The effects of health-conditional and health-unconditional PROGRESA cash transfers on health

Carlos Chiapa*

El Colegio de México

April, 2008

Abstract

This paper analyzes the role of conditionality of PROGRESA cash transfers on the health status of different household members. Some transfers are conditional on frequent medical check-ups of all household members, while others are not conditional on health check-ups–and depend instead on school enrollment of school-age children. I find that the latter transfers improve the health status only of potential income earners, while the total effect of the program benefits all members including infants and nonworking mothers. The results indicate that conditionality–on medical check-ups for the entire family–of health-related transfers induces improvements in the health of infants and nonworking women, the main target household members of PROGRESA.

1 Introduction

In an effort to break the intergenerational transmission of poverty, a number of countries throughout Latin America, Asia, Eastern Europe, Africa and even New York City in the United States, have started to implement conditional cash transfer programs (Parker, Rubalcava and Teruel, 2007). The main aim of these programs is to increase the investment in human capital of children living in households in (extreme) poverty in the hopes that this investment will break the prevailing vicious circle of poverty. Children living in beneficiary households today should be able to overcome

*Email: cchiapa@colmex.mx.

This paper is a revised version of a chapter of my doctoral dissertation at Boston University. I am very grateful to Dilip Mookherjee, Kevin Lang, and Iván Fernández-Val for their advice and support. A special thanks goes to Rodrigo García-Verdú, his research has undoubtly influenced my views on PROGRESA and its evaluation sample data set. I am also grateful to Iliana Yaschine Arroyo from the Dirección General de Planeación, Evaluación y Seguimiento del Programa Oportunidades for providing me the data on PROGRESA, and to Alejandra Macías Sánchez for kindly solving many of my doubts about it.

poverty tomorrow. Given the complexity of the programs it has been hard to assess how important each of their components is. Surprisingly, not much effort has been put in in order to separate the effect of actually fulfilling the required conditions in order to get the cash transfers–e.g., attending school or health clinics for regular check-ups–, from the income effect derived from the transfers itself–particularly with respect to impacts on health and nutrition. Consequently, there is an ongoing debate over the optimality of conditioning the delivery of cash transfers to poor households on specific behaviors by their members.

Imposing behavioral conditions on households has a number of drawbacks: it is expensive for the program's administration; the actual program's benefits may be less than they were intended to be if satisfying the requirements is costly to the households; conditions may be too difficult to meet for some households cutting them out of the program; the target population may feel their behavior is being conditioned as a result of them not knowing what is actually good for them (de Brauw and Hoddinott, 2007). Nevertheless, de Janvry and Sadoulet (2006) argue that a conditional cash transfer program may be a good choice as long as the sole objective of a program is not to simply transfer cash directly to a target population, and imposing conditions is not too expensive from an administrative point of view. A clear example would be a case in which there is under-utilization of school and health facilities, and increasing their use is the objective of the program. Furthermore, a conditional cash transfer program may be preferred over a simple cash transfer one if: (i) the parents do not know or do not understand the benefits of investing in the health and education of their children, and so, under-invest on them; (ii) the parents objective function is not aligned with their children's welfare; (iii) there are positive externalities for society as a whole from investing in children's health and education (de Janvry and Sadoulet, 2006).

Conditional cash transfer programs are primarily aimed at improving the educational, health and nutritional status of poor families. Recently, a number of studies that have analyzed whether impacts on school enrollment (Bourguignon, Ferreira, and Leite, 2003; de Brauw and Hoddinott, 2007; Schady and Araujo, 2006), school attendance (Kakwani, Veras, and Son, 2005) and entry decisions into secondary school (de Janvry, Sadoulet, Solomon, and Vakis, 2006; Todd and Wolpin, 2003) are greater if a conditional cash transfer program is used instead of simple cash transfers. The general conclusion of these papers is that the impact is greater when transfers are conditional on some specific behavior than when they are not. Curiously, there is much less evidence on whether conditional cash transfers yield better results than simple cash transfers with respect to health and nutrition.

Up to my knowledge there is no evidence on whether improvements in health and nutrition are greater with conditional cash transfers than with simple cash transfers. The closest evidence on the matter is available for the United States. Duflo (2003) citing the work of Currie (1995) and Mayer (1997) mentions that in-kind transfers–which she considers a particular kind of conditional transfer–have a greater impact on children's health than cash transfers. For developing countries, there are studies that evaluate the impact of conditional cash transfer programs (Gertler, 2000; Gertler and Boyce, 2001), and simple cash transfer programs (Duflo, 2003) on health–finding positive impacts–and a number of studies focusing on the calorie response to changes in income–finding mixed results.[1] However, none of these evaluations allows to determine whether a conditional cash transfer or a simple cash transfer program is more successful than the other.

