2000).

Height is a common objective indicator to assess the effect of nutrition and access to care early in childhood. A first group of papers found positive effects of the program exposure for a subsample of children measured one to two years after the start of the program (Gertler 2004; Behrman and Hoddinott 2005). A later study that uses the 2003 Progresa follow-up survey, also finds differences on the medium run (Neufeld et al. 2005). However, this study compares only the outcomes of children in the experimental localities to those of children in new "control" localities. Finally, Farfán et al. (2011) find significant effects on height of children aged 5-8 when comparing children fully to partially exposed to the program from their birth using the Mexican Family Life Survey.

Finally, as mentioned in *Section 1*, only two papers have investigated the effects of Progresa on children's cognitive development (Fernald and Gertler 2005; Fernald et al. 2008), finding inconsistent results about the effect of the program.

## 3 Data

The main outcomes used in this study come from the 2003 Progresa follow-up survey. Five years after the initial randomization of the Progresa experiment, this later wave of data was collected to analyze medium-term effects of the program. Anthropometric, cognitive, health, motor skills, and behavioral information of children aged 2-6 was gathered from a subsample of the original 506 villages.[16] The sample for the analysis is restricted to children from eligible households that have an available date of birth.[17] This results in a sample of 264 villages, 2,203 households and 3,019 children that is used in the analysis. Using the longitudinal component of the Progresa databases, the information can be related to the baseline (1997) characteristics of each children's households as well as their parents' characteristics. *Table 1* includes some descriptive statistics of these indicators.

[16]Data is publicly available at http://evaluacion.oportunidades.gob.mx/evaluacion

[17]Date of birth was verified against self reported age for consistency. Whenever there was an inconsistency in the years, but not in months (assuming the month and day of birth are easier to recall than the year) the self-reported age is used to correct the year of birth.

### 3.1 Anthropometric data

Height and weight were collected by trained personnel using regularly calibrated portable scales and stadiometers (Neufeld et al. 2005). These measures were standardized with respect to a healthy age-sex reference population following the methodology recommended by the World Health Organization.[18] Using the standardized measures two other indicators were calculated: (i) *stunting*[19] or low weight for age, which is a binary variable equal to *one* if the height is two or more standard deviations below the age-sex standardized height; and (ii) *overweight*, which is a binary variable equal to *one* if the body mass index (BMI) is above the *85th* percentile of the age-sex standardized BMI.

*Table 1* shows that the group of children considered in the sample are on average 1.81 standard deviations below for height, 0.79 standard deviations below for weight and 0.60 standard deviations above for BMI with respect to the age-sex reference population mean. Stunting is prevalent in 44 percent and overweight in 29 percent of the sample. These indicators illustrate that serious lags in growth are prevalent in the sample used, probably as a result of undernourishment early in life. It is important to remember that the Progresa data was collected from Mexican marginalized rural communities and the sample was further restricted to children in eligible (poor) households.

### 3.2 Cognitive indicators

Objective measures for early child cognitive development are available in the Progresa dataset. These measures result from applying the *Peabody Picture Vocabulary Test* (PPVT) (Dunn and Dunn 1986) and three subsections of the *Batería Woodcock-Muñoz Test* (WMT) (Woodcock and Muñoz-Sandoval 1996). Both tests are acknowledged in the educational literature for their high *internal reliability* and *validity*.[20]

[18]World Health Organization software was used to generate the standardized values. Access to the software is publicly available at `http://www.who.int/nutgrowthdb/software/en/`

[19]Stunting usually reflects insufficient nutrient intake during early stages of development. It generally occurs before age two and once established, it is usually permanent. Possible consequences include delayed development, impaired cognitive function, and poor school performance (UNICEF 2007)

[20]In educational testing, *internal reliability* indicates the degree to which test scores for a group of test takers are consistent over repeated applications of the measurement procedure, and *Validity* refers to

The PPVT measures the receptive vocabulary of children aged 3 to 6 by asking them to indicate which of four pictures best represents a stimulus word. Studies have found that vocabulary tests tend to be strong predictors of school success and contribute in a large extent on tests that assess general intelligence. The PPVT test is widely used with preschool children to assess early child development (Duncan et al. 2007).

Scores from three subtests of the WMT are available for children 2 to 6 years old. These sub-tests ask children to: learn associations between unfamiliar auditory and visual stimuli; remember and repeat single words, phrases, and sentences; and identify an object's picture from a partial drawing or representation. The results are related to long-term memory, working memory, and visual-spatial thinking abilities, respectively.[21] The WMT has been used in the literature to evaluate the effect of early nutritional interventions on cognitive development and have been shown to detect differences between children with low birth weight incidence and those born with normal weight (Breslau et al. 2001; Lozoff et al. 1991).

The logarithmic transformation of the scores is used in the analysis. *Table 1* shows that on average children successfully answer 10% of the PPVT questions, 16% of the long-term memory, 35% of the short-term memory, and 19% of the visual-spatial integration portions of the WMT. Fernald and Gertler (2005) show that when compared to a standardized spanish-speaking population[22] these sample's average test results fall in the 18.9 percentile for the PPVT, and the 16.1, 21.5 and 7.2 for the three WMT subtests, respectively. These very low levels of cognitive development are distressing by themselves and give evidence of a big disadvantage that these children have after its early stages of development.

the degree to which accumulated evidence and theory support specific interpretations of the test scores (American Educational Research Association 1999).

[21]Schrank et al. (2005) describe these abilities as follows: (i) long-term memory is the ability to store information and fluently retrieve it later; (ii) working memory (also referred to as short-term memory) is the capacity to hold information in immediate awareness while performing a mental operation on the information; and (iii) and visual-spatial thinking is the ability to perceive, analyze, synthesize, and think with visual patterns, including the ability to store and retrieve visual associations.

[22]The reference spanish-speaking population used to standardize the Woodcock-Muñoz results is obtained from a sample of 802 children from Costa Rica, Peru, Mexico and Spain

## 3.3 Motor skills

Motor skill indicators result from applying the *McCarthy Scale of Children's Abilities* (MSCA) to children aged 2-6 years old (McCarthy 1972). Children are asked to perform a series of tasks that include: walk backwards, stand on one foot (twice, one for each foot), tiptoe, walk on a straight line (following a ribbon), and jump rhythmically alternating both feet. All this tasks are scaled in a three rank score depending in the level of achievement. A *skill* variable is generated adding the ranking scores of the tasks. The standardized score of the sample is then used as an outcome in the analysis. Also, the *standing in one foot* task measures the seconds endured on each foot. The endurance on each foot is averaged to create a *balance* indicator. The MSCA is employed in the literature to measure mental competence and motor skill abilities (Black and Powell 2004). Deficiencies in gross motor coordination (e.g. poor balance, poor timing and coordination, difficulty combining movements into controlled sequences) may reflect neuromotor and executive-function deficits (Poltajko et al. 1995).

On average, children are able to hold balance for 7.6 seconds and are successful in the rest of the tasks 83% for walking back, 74% for tiptoe, 77% to walk straight, and 27% to skillfully jump.

## 3.4 Health and behavioral

Blood samples were gathered for children aged 2-6 years old. Haemoglobin levels were obtained from the samples and adjusted for village altitude to use as indicators for the prevalence of *anemia* (Ruiz-Argüelles and Llorente-Peters 1981). High levels of hemoglobin are usually an indicator of poor nutrition (mainly iron deficiency) and poor health. Its negative consequences range from lower cognitive and physical development to increased risk of mortality (World Health Organization 2008). Also, the primary caregiver is asked to self-report the number of days that each child was sick and unable to perform his regular activities during the past 4 weeks. Finally, two measures of behavioral attitudes (depression and aggression) are estimated using responses from the primary caregiver about the children's attitudes based on the *Achenbach Child Behavioral Checklist* (CBCL) (Achenbach and Rescorla 2000).

*Table 1* shows that on average hemoglobin levels are high, resulting in a 35% incidence of anemia in the sample. Sick days reported are only 1.25 on average. Finally, the *depression* and *aggression* indexes calculated using the CBCL are standardized and reported in terms of standard deviations from the sample mean.

### 3.5 Cash transfers

All the households from the Progresa surveys can be related to administrative information that contains details about the cash transfers. Date of enrollment to the program and amounts transferred each two months are available for each household from 1997 up to February 2012. *Table 1* shows that at the beginning of the program (October 1998) the monthly cash transfer averaged $241 Mexican pesos, which is equivalent to 49% of eligible household's food expenditure and 27% of household's monetary income.

Using the cash transfer information, three variables that will be used in the analysis were formed: (i) CCTs during pregnancy ($CCT\_preg$) which is equal to the sum of the cash transfers received at the household level during the 10 months previous to the child's birth; (ii) CCTs during the first year of life ($CCT\_fstyr$) which is equal to the sum of the cash transfers received at the household level during the 12 months after the child's birth (including the month of birth); and (iii) total accumulated cash transfers ($Total\_CCT$) which is equal to the sum of cash transfers received from the date of the household's enrollment up to June 2003. All values are deflated to January 1998 values using Mexico's CPI (Banco de México 2012a). *Table 1* shows the average values for these variables as well.

## 4 Empirical Specification

To investigate if Progresa had medium-term effects on children's anthropometric, cognitive, motor skills, health, and behavioral development indicators collected in 2003, the following specifications are estimated.

First, the initial randomization is employed. The 506 villages were randomly assigned a *treatment* or *control* status. Households in *treatment* localities began to receive the benefits from the program in April 1998 and those in *control* localities a year and a half later in November 1999. *Table 2* gives evidence that children born in *treatment* and *control* localities are similar in terms of their household's baseline characteristics. Therefore, the *treatment* indicator will give the difference in each children's (or their families') early exposure to the program. Restricting our sample of children to those eligible to receive the program,[23] the following estimation is calculated:

$$Y_{ij} = \phi Treat_j + \beta X_{ij} + \epsilon_{ij} \tag{1}$$

where $Y_{ij}$ is the outcome for child $i$ in locality $j$, $Treat_j$ is an indicator for locality $j$ being assigned as *treatment* locality, $X_{ij}$ are controls for child $i$ in locality $j$, and $\epsilon_{ij}$ is the error term, which will be clustered at the village level.

The outcomes ($Y_{ij}$) included in the analysis[24] are the anthropometric, cognitive, motor skill, health, behavioral, and cash transfer variables described in *Section 3*. The controls ($X_{ij}$) considered throughout the analysis are:[25] (i) individual characteristics, such as sex, age, and number of siblings; (ii) baseline household characteristics, such as household size, access to water and electricity, ownership of draft and small animals, and an asset ownership index;[26] (iii) parents' baseline (1997) characteristics, such as household head knowledge of indigenous language, father's years of schooling, father living in the household, as well as mother's age, height and score in a language test; and (iv) household demographic structure, including the proportion of individuals at different age groups. *Table 1* includes descriptive statistics for these variables.

A second estimation considers the difference in the program's start between the original

[23] As described in *Section 2*, eligibility was determined based on a poverty index calculated with the baseline (1997) information.

[24] To avoid outliers, the estimations exclude outcomes below and above the percentiles 1 and 99, respectively.

[25] Missing controls are substituted in the analysis with the locality level means

[26] The asset ownership index results from a principal component analysis that weights household's ownership of assets, including blender, refrigerator, gas stove, heater, radio, stereo, TV, video-player, washer, fan, car, and van

*treatment* (April 1998) and *control* (November 1999) localities and each child's date of birth. Five groups based on the date of birth are formed and the following specification is estimated:

$$Y_{ij} = \left( \sum_{k=1}^{5} \phi_k G.k * Treat_j \right) + \beta X_{ij} + \nu_j + \epsilon_{ij} \qquad (2)$$

where the five parameters ($\phi_1$-$\phi_5$) show how exposure to the program at different stages of development might have influenced the medium-term outcomes analyzed. The groups (G.1-G.5) are formed as follows:

**G.1:** Born between July 1997-April 1998. Children born in *treatment* localities had additional exposure to the program during their early childhood

**G.2:** Born between May 1998-December 1998. Children born in *treatment* localities had additional benefits partially while in-utero and during their early childhood

**G.3:** Born between January 1999-October 1999. Children born in *treatment* localities had additional benefits during all its time in-utero and some during early childhood

**G.4:** Born between November 1999-June 2000. Children born in *treatment* localities were benefited its complete time in-utero and those in *control* localities only partially

**G.5:** Born between July 2000-November 2001. Children born in *treatment* localities and *control* localities are benefited its complete time in-utero. But families in *treatment* localities had received the benefits for longer time

Previous work in the literature has argued that obtaining no effects in the medium-term when comparing the original *treatment* and *control* localities results because those children in the latter group catch-up with those in the former since both benefit from the program by November 1999. To test this argument, a regression discontinuity estimation compares the average outcomes of children just before and after the poverty index cutoff that determines eligibility. The rules of Progresa establish that once households in a locality are added to the program, new household additions or removals will not be considered until three years after the initial assessment. By limiting the sample to children in *treatment* localities, the discontinuity in enrollment at the poverty index threshold should stay constant for three years. Therefore, comparing the 2003 outcomes of children before and after the cutoff should give the difference of receiving the program from the start (April 1998) rather than three years later (April 2001), making the catch-up hypothesis less likely.

Finally, a last exercise attempts to isolate the effect of the cash component on the medium-term outcomes of children. Progresa rules indicate that no cash transfers are given for attendance until 3rd grade. *Table 3* shows the educational cash transfers that a household should receive for each child regularly attending school by child's date of birth[27] and semester. Two groups are formed: (i) Group I includes children that were born one semester after their oldest sibling's age is such that he/she should be attending school between 3rd and 5th grade; and (ii) Group II includes children that were born one semester after their oldest sibling's age is such that he should be attending school between *preprimaria*[28] and 2nd grade. For example, a child born on February 2000 (column 2, Table 3) would be in Group I if his oldest sibling was born between Sept. 2nd, 1988 and Sept. 1st, 1991 (lines 4-6, Table 3).

The following specification is estimated:

$$Y_{ij} = \psi Cash\_Disc_{ij} + \beta X_{ij} + \nu_j + \epsilon_{ij} \tag{3}$$

where $Cash\_Disc_{ij}$ is equal to *one* (*zero*) if child $i$ in locality $j$ belongs to Group I (II).

*Table 4* presents an exogeneity test showing that children in Group I and II are similar in terms of observable baseline characteristics. The only significant difference between the groups are the household size, number of siblings and parents' age. This is expected since Group I by construction has a slightly oldest first child. The estimations will show the difference in the results before and after controlling for these variables.

[27]Mexican regulations establish that a child should enroll to 1st grade the year in which he/she is six years old by September 1st. *Table 3* assumes that a child enrolls on time and continues his/her education without repeating any grade. Using date of birth (age) is preferred that using actual enrollment as in Manley et al. (2012) since considering enrollment to predict the transfers received could threat the exogeneity of the discontinuity

[28]In Mexico, the last year of kindergarden is called *preprimaria* (pre-primary)

# 5 Results

## 5.1 Effects of being born in an early versus late treatment locality

*Table 5* shows that children born in *treatment* localities are exposed to additional cash transfers at their household level. On average, they receive \$635, \$820, and \$3,192 Mexican pesos more during pregnancy, the first year, and cumulatively than households in *control* localities. Given Progresa's conditionality components, it would be expected that they also receive advantages from health care and nutrition while in-utero and/or early childhood.

*Tables 6* and *7* present the results of the estimations described in equation 1. Each line corresponds to a different regression and each column to estimations using a different set of controls. They report the average difference of children's outcomes ($\phi$) if they were born in a *treatment* (*early treatment*) instead of a *control* (*late treatment*) locality. *Table 6* includes the results for the anthropometric and cognitive outcomes and *Table 7* for the motor skills, health and behavioral outcomes. No significant difference between being born in a *treatment* rather than a *control* locality is found for any of these outcomes.

## 5.2 Heterogenous effects by stages of development

Given the difference of date in which the program started in the *treatment* (April 1998) and *control* (November 1999) localities, it would be expected that the program has heterogenous effects on children depending on their dates of birth. As described in *Section 4*, five different groups are formed based on dates of birth to analyze this heterogeneity. *Table 8* shows the advantage of being born in a *treatment* locality in terms of the cash transfers received by birthdate group. Cash transfers received during pregnancy are \$463, \$1,544, and \$1,118 Mexican pesos significantly higher for households in groups G.2, G.3, and G.4 (i.e. children born May 98-Jun 00) inhabiting in a *treatment* locality, respectively. Similarly, cash transfers received during the first year of life are \$1,077, \$1,937, and \$896 Mexican pesos significantly higher for households in groups G.1, G.2, and G.3 (i.e. children born Jul 97-Oct 99) living in a *treatment* locality, respectively. Cumulative transfers are also significantly higher for households with children at all groups that were born in a *treatment* locality.

*Tables 9, 10* and *11* show the results of anthropometric, cognitive, motor skills, health, and behavioral development. No consistent significant results are found for Progresa exposure during vital stages of early child development. The only consistent evidence is found for group G.2 (born May 98-Dec 98) which corresponds to children that, for being born in a *treatment* locality, receive $463 and $1,937 Mexican pesos more during pregnancy and the first year of life as well as better exposure to health services during their in-utero and early childhood development. This group consistently exhibits positive effects of the exposure to Progresa on the anthropometric, cognitive, and motor skill development outcomes, but just the skills index is significant at a 5% level.