Due to the important policy implications of the subject, the aim of this paper is to fill-in this gap. Identifying the best policy to improve the health and nutrition levels is particularly relevant given the well documented link between child nutrition, physical and intelligence development, and productivity in the long run.[2] Higher rates of school enrollment, attendance and entry into higher school levels could be meaningless if the students are not able to absorb the lessons they are being thought due to early life deficiencies in their health and nutrition. Using data from the evaluation data set of the Mexican conditional cash transfer program PROGRESA, I evaluate whether the conditions imposed by the program on the behavior of individuals or the cash transfers received by the households are the driving forces behind PROGRESA's success in improving the health status of its target population: children 0-5 years old and their mothers.

PROGRESA was launched in 1997 in an effort by the federal government to break the intergenerational transmission of poverty by enhancing the human capital of poor families. The program has a number of objectives, but it is primarily aimed at improving the educational, health, and nutritional status of poor families, and particularly of children and their mothers. PROGRESA sought to substitute targeted or generalized food subsidies, giving the beneficiary households complete freedom in their spending decisions (Levy, 2006). However, it conditioned the delivery of nutritional supplements and of monetary cash transfers on the attendance of all household members to health clinics for preventive health check-ups and on the regular attendance of children to school.

[1] For example, Behrman and Deolalikar (1987, 1988); Behrman, Foster and Rosenzweig (1997); Bouis (1994); Bouis and Haddad (1992); Hoddinott, Skoufias and Washburn (2000); Strauss and Thomas (1998); Subramanian and Deaton (1996).

[2] See, among others, Barker (1990); Haas, Murdoch, Rivera and Martorell (1996); Martorell (1999); Martorell, Rivera and Kaplowitz (1989); Mook and Leslie (1986); Jamison (1986); Strauss and Thomas (1998).

The specific health-related condition of PROGRESA is that all family members must attend regularly health clinics in order to get preventive health care. If the condition is satisfied, the household receives a monetary transfer that is fixed in size for all households. Additionally, households with school-age children may receive a school-attendance-conditional cash transfer. As this education-related transfer is given to the families independently of whether they go to their scheduled health check-up visits or not, it can be seen as a health-*unconditional* transfer. Furthermore, the education-related transfer represents the major component of the program and varies according to the number of school-aged children per household and their school year. Although the decision to attend school or not is endogenous to the household, the number of children in the qualifying school-age it had by the time PROGRESA began is not. I exploit this particularity of the program design in order to study the impact of the health-conditional and health-unconditional transfers on the health outcome of the household.

I first develop a model that shows that it is optimal for a household to distribute more resources to currently working members. That is, the model shows that it is optimal for households to underinvest in the health of children and nonworking mothers. Furthermore, I derive a condition which implies that working household members will receive even more resources than nonworking members as the available income of the household goes up. Having a theoretical framework is crucial to understand how do households allocate the additional resources they can afford as a result of the cash transfers received among its members. If the data actually supports this latter condition of the model, imposing specific behaviors on the individuals can be expected to be key for the success of PROGRESA. This appears to be indeed the case.

Gertler (2000) and Gertler and Boyce (2001) were the first to study the total effect of PROGRESA on health. They find that the program, as a whole, has a positive impact improving the health of children 0-5, adults 18-50 and older members. In my study, I conduct a thinner analysis as I am interested on the effects of the target population: boys and girls 0-5 and their mothers. Thus, I evaluate the effect of PROGRESA on the health of boys and girls 0-5 and 6-17 years old; on mothers, household heads, and adults 18-64 in general; and older members. Using the same methodology as Gertler and Gertler and Boyce I show that the program has reduced the proportion of children–both boys and girls–0-5 reported to be sick and has diminished the number of days nonworking mothers have difficulties to perform their daily tasks or simply have not been able to perform them due to illness. On the other hand, deriving reduced form regressions from the model I test the effect of each of the two types of transfers, the health-conditional and the health-unconditional one, on the health outcome of the household members specified above. Results show that the effects of the cash transfers are quite biased towards potential income earners. In particular, the cash transfers do not seem to improve the health status of any children, their mothers, or older household members. However, the health-unconditional cash transfers significantly improve the health status of members who are likely to be working in the market: adults, and, in particular, the head of the household. The results are robust to dividing the sample into two groups: potential working members and nonpotential working members. As the decision to work or not is endogenous to the household, I build two different potential-nonpotential working members' samples. In one I consider as a potential worker all men 13-64 years old who declared to be working in the baseline survey in 1997 before the benefits of the program had been distributed. For the second sample, I consider all men between 15-64 in each of the two survey rounds carried out in 1999 that I use in the analysis. All the rest of the individuals in the sample are considered nonpotential workers. Health-unconditional transfers have a positive impact on the status of potential working members, and no impact at all on the health level of nonpotential working members. The results obtained from these two samples are strikingly similar between themselves and between the ones for the head of the household.