### 5.3 Test for children in the late treatment group catching-up

Most of the results found in *Tables 6-11* show no significant advantages of children from the original *treatment* localities (i.e. the *early treatment*). These results are consistent with previous findings in the literature that argue that these results are not conclusive of a lack of effect from the program, but rather from a catch-up of the children on the late treatment localities (Neufeld et al. 2005). The catch-up hypothesis claims that both groups actually benefit from the program.

The regression discontinuity design estimated here attempts to shed some light on the catch-up hypothesis. It takes advantage from the fact that once localities are added to the program, a new reassessment to add or remove additional households does not happen until three years later. *Figure 1* shows the proportion of households that became beneficiaries of Progresa depending on their poverty index in the *treatment* localities. Progresa's rules establish that eligibility based on the poverty index should yield a sharp regression discontinuity for this group of households. The top left panel in *Figure 1* shows that the selection based on the poverty index was applied as expected at the beginning of the program (April 1998). The top right panel shows that the discontinuity remained until December 2000, although by then some additional households just below the eligibility threshold had already been added. Finally, the bottom left panel shows that a reassessment was effectively done by April 2001 and additional households were added, breaking the original discontinuity. The reassessment was done based on a different model, which means that the original 1997 poverty index is no longer the reference to determine eligibility. Finally, the bottom right panel shows the picture at the moment the 2003 survey was collected.

*Figures 2* to *4* show no evidence of a medium-term effect on a selected group of anthropometric, cognitive and motor skills outcomes for early exposure to the program. These results contrast with the catch-up hypothesis and are more consistent with the no-effect argument. The anthropometric, cognitive, motor skill, health and behavioral outcomes not presented were also analyzed. No effects were found in any of those cases either.[29]

### 5.4 Effects of the cash component

The results presented contrast with previous findings in the literature that indicate that increases in the Progresa cash component result in anthropometric, cognitive and motor skill improvements (Fernald et al. 2008; Manley et al. 2012). The final specification, described in equation 3, estimates the result of discrete increases in cash transfers at the household level that result from the age of the oldest sibling and Progresa transfers' structure. *Table 12* shows that the identification design effectively reflects differences in the cash flows received at those children's households. Children in households that receive the cash benefit are related to estimated increases in cash transfers equal to $314, $649 and $3,155 Mexican pesos during pregnancy, the first year of life, and total accumulated.

*Tables 13* and *14* show the results for the anthropometric, cognitive, motor skill, health, and behavioral outcomes. Each line corresponds to a different regression and each column to estimations using a different set of controls. The effect of the cash discontinuity ($\psi$) is reported. *Table 13* shows consistent positive effects on most of the anthropometric and cognitive outcomes. However, none of the effects is statistically significant and they revert when controls for household baseline demographics are included.[30] Finally, the evidence

[29] Graphs available upon request

[30] The problem with adding baseline household demographic characteristics is that to a great extent they

from *Table 14* finds no consistent nor significant effects form the cash transfers on motor skill, health and behavioral outcomes.

A threat to the identification's validity could be that parents in the group that receives higher transfers might also comply in a higher proportion and more timely the conditionalities (since their cost of not doing so is higher). Also, the higher incentive of sending the oldest child to school might result in parents' higher awareness of the importance of child development. Both of these effects might bias positively the effect of the cash transfer. On the contrary, a negative bias could result since having older sibling whose school participation yield higher transfers to the family might divert parents' attention from their younger children.

## 6 Discussion

Conditional cash transfer programs have become widely popular in developing countries. Particularly in Latin America, the number of countries implementing CCTs went from 2 at the end of the 1990's (Mexico and Brazil) to 17 by 2008. Most of these programs' motivation is to improve human capital acquisition among the poor in order to alleviate the disadvantages of children born in these settings. A recent growing literature has underlined the importance of early child development and has shown that deficiencies during early childhood tend to have a long-term influence on individuals' lives. A vast body of work has analyzed the impacts that CCT programs have on several dimensions of peoples' lives. However, little attention has been paid to investigate whether children are in equitable development conditions (physical, cognitive, health and behavioral) before entering school. If children are already disadvantaged, then it is likely that they will not be able to benefit as much from their added human capital investments. This argument should be of great concern from a policy point of view and efficient use of resources.

This paper benefits from a rich dataset that was gathered as part of Progresa's follow-

determined the amount of cash transfers to be received. Therefore, their correlation with amounts of cash transfers is highly correlated. As a result, adding this controls is expected to absorb part of the effect of the cash component.

up surveys. The information includes objective indicators of anthropometric, cognitive, motor skills, health, and behavioral development of preschool children from the original experimental localities. Even though the design of Progresa includes components intended to benefit children at their early development stages, no significant effects on medium-term development were found. As described in *Section 3*, these children are, on average, 1.81 standard deviations below a healthy reference population height and between the 7 and 21 percentile of cognitive test results with respect to a Latin-American reference population. This serious lag in physical and cognitive development, combined with the lack of CCT benefits found in this paper raise an important concern.

The evidence presented in this paper is based on the original Progresa experiment localities, which are representative of rural and marginalized communities in Mexico. The results and analyses might differ for localities that were later added to the program, particularly those in urban settings. However, given that one of Progresa's main goals is to close the inequality gap for future generations, attention should be paid to the results on the most marginalized.

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Table 1: Descriptive statistics*

| Variable | Num. obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **Outcomes: Anthropometric** | | | | | |
| Height (Z) | 1750 | -1.81 | 1.2949 | -14.48 | 16.13 |
| Stunting (binary) | 1750 | 0.44 | 0.4966 | 0 | 1 |
| Weight (Z) | 1765 | -0.79 | 1.0081 | -3.88 | 12.32 |
| BMI (Z) | 1749 | 0.60 | 1.4472 | -5.23 | 36.7 |
| Overweight (binary) | 1749 | 0.29 | 0.4530 | 0 | 1 |
| **Outcomes: Cognitive tests** | | | | | |
| LT memory (% correct) | 2515 | 0.16 | .1541 | 0 | 0.90 |
| ST memory (% correct) | 2469 | 0.35 | .1842 | 0 | 0.86 |
| Visual-spatial (% correct) | 2394 | 0.19 | .1330 | 0 | 0.88 |
| Language (% correct) | 1956 | 0.10 | .0871 | 0 | 0.62 |
| **Outcomes: Motor skills** | | | | | |
| Skills (Z) | 2144 | -0.03 | 1.0164 | -2.61 | 1.09 |
| Balance (secs) | 2333 | 7.57 | 5.0051 | 0 | 37.5 |
| **Outcomes: Health and behavioral** | | | | | |
| Anemia (binary) | 2526 | 0.35 | 0.4784 | 0 | 1 |
| Days sick | 2252 | 1.25 | 2.6040 | 0 | 30 |
| Depression (Z) | 2468 | 0.01 | 1.0058 | -1.48 | 2.71 |
| Aggression (Z) | 2467 | -0.09 | 1.0169 | -1.76 | 2.30 |

Continued on next page

Descriptive statistics – continued

| Variable | Num. obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **Individual variables** | | | | | |
| Age (months) | 3019 | 49.18 | 13.9957 | 24 | 72 |
| Male (binary) | 2848 | 0.51 | .4999 | 0 | 1 |
| Num siblings | 2919 | 5.15 | 2.4592 | 1 | 23 |
| **Baseline variables (1997)** | | | | | |
| HH size | 3019 | 6.36 | 2.4215 | 2 | 24 |
| Water access (binary) | 3019 | 0.27 | 0.4445 | 0 | 1 |
| Electricity (binary) | 3019 | 0.66 | 0.4726 | 0 | 1 |
| Draft animals (binary) | 3019 | 0.34 | 0.4736 | 0 | 1 |
| Small animals (binary) | 3019 | 0.79 | 0.4099 | 0 | 1 |
| Poverty index (Z) | 3019 | -0.66 | 1.1695 | -1.57 | 8.76 |
| **HH Demographic structure (1997)** | | | | | |
| % 0-5 years | 3019 | 0.28 | .1641 | 0 | 0.67 |
| % 6-17 years | 3019 | 0.30 | .2099 | 0 | 1 |
| % 18-49 years | 3019 | 0.37 | .1460 | 0 | 1 |
| % over 50 | 3019 | 0.05 | .1025 | 0 | 1 |
| **Parents' characteristics** | | | | | |
| Head speak indig (binary) | 3019 | 0.51 | 0.5000 | 0 | 1 |
| Father present (binary) | 2795 | 0.88 | 0.3206 | 0 | 1 |
| Father yrs educ | 3019 | 3.42 | 2.5843 | 0 | 17 |
| Mother yrs educ | 3019 | 3.01 | 2.5476 | 0 | 17 |
| Mother age | 3019 | 33.96 | 6.9682 | 8 | 72 |
| Mother height (cm) | 3014 | 151.36 | 1.0377 | 143.5 | 158.76 |
| Mother lang test (log) | 3013 | 4.41 | 0.0560 | 3.43 | 4.65 |

Continued on next page

Descriptive statistics – continued

| Variable | Num. obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **Random Treatment status** | | | | | |
| Treatment (binary) | 3019 | 0.58 | 0.4941 | 0 | 1 |
| **Cash transfer variables (Mx. Pesos)** | | | | | |
| Monthly CCTs (Oct 98) | 2531 | 241 | 338.8 | 0 | 2056 |
| CCTs during pregnancy | 2628 | 951 | 1227.8 | 0 | 6337 |
| CCTs during 1st year | 2232 | 1690 | 1566.5 | 0 | 7532 |
| Total CCT (May 98-Jun 03) | 2531 | 12296 | 7623 | 0 | 40346 |
| **Monthly baseline economic indicators** (Mx. Pesos)** | | | | | |
| Food expenditure | 1224 | 491.85 | 273.33 | 39.16 | 1958 |
| Value of food consumed | 1244 | 737.65 | 495.47 | 0 | 7100 |
| Val food cons (per capita) | 1244 | 118.48 | 112.21 | 0 | 2367 |
| HH monetary income | 2911 | 877.50 | 1010.88 | 8.63 | 18803 |

* Sample restricted to children with available date of birth from eligible families living in localities where anthropometric and cognitive data was collected in 2003.

** Sample obtained in October 1998 from households at control localities

Table 2: Exogeneity tests for treatment randomization using baseline (1997) data

| Variable | Mean $Treat_j = 0$ | Mean $Treat_j = 1$ | Difference | t-statistic |
|---|---|---|---|---|
| **Home characteristics** | | | | |
| Home owned | 0.926 | 0.935 | -0.00885 | -0.859 |
| Land owned | 0.855 | 0.857 | -0.00234 | -0.164 |
| Dirt floor | 0.779 | 0.750 | 0.0285 | 1.646 |
| Water access | 0.233 | 0.303 | -0.0704*** | -3.893 |
| Electricity access | 0.686 | 0.652 | 0.0337 | 1.757 |
| **Asset ownership** | | | | |
| Blender | 0.184 | 0.146 | 0.0373* | 2.493 |
| Refrigerator | 0.0231 | 0.0396 | -0.0165* | -2.288 |
| Gas stove | 0.142 | 0.143 | -0.000549 | -0.0386 |
| Heater | 0.0126 | 0.0223 | -0.00970 | -1.786 |
| Radio | 0.561 | 0.512 | 0.0488* | 2.405 |
| Stereo | 0.0298 | 0.0271 | 0.00276 | 0.410 |
| TV | 0.353 | 0.270 | 0.0831*** | 4.455 |
| Video player | 0.0125 | 0.0104 | 0.00207 | 0.483 |
| Washer | 0.0106 | 0.00799 | 0.00259 | 0.676 |
| Fan | 0.0510 | 0.0195 | 0.0315*** | 4.366 |
| Car | 0.00385 | 0.00212 | 0.00173 | 0.799 |
| Van | 0.0144 | 0.0126 | 0.00183 | 0.393 |
| Draft animals | 0.315 | 0.328 | -0.0126 | -0.664 |
| Other animals | 0.799 | 0.767 | 0.0320 | 1.904 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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**Table 2 − continued**

| Variable | Mean $Treat_j = 0$ | Mean $Treat_j = 1$ | Difference | t-statistic |
|---|---|---|---|---|
| **Family characteristics** | | | | |
| Poverty index | 634.9 | 637.0 | -2.154 | -0.638 |
| Monthly income (MxP) | 811.4 | 764.7 | 46.71 | 1.288 |
| Household size | 6.203 | 6.117 | 0.0857 | 0.892 |
| Num siblings | 5.027 | 5.103 | -0.0764 | -0.790 |
| **Parents characteristics** | | | | |
| HH head spk indig | 0.507 | 0.515 | -0.00853 | -0.419 |
| HH head spk spanish | 0.951 | 0.962 | -0.0109 | -1.325 |
| Mother years educ | 3.220 | 3.123 | 0.0963 | 0.917 |
| Father years educ | 3.427 | 3.554 | -0.127 | -1.203 |
| Mother weight (kg) | 60.75 | 60.60 | 0.147* | 2.088 |
| Mother height (cm) | 151.4 | 151.4 | 0.0447 | 1.166 |
| Mother PPVT (log) | 4.419 | 4.414 | 0.00500* | 2.241 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Household's predicted monthly cash transfers per child, conditional on regular school attendance, by child's date of birth (values in Mexican Pesos).[a] Transfers assume that the child enrolls to school at the age specified by Mexican educational regulations.[b] Each column corresponds to a school year[c]

| Date of birth | 1998-1999 | 1999-2000 | 2000-2001 | 2001-2002[d] | 2002-2003 |
|---|---|---|---|---|---|
| Sep 2, 1993 - Sep 1, 1994 | - | - | - | - | 100 |
| Sep 2, 1992 - Sep 1, 1993 | - | - | - | 95 | 115 |
| Sep 2, 1991 - Sep 1, 1992 | - | - | 90 | 110 | 150 |
| Sep 2, 1990 - Sep 1, 1991 | - | 80 | 105 | 145 | 200 |
| Sep 2, 1989 - Sep 1, 1990 | 70 | 95 | 135 | 190 | 290 |
| Sep 2, 1988 - Sep 1, 1989 | 80 | 125 | 180 | 280 | 310 |
| Sep 2, 1987 - Sep 1, 1988 | 105 | 165 | 260 | 295 | 325 |
| Sep 2, 1986 - Sep 1, 1987 | 135 | 240 | 275 | 310 | - |
| Sep 2, 1985 - Sep 1, 1986 | 200 | 250 | 290 | - | - |
| Sep 2, 1984 - Sep 1, 1985 | 210 | 265 | - | - | - |
| Sep 2, 1983 - Sep 1, 1984 | 225 | - | - | - | - |

Amounts in Mexican pesos. The exchange rate during this time frame was on average 9.55 Mexican Pesos per U.S. dollar (Banco de México 2012b)

[a] Amounts presented correspond to male transfers at the beginning of the school year. Cash transfers begin to be received when the child enrolls to 3rd grade and run until 9th grade. Beginning on 7th grade, transfers are higher for female (on average 6%, 11% and 15% for 7th, 8th and 9th grade correspondingly). For the second semester of the school year, transfers are adjusted (on average 5%). Additionally to educational transfers, each family receives a lump-sum transfer conditional on health attendance. Total household cash transfers are caped. This educational transfers assume that the cap has not been reached.

[b] Mexican regulations between 1997 and 2003 specified that children had to enroll on 1st grade on a given year if they are 6 years old by September 1st.

[c] A school year runs from mid-August to mid-June of the next year.

[d] Beginning on this year, transfers were given also for high school attendance (10th-12th grade). This amount are not presented in this table.

Table 4: Exogeneity tests for cash transfer discontinuity using baseline (1997) data[a]

| Variable | Mean Group I | Mean Group II | Difference | t-statistic |
|---|---|---|---|---|
| **Home characteristics** | | | | |
| Home owned | 0.909 | 0.946 | -0.0371 | -1.781 |
| Land owned | 0.828 | 0.861 | -0.0325 | -1.110 |
| Dirt floor | 0.751 | 0.778 | -0.0276 | -0.806 |
| Water access | 0.313 | 0.266 | 0.0471 | 1.285 |
| Electricity access | 0.646 | 0.699 | -0.0529 | -1.396 |
| **Asset ownership** | | | | |
| Blender | 0.148 | 0.133 | 0.0152 | 0.542 |
| Refrigerator | 0.0269 | 0.0190 | 0.00795 | 0.658 |
| Gas stove | 0.131 | 0.152 | -0.0206 | -0.729 |
| Heater | 0.00337 | 0.0159 | -0.0125 | -1.574 |
| Radio | 0.505 | 0.509 | -0.00444 | -0.110 |
| Stereo | 0.0135 | 0.0443 | -0.0308* | -2.263 |
| TV | 0.276 | 0.294 | -0.0182 | -0.498 |
| Video player | 0 | 0.00949 | -0.00949 | -1.684 |
| Washer | 0.00673 | 0.00651 | 0.000224 | 0.0344 |
| Fan | 0.0236 | 0.0542 | -0.0306 | -1.957 |
| Car | 0 | 0.00335 | -0.00335 | -1.024 |
| Van | 0.0135 | 0.00999 | 0.00348 | 0.404 |
| Draft animals | 0.253 | 0.313 | -0.0608 | -1.669 |
| Other animals | 0.741 | 0.759 | -0.0188 | -0.535 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Continued on next page

**Table 4 – continued**

| Variable | Mean Group I | Mean Group II | Difference | t-statistic |
|---|---|---|---|---|
| **Family characteristics** | | | | |
| Poverty index | 650.9 | 638.2 | 12.69* | 2.103 |
| Monthly income (MxP) | 712.4 | 683.4 | 28.90 | 0.396 |
| Household size | 4.731 | 5.889 | -1.159*** | -8.910 |
| Num siblings | 4.269 | 5.184 | -0.914*** | -6.342 |
| **Parents characteristics** | | | | |
| HH head spk indig | 0.488 | 0.506 | -0.0181 | -0.448 |
| HH head spk spanish | 0.956 | 0.965 | -0.00896 | -0.571 |
| Mother years educ | 3.875 | 3.305 | 0.570** | 2.761 |
| Father years educ | 3.919 | 3.694 | 0.225 | 1.040 |
| Mother weight (kg) | 60.71 | 60.73 | -0.0201 | -0.272 |
| Mother height (cm) | 151.4 | 151.3 | 0.0307 | 0.619 |
| Mother PPVT (log) | 4.422 | 4.416 | 0.00597 | 1.491 |

[a] The discontinuity is identified using the age of the oldest sibling in the household and the educational cash transfers structure described in *Table 3*.
See *Section 4* for details.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: First Stage effect of early versus late treatment on Cash Transfers received at the household level[a]

| Dependent variable | Treatment[b] Model (1) | Treatment Model (2) | Treatment Model (3) | Treatment Model (4) |
|---|---|---|---|---|
| CCT pregnancy (MxP ,000)[c] | 0.618*** | 0.632*** | 0.637*** | 0.635*** |
| | (0.0538) | (0.0549) | (0.0555) | (0.0565) |
| CCT 1st year (MxP ,000)[d] | 0.775*** | 0.808*** | 0.823*** | 0.820*** |
| | (0.0998) | (0.0928) | (0.0887) | (0.0850) |
| CCT total (MxP ,000)[e] | 2.887*** | 3.253*** | 3.232*** | 3.192*** |
| | (0.6453) | (0.5567) | (0.4968) | (0.4870) |
| **Controls[f]** | | | | |
| Individual charact | ✓ | ✓ | ✓ | ✓ |
| Baseline charact | | ✓ | ✓ | ✓ |
| Parents' charact | | | ✓ | ✓ |
| Household structure (1997) | | | | ✓ |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors clustered by village in parenthesis

[a] Each line corresponds to a different regression. Number of observations range between 2,137 and 2,536.

[b] *Treatment* coefficient represents the difference between receiving *early* versus *late* access to the program.

[c] Cash transfer amounts received during the 10 months previous to each child's date of birth. Values in thousand Mexican Pesos deflated to January 1998 values.

[d] Cash transfer amounts received during the 12 months after each child's date of birth. Values in thousand Mexican Pesos deflated to January 1998 values.

[e] Accumulated cash transfers received at the household level from the moment the household was added to the program up to June 2003. Values in thousand Mexican Pesos deflated to January 1998 values.

[f] See *Table 1* for details of variables included as controls.

Table 6: Medium-term effect of early versus late treatment on anthropometric and cognitive development of children aged 2-6 years old[a]

| Dependent variable | Treatment[b] Model (1) | Treatment Model (2) | Treatment Model (3) | Treatment Model (4) |
|---|---|---|---|---|
| **Anthropometric** | | | | |
| Height (Z)[c] | -0.0650 | -0.0359 | -0.0550 | -0.0529 |
| | (0.1135) | (0.1105) | (0.1008) | (0.0981) |
| Stunting (binary)[d] | 0.0178 | 0.0105 | 0.0165 | 0.0158 |
| | (0.0478) | (0.0471) | (0.0429) | (0.0420) |
| Weight (Z)[c] | -0.0323 | -0.0214 | -0.0318 | -0.0309 |
| | (0.0678) | (0.0628) | (0.0602) | (0.0592) |
| BMI (Z)[c] | 0.0201 | 0.0108 | 0.0174 | 0.0173 |
| | (0.0872) | (0.0893) | (0.0864) | (0.0862) |
| Overweight (binary)[e] | 0.0177 | 0.0153 | 0.0196 | 0.0189 |
| | (0.0311) | (0.0312) | (0.0288) | (0.0288) |
| **Cognitive tests** | | | | |
| LT memory (log)[f] | -0.0228 | 0.00216 | 0.00920 | 0.00877 |
| | (0.0620) | (0.0559) | (0.0475) | (0.0471) |
| ST memory (log)[f] | -0.0191 | -0.0139 | -0.00988 | -0.00991 |
| | (0.0398) | (0.0371) | (0.0307) | (0.0309) |
| Visual-spatial (log)[f] | -0.0497 | -0.0359 | -0.0266 | -0.0275 |
| | (0.0451) | (0.0424) | (0.0385) | (0.0388) |
| Language (log)[g] | 0.0204 | 0.0302 | 0.0240 | 0.0242 |
| | (0.0733) | (0.0662) | (0.0598) | (0.0596) |
| **Controls[h]** | | | | |
| Individual charact | ✓ | ✓ | ✓ | ✓ |
| Baseline charact | | ✓ | ✓ | ✓ |
| Parents' charact | | | ✓ | ✓ |
| Household structure (1997) | | | | ✓ |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors clustered by village in parenthesis

[a] Each line corresponds to a different regression. Number of observations range between 1,725 and 2,328.

[b] *Treatment* coefficient represents the difference between receiving *early* versus *late* access to the program.

[c] Weight, height and BMI are standardized with respect to a same age-sex healthy reference population following WHO guidelines.

[d] Stunting is a binary variable equal to one if an individual's height corresponds to being two or more standard deviations below the same age-sex standardized height of a healthy reference population.

[e] Overweight is a binary variable equal to one if an individual's BMI corresponds to being above the 85th percentile of a same age-sex standardized BMI of a health reference population.

[f] Long and short term memory and visual spatial integration are assessed using the Woodcock-Muñoz Test in children aged 2-6.

[g] Language development is measured using the Peabody test in children aged 3-6.

[h] See *Table 1* for details of variables included as controls.

Table 7: Medium-term effect of early versus late treatment on motor skills, health, and behavioral development of children aged 2-6 years old[a]

| Dependent variable | Treatment[b] Model (1) | Treatment Model (2) | Treatment Model (3) | Treatment Model (4) |
|---|---|---|---|---|
| **Motor skills[c]** | | | | |
| Balance (secs) | -0.276 | -0.201 | -0.145 | -0.142 |
| | (0.2870) | (0.2843) | (0.2748) | (0.2773) |
| Skills (Z) | -0.0218 | -0.0107 | 0.00194 | 0.00163 |
| | (0.0619) | (0.0617) | (0.0596) | (0.0596) |
| **Health outcomes** | | | | |
| Anemia (binary)[d] | -0.00404 | -0.00424 | -0.00432 | -0.00378 |
| | (0.0222) | (0.0226) | (0.0227) | (0.0226) |
| Days sick[e] | -0.0708 | -0.106 | -0.105 | -0.107 |
| | (0.1361) | (0.1342) | (0.1352) | (0.1351) |
| **Behavioral outcomes[f]** | | | | |
| Depression (Z) | 0.0228 | 0.0160 | 0.00871 | 0.00927 |
| | (0.0561) | (0.0514) | (0.0498) | (0.0497) |
| Aggression (Z) | -0.0276 | -0.0322 | -0.0400 | -0.0407 |
| | (0.0547) | (0.0559) | (0.0559) | (0.0560) |
| **Controls[g]** | | | | |
| Individual charact | ✓ | ✓ | ✓ | ✓ |
| Baseline charact | | ✓ | ✓ | ✓ |
| Parents' charact | | | ✓ | ✓ |
| Household structure (1997) | | | | ✓ |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors clustered by village in parenthesis

[a] Each line corresponds to a different regression. Number of observations range between 2,027 and 2,370.

[b] *Treatment* coefficient represents the difference between receiving *early* versus *late* access to the program.

[c] McCarthy Scale of Children's Abilities is used to assess motor skills on children aged 2-6.

[d] Anemia is identified using haemoglobin samples corrected by village height. WHO standards were employed (World Health Organization 2008).

[e] Children's mother self reports the number of days that the child has been sick during the past 4 weeks.

[f] Depression and aggression are Z scores of an index calculated using behavioral questions answered by the child's mother. The procedure to calculate the index follows Achenbach and Rescorla (2000) CBCL.

[g] See Table 1 for details of variables included as controls.

Table 8: First stage: Cash transfers received at the household level. Divided by timing in which the treatment began to be received with respect to child's date of birth

| | CCT preg (MxP ,000)[a] | CCT 1st yr (MxP ,000)[b] | CCT total (MxP ,000)[c] |
|---|---|---|---|
| | (1) | (2) | (3) |
| Treatment[d] x G.1[e] | 0.0397 | 1.077*** | 3.820*** |
| | (0.0397) | (0.0909) | (0.6996) |
| Treatment x G.2[f] | 0.463*** | 1.937*** | 3.206*** |
| | (0.0520) | (0.1132) | (0.6891) |
| Treatment x G.3[g] | 1.544*** | 0.896*** | 2.480*** |
| | (0.0718) | (0.1262) | (0.6127) |
| Treatment x G.4[h] | 1.118*** | 0.267* | 3.369*** |
| | (0.0927) | (0.1479) | (0.6690) |
| Treatment x G.5[i] | 0.204* | -0.259 | 3.185*** |
| | (0.1164) | (0.1816) | (0.6172) |
| Observations | 2490 | 2137 | 2408 |
| $R^2$ | 0.60 | 0.53 | 0.46 |

Controlling for household demographics, individual, baseline and parents' characteristics

Standard errors clustered by village (in parenthesis)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[a] Cash transfer amounts received during the 10 months previous to each child's date of birth. Values in thousand Mexican Pesos deflated to January 1998 values.

[b] Cash transfer amounts received during the 12 months after each child's date of birth. Values in thousand Mexican Pesos deflated to January 1998 values.

[c] Accumulated cash transfers received at the household level from the moment the household was added to the Progresa program up to June 2003. Values in thousand Mexican Pesos deflated to January 1998 values.

[d] *Treatment* villages begin to receive transfers in April 1998 and control villages in November 1999.

[e] G.1: Born Jul 97 - Apr 98. If on a Treatment locality, these children were benefited during its early childhood (beginning ages 0-10 months), but not during pregnancy.

[f] G.2: Born May 98 - Dec 98. If on a Treatment locality, these children were benefited during part of the pregnancy and in early childhood.

[g] G.3: Born Jan 99 - Oct 99. If on a Treatment locality, these children were benefited during all of the pregnancy and in early childhood.

[h] G.4: Born Nov 99 - Jun 00. If on a Treatment locality, these children were benefited during all of the pregnancy while those in control localities were benefited in part of the pregnancy.

[i] G.5: Born Jul 00 - Nov 01. Both children on treatment and control localities were benefited during pregnancy. Children's families on treatment localities have been received benefits for longer.

Table 9: Medium-term effects of Treatment on children's anthropometric development. Effects classified by timing in which the treatment began to be received with respect to child's date of birth[a]

| | Height (Z)[b] | Stunt[c] | Weight (Z)[b] | BMI (Z)[b] | Overweight[d] |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Treatment[e] x G.2[f] | 0.0617 | -0.0926 | 0.0861 | 0.0725 | -0.0189 |
| | (0.1439) | (0.0711) | (0.1114) | (0.1438) | (0.0517) |
| Treatment x G.3[g] | -0.0876 | 0.0267 | -0.0691 | 0.0560 | 0.0268 |
| | (0.1096) | (0.0489) | (0.1058) | (0.1974) | (0.0413) |
| Treatment x G.4[h] | -0.172 | 0.0463 | -0.197** | -0.119 | 0.0116 |
| | (0.1341) | (0.0616) | (0.0998) | (0.1080) | (0.0454) |
| Treatment x G.5[i] | 0.00700 | 0.0282 | 0.0741 | 0.0758 | 0.0349 |
| | (0.1603) | (0.0560) | (0.0954) | (0.1119) | (0.0468) |
| Observations | 1726 | 1726 | 1741 | 1725 | 1725 |
| $R^2$ | 0.09 | 0.10 | 0.06 | 0.04 | 0.06 |

Controlling for household demographics, individual, baseline and parents' characteristics

Standard errors clustered by village (in parenthesis)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[a] No observations for G.1 available since WHO software standardization not available for those ages.

[b] Weight, height and BMI are standardized with respect to a same age-sex healthy reference population following WHO guidelines.

[c] Stunting is a binary variable equal to one if an individual's height corresponds to being two or more standard deviations below the same age-sex standardized height of a healthy reference population (World Health Organization 2012).

[d] Overweight is a binary variable equal to one if an individual's BMI corresponds to being above the 85 percentile of a same age-sex standardized BMI of a health reference population (World Health Organization 2012).

[e] *Treatment* villages begin to receive transfers in April 1998 and control villages in November 1999.

[f] G.2: Born May 98 - Dec 98. If on a Treatment locality, these children were benefited during part of the pregnancy and in early childhood.

[g] G.3: Born Jan 99 - Oct 99. If on a Treatment locality, these children were benefited during all of the pregnancy and in early childhood.

[h] G.4: Born Nov 99 - Jun 00. If on a Treatment locality, these children were benefited during all of the pregnancy while those in control localities were benefited in part of the pregnancy.

[i] G.5: Born Jul 00 - Nov 01. Both children on treatment and control localities were benefited during pregnancy.

Children's families on treatment localities have been received benefits for longer.

Table 10: Medium-term effects of Treatment on children's cognitive development measured with the *Peabody Picture Vocabulary Test* and *Batería Woodcock-Muñoz Test*. Effects divided by timing in which the treatment began to be received with respect to child's date of birth

| | **Peabody Test[a]** | **Woodcock-Muñoz Test[b]** | | |
|---|---|---|---|---|
| | Language | LT memory | ST memory | Visual-spatial |
| | (1) | (2) | (3) | (4) |
| Treatment[c] x G.1[d] | 0.0351 | 0.0491 | 0.00788 | 0.0302 |
| | (0.0740) | (0.0774) | (0.0293) | (0.0334) |
| Treatment x G.2[e] | 0.0746 | 0.0733 | 0.0275 | 0.00925 |
| | (0.0992) | (0.0964) | (0.0443) | (0.0527) |
| Treatment x G.3[f] | 0.00193 | 0.0640 | 0.0424 | -0.0285 |
| | (0.0755) | (0.0722) | (0.0500) | (0.0469) |
| Treatment x G.4[g] | -0.0635 | -0.0196 | -0.0963 | 0.0408 |
| | (0.0755) | (0.0652) | (0.0594) | (0.0734) |
| Treatment x G.5[h] | -0.0406 | -0.0821 | 0.00334 | -0.229*** |
| | (0.1633) | (0.0632) | (0.0584) | (0.0849) |
| Observations | 1851 | 2300 | 2189 | 1897 |
| $R^2$ | 0.34 | 0.33 | 0.44 | 0.36 |

Controlling for household demographics, individual, baseline and parents' characteristics

Standard errors clustered by village (in parenthesis)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[a] Peabody test measures language development in children aged 3-6. Peabody tests have been shown to be a reliable predictor of achievement in primary school(Duncan et al. 2007).

[b] Woodcock-Muñoz Test measures different cognitive abilities in children 2-6. The ENCEL 2003 dataset contains test scores from subtests that measure long-term memory, short-term memory and visual-spatial integration.

[c] *Treatment* villages begin to receive transfers in April 1998 and control villages in November 1999.

[d] G.1: Born Jul 97 - Apr 98. If on a Treatment locality, these children were benefited during its early childhood (beginning ages 0-10 months), but not during pregnancy.

[e] G.2: Born May 98 - Dec 98. If on a Treatment locality, these children were benefited during part of the pregnancy and in early childhood.

[f] G.3: Born Jan 99 - Oct 99. If on a Treatment locality, these children were benefited during all of the pregnancy and in early childhood.

[g] G.4: Born Nov 99 - Jun 00. If on a Treatment locality, these children were benefited during all of the pregnancy while those in control localities were benefited in part of the pregnancy.

[h] G.5: Born Jul 00 - Nov 01. Both children on treatment and control localities were benefited during pregnancy. Children's families on treatment localities have been received benefits for longer.

Table 11: Medium-term effects of Treatment on children's motor skills, health, and behavior. Effects divided by timing in which the treatment began to be received with respect to child's date of birth

| | **Motor skills**[a] | | **Health**[b] | | **Behavior**[c] | |
|---|---|---|---|---|---|---|
| | Skills (Z) | Balance (secs) | Anemia (binary) | Days sick | Depression (Z) | Agression (Z) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Treatment[d] x G.1[e] | 0.0347 | 0.265 | 0.0575 | 0.0936 | 0.148 | 0.0527 |
| | (0.0623) | (0.4859) | (0.0460) | (0.2628) | (0.0989) | (0.1050) |
| Treatment x G.2[f] | 0.178** | 0.512 | -0.0517 | 0.0913 | -0.0448 | 0.0336 |
| | (0.0900) | (0.4485) | (0.0441) | (0.2215) | (0.0958) | (0.1051) |
| Treatment x G.3[g] | -0.0807 | -0.620 | -0.0208 | -0.0668 | -0.0297 | -0.200** |
| | (0.0811) | (0.3843) | (0.0388) | (0.2411) | (0.0945) | (0.0960) |
| Treatment x G.4[h] | -0.112 | -0.559 | -0.0167 | -0.356 | -0.0161 | 0.122 |
| | (0.1014) | (0.4250) | (0.0463) | (0.3148) | (0.1159) | (0.1130) |
| Treatment x G.5[i] | 0.0453 | 0.124 | 0.00376 | -0.261 | 0.00881 | -0.133 |
| | (0.1041) | (0.3666) | (0.0447) | (0.2716) | (0.0845) | (0.0954) |
| Observations | 2027 | 2210 | 2398 | 2135 | 2342 | 2338 |
| $R^2$ | 0.41 | 0.31 | 0.02 | 0.02 | 0.03 | 0.03 |

Controlling for household demographics, individual, baseline and parents' characteristics

Standard errors clustered by village (in parenthesis)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[a] Motor skills assessed using the McCarthy Scale of Children's Abilities (MSCA) applied to children aged 2-6.

[b] Health indicators obtained from an haemoglobin sample and children's health status self-reported by his primary caregiver.

[c] Behavioral indicators obtained from indexes calculated using Achenbach and Rescorla (2000) CBCL. The inputs for the indexes are obtained from child's behavioral questions answered by his primary caregiver.

[d] *Treatment* villages begin to receive transfers in April 1998 and control villages in November 1999.

[e] G.1: Born Jul 97 - Apr 98. If on a Treatment locality, these children were benefited during its early childhood (beginning ages 0-10 months), but not during pregnancy.

[f] G.2: Born May 98 - Dec 98. If on a Treatment locality, these children were benefited during part of the pregnancy and in early childhood.

[g] G.3: Born Jan 99 - Oct 99. If on a Treatment locality, these children were benefited during all of the pregnancy and in early childhood.

[h] G.4: Born Nov 99 - Jun 00. If on a Treatment locality, these children were benefited during all of the pregnancy while those in control localities were benefited in part of the pregnancy.

[i] G.5: Born Jul 00 - Nov 01. Both children on treatment and control localities were benefited during pregnancy. Children's families on treatment localities have been received benefits for longer.

Table 12: Relation between the cash discontinuity variable (*Cash_Disc*) and actual cash transfers[a]

| Dependent variable | *Cash_Disc*[b] | *Cash_Disc* | *Cash_Disc* | *Cash_Disc* |
|---|---|---|---|---|
| | Model (1) | Model (2) | Model (3) | Model (4) |
| **Cash flows** | | | | |
| CCT pregnancy (MxP ,000)[c] | 0.305*** | 0.336*** | 0.314*** | 0.218*** |
| | (0.0516) | (0.0494) | (0.0492) | (0.0601) |
| CCT 1st year (MxP ,000)[d] | 0.612*** | 0.665*** | 0.649*** | 0.414*** |
| | (0.0812) | (0.0767) | (0.0802) | (0.0827) |
| CCT total (MxP ,000)[e] | 3.179*** | 3.295*** | 3.155*** | 1.972*** |
| | (0.3458) | (0.3378) | (0.3542) | (0.3864) |
| **Controls**[f] | | | | |
| Individual charact | ✓ | ✓ | ✓ | ✓ |
| Baseline charact | | ✓ | ✓ | ✓ |
| Parents' charact | | | ✓ | ✓ |
| Household structure (1997) | | | | ✓ |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors clustered by village in parenthesis

[a] Each line corresponds to a different regression. Number of observations range between 542 and 676.

[b] The discontinuity is identified using the age of the oldest sibling in the household and the educational cash transfers structure described in *Table 3*. See *Section 4* for details.

[c] Cash transfer amounts received during the 10 months previous to each child's date of birth. Values in thousand Mexican Pesos deflated to January 1998 values.

[d] Cash transfer amounts received during the 12 months after each child's date of birth. Values in thousand Mexican Pesos deflated to January 1998 values.

[e] Accumulated cash transfers received at the household level from the moment the household was added to the Progresa program up to June 2003. Values in thousand Mexican Pesos deflated to January 1998 values.

[f] See *Table 1* for details of variables included as controls.

Table 13: Medium-term effect of additional household cash transfers on anthropometric and cognitive development of children aged 2-6 years old.[a]

| Dependent variable | *Cash_Disc*[b] Model (1) | *Cash_Disc* Model (2) | *Cash_Disc* Model (3) | *Cash_Disc* Model (4) |
|---|---|---|---|---|
| **Anthropometric** | | | | |
| Height (Z)[c] | 0.150 | 0.120 | 0.106 | -0.0427 |
| | (0.0963) | (0.0931) | (0.0952) | (0.1155) |
| Stunting (binary)[d] | -0.0233 | -0.0216 | -0.0174 | 0.0351 |
| | (0.0399) | (0.0397) | (0.0403) | (0.0465) |
| Weight (Z)[c] | 0.0227 | 0.0232 | 0.0251 | -0.0371 |
| | (0.0684) | (0.0677) | (0.0689) | (0.0842) |
| BMI (Z)[c] | -0.0959 | -0.0772 | -0.0580 | -0.0110 |
| | (0.0780) | (0.0783) | (0.0854) | (0.0936) |
| Overweight (binary)[e] | -0.0539 | -0.0513 | -0.0399 | -0.00190 |
| | (0.0360) | (0.0354) | (0.0368) | (0.0403) |
| **Cognitive tests** | | | | |
| LT memory (log)[f] | 0.0626 | 0.0261 | 0.0350 | -0.0127 |
| | (0.0526) | (0.0520) | (0.0545) | (0.0643) |
| ST memory (log)[f] | 0.0268 | 0.0261 | 0.0244 | 0.0695 |
| | (0.0401) | (0.0413) | (0.0412) | (0.0572) |
| Visual-spatial (log)[f] | -0.0312 | -0.0490 | -0.0408 | 0.00410 |
| | (0.0515) | (0.0507) | (0.0509) | (0.0579) |
| Language (log)[g] | -0.0379 | -0.0490 | -0.0243 | -0.0124 |
| | (0.0641) | (0.0629) | (0.0649) | (0.0818) |
| **Controls**[h] | | | | |
| Individual charact | ✓ | ✓ | ✓ | ✓ |
| Baseline charact | | ✓ | ✓ | ✓ |
| Parents' charact | | | ✓ | ✓ |
| Household structure (1997) | | | | ✓ |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors clustered by village in parenthesis

[a] Each line corresponds to a different regression. Number of observations range between 492 and 742.

[b] The discontinuity is identified using the age of the oldest sibling in the household and the educational cash transfers structure described in *Table 3*. See *Section 4* for details.

[c] Weight, height and BMI are standardized with respect to a same age-sex healthy reference population following WHO guidelines.

[d] Stunting is a binary variable equal to one if an individual's height corresponds to being two or more standard deviations below the same age-sex standardized height of a healthy reference population.

[e] Overweight is a binary variable equal to one if an individual's BMI corresponds to being above the 85 percentile of a same age-sex standardized BMI of a health reference population.

[f] Long and short term memory and visual spatial integration are assessed using the Woodcock-Muñoz Test in children aged 2-6.

[g] Language development is measured using the Peabody test in children aged 3-6.

[h] See *Table 1* for details of variables included as controls.

Table 14: Medium-term effect of additional household cash transfers on motor skills, health, and behavioral development of children aged 2-6 years old[a]

| Dependent variable | *Cash_Disc*[b] Model (1) | *Cash_Disc* Model (2) | *Cash_Disc* Model (3) | *Cash_Disc* Model (4) |
|---|---|---|---|---|
| **Motor skills**[c] | | | | |
| Balance (secs) | -0.249 | -0.202 | -0.286 | -0.0775 |
| | (0.2958) | (0.3081) | (0.3145) | (0.3989) |
| Skills (Z) | -0.0849 | -0.0559 | -0.0775 | -0.0526 |
| | (0.0645) | (0.0675) | (0.0689) | (0.0880) |
| **Health outcomes** | | | | |
| Anemia (binary)[d] | 0.00284 | 0.00861 | 0.0119 | 0.0306 |
| | (0.0391) | (0.0398) | (0.0409) | (0.0443) |
| Days sick[e] | 0.102 | 0.160 | 0.174 | 0.175 |
| | (0.2227) | (0.2337) | (0.2447) | (0.3062) |
| **Behavioral outcomes** | | | | |
| Depression (Z-score)[f] | 0.00837 | 0.00960 | 0.00129 | -0.00304 |
| | (0.0831) | (0.0837) | (0.0866) | (0.0904) |
| Aggression (Z-score)[f] | -0.0610 | -0.0714 | -0.0642 | -0.100 |
| | (0.0828) | (0.0855) | (0.0904) | (0.1051) |
| **Controls**[g] | | | | |
| Individual charact | ✓ | ✓ | ✓ | ✓ |
| Baseline charact | | ✓ | ✓ | ✓ |
| Parents' charact | | | ✓ | ✓ |
| Household structure (1997) | | | | ✓ |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Standard errors clustered by village in parenthesis

[a] Each line corresponds to a different regression. Number of observations range between 600 and 742.

[b] The discontinuity is identified using the age of the oldest sibling in the household and the educational cash transfers structure described in *Table 3*. See *Section 4* for details.

[c] McCarthy Scale of Children's Abilities is used to assess motor skills on children aged 2-6.

[d] Anemia is identified using haemoglobin samples corrected by village height. WHO standards were employed (World Health Organization 2008).

[e] Children's mother self reports the number of days that the child has been sick during the past 4 weeks.

[f] Depression and aggression are Z scores of an index calculated using behavioral questions answered by the child's mother. The procedure to calculate the index follows Achenbach and Rescorla (2000) CBCL.

[g] See *Table 1* for details of variables included as controls.

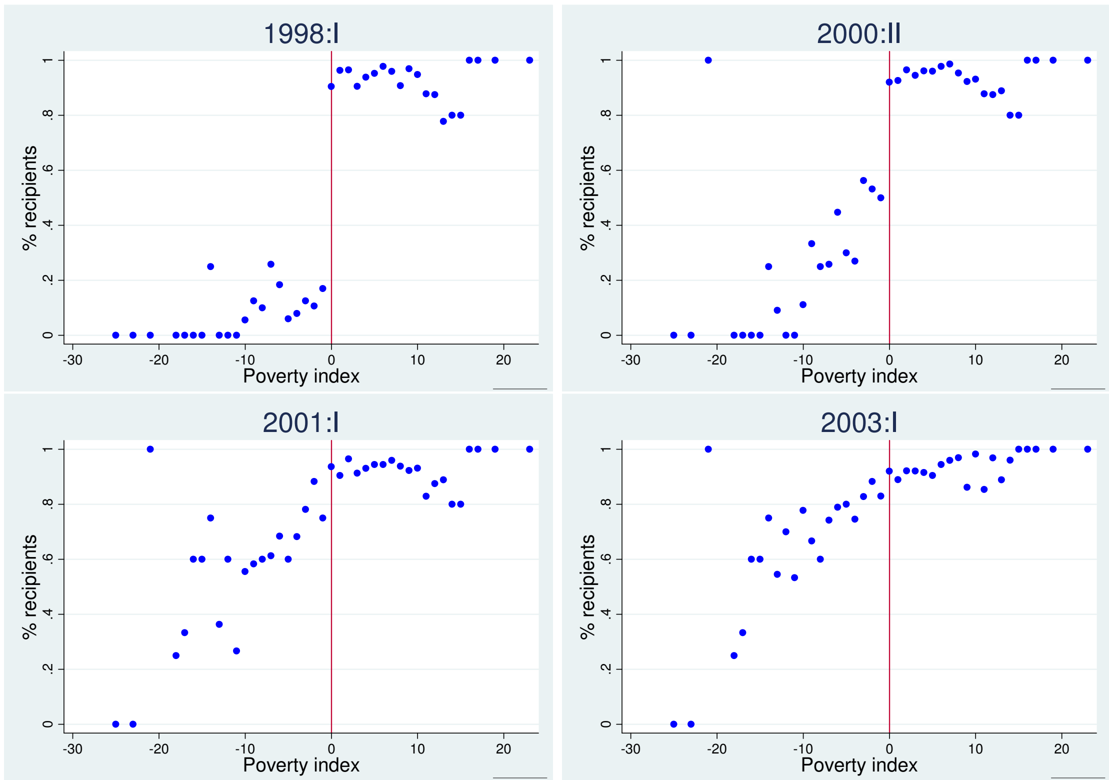


Figure 1: Regression Discontinuity: First Stage ID

On each graph, the x-axis corresponds to the poverty index used by the administrative rule to select Progresa beneficiaries. The administrative cutoff is centered at zero.

The poverty index is formed with a formula that weights household's asset ownership and socio-economic characteristics of its members.

Analysis restricted to original randomized treatment villages. These villages begin to receive the transfers on April 1998 and are reassessed three years later to consider including more households.

The y-axis gives the proportion of households that report receiving the cash transfers of the program. Perfect targeting and take-up rates would yield a sharp regression discontinuity.


Figure 2: Regression discontinuity analysis: anthropometric outcomes

On each graph, the x-axis corresponds to the standardized poverty index used by the administrative rule to select Progresa beneficiaries. The administrative cutoff is centered at zero.

Analysis restricted to original randomized treatment villages.

The y-axis gives conditional means of the individual outcomes.

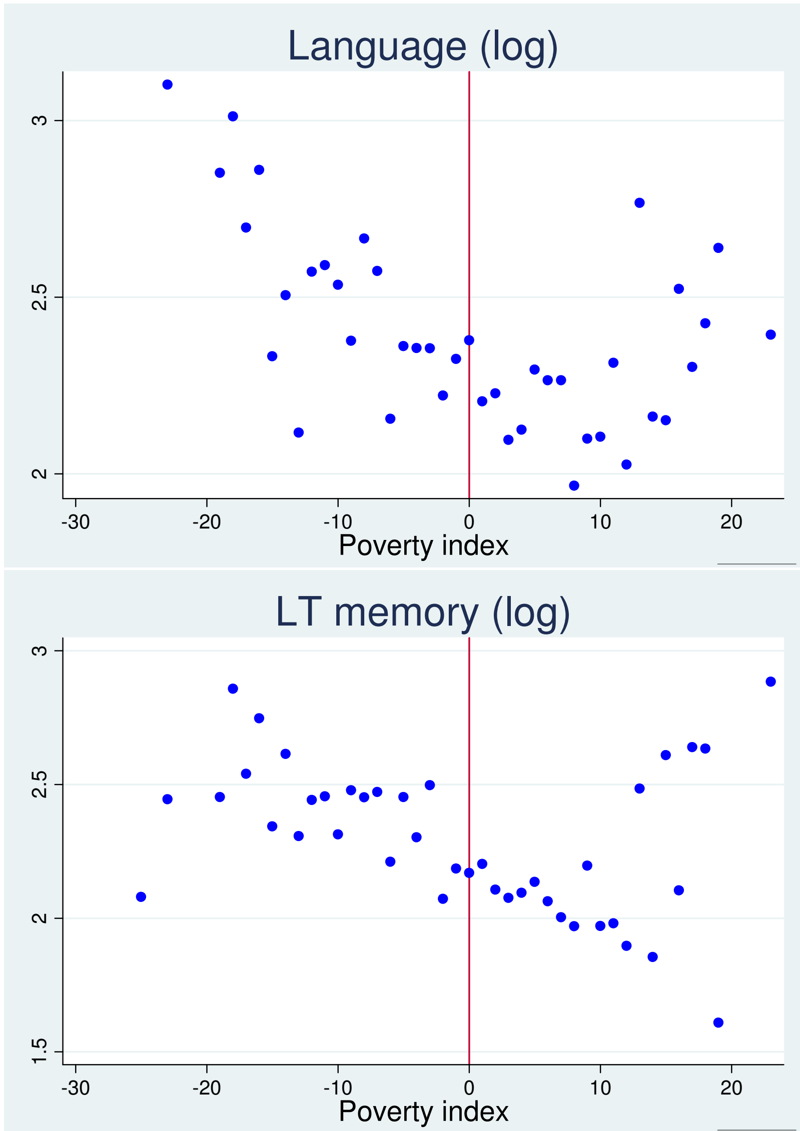


Figure 3: Regression discontinuity analysis: cognitive outcomes

On each graph, the x-axis corresponds to the standardized poverty index used by the administrative rule to select Progresa beneficiaries. The administrative cutoff is centered at zero.

Analysis restricted to original randomized treatment villages.

The y-axis gives conditional means of the individual outcomes.


Figure 4: Regression discontinuity analysis: motor skills outcomes

On each graph, the x-axis corresponds to the standardized poverty index used by the administrative rule to select Progresa beneficiaries. The administrative cutoff is centered at zero.

Analysis restricted to original randomized treatment villages.

The y-axis gives conditional means of the individual outcomes.