From the marked difference in outcomes between analyzing the total effect of PROGRESA against the impact of its cash transfers on health, it can be inferred that a simple cash transfer program, would fail in accomplishing one of PROGRESA's main goals which is to improve the health status of young children and their mothers. The driving force behind these results may be the lack of understanding by the parents of the future benefits of good health and nutrition for their children. Also, they can be the result of the misalignment of the parents objective function with their children's welfare. In any case, evidence suggests that without conditionality, short term gains for the parents at the cost of their children's health would most probably replicate poverty in the years to come.

The rest of the paper is organized as follows. PROGRESA's cash transfers have an effect on the beneficiaries' health through the additional health inputs they can afford to buy, Section 2 develops a theoretical framework that explains the intrahousehold distribution of these inputs. Section 3 gives a description of PROGRESA its evaluation data set and presents some descriptive statistics. Section 4 studies the effect of PROGRESA on the available income of the households and concludes that despite the income and substitution effects induced by the program, the available income of the households increases as a result of participation. Section 5 evaluates the effects of the program on health. First it analyzes the total effect of PROGRESA on health following the methodology developed in Gertler (2000) and Gertler and Boyce (2001). Then it develops the empirical strategy to study the effect of the program's cash transfers. Finally, it presents the main results of the paper along with some robustness checks. Lastly, Section 6 concludes discussing a number of caveats and assessing the extent to which the results can be generalized.

2 Theoretical framework

Cash transfers can have an effect on the health status of individuals by allowing them to buy a greater quantity of food–particularly, more nutritious one–, medicines, and health-related services. Thus, a theoretical framework that explains the intrahousehold distribution of health inputs is essential in order to understand how changes in a household's available income may translate into improvements in the health status of (some) of its members. Hence, I present a simple one-period model that describes the allocation of health inputs within a household composed of heterogenous members following Pitt, Rosenzweig, and Hassan (1990).

Consider an economy with I households which differ in their demographic structure and level of assets or nonlabor income. Each household is composed of a single parent and $m_i - 1$ children. Of these children, $m_i^s \leq m_i - 1$ go to school and $m_i^n \leq m_i - 1$ work. Each household member j values her consumption of health inputs, x_{ij}, and other nonhealth related purchased goods, y_{ij}, her leisure time, l_{ij}, and health level, h_{ij}. Additionally, the parent values the education of her children, $s_i = (s_{i1}, ..., s_{i,m_i-1})$. The specific vectors of consumption goods, leisure, health, and education of each member j enter household i's utility function such that:

$$u_i = u\left(x_{ij}, y_{ij}, l_{ij}, h_{ij}, s_i\right), \qquad j = 1, ..., m_i. \tag{1}$$

As usual, u_i is a concave function for all its elements.

All household members share the same health production function. In particular, the health output of household member j is determined by her consumption of health inputs, the amount of time she works in the market, t_{ij}, as well as by the preventive health care measures she takes, such as regular check-up visits to health clinics, d_{ij}. Thus, the health level of each member is represented by the health production function

$$h_{ij} = h\left(x_{ij}, t_{ij}, d_{ij}\right). \tag{2}$$

Health output is increasing, at a decreasing rate, in both x_{ij} and d_{ij}, and decreasing in t_{ij} since work consumes energy and this, in turn, may deteriorate health.

Working household members work in the market, for wage w. However, the *effective* number of hours, n, that they are able to supply are a function of the amount of time they dedicate to their working activities and their level of health:

$$n_{ik} = n\left(t_{ik}, h_{ik}\right), \qquad k = 1, ..., m_i^n + 1. \tag{3}$$

The effective number of hours worked is increasing in both t_{ik} and h_{ik}. Therefore, household i faces the following budget constraint:

$$p_x \sum_{j=1}^{m_i} x_{ij} + p_y \sum_{j=1}^{m_i} y_{ij} = a_i + w \sum_{k=1}^{m_i^n+1} n_{ik} \tag{4}$$

where p_x and p_y are the price of health inputs and nonhealth related goods, respectively, and a_i denotes household i's assets or nonlabor income.

Finally, normalizing all time endowments to one, the time constraint of each member j of household i is given by

$$l_{ij} + t_{ij} + s_{ij} + d_{ij} = 1. \tag{5}$$

That is, household members divide their time in leisure, market labor, going to school, and/or attending regular check-up visits.

The problem of household i is then to maximize the utility function (1) subject to (2)-(5). In order to understand how a household distributes the health input among its members, it is useful to derive the household's necessary first-order conditions of the health input for nonworking and working members. Thus, the first order condition for a nonworking household member j is

$$\frac{\partial u}{\partial x_{ij}} + \frac{\partial u}{\partial h}\frac{\partial h}{\partial x_{ij}} = \lambda\left(p_x\right) \tag{6}$$

while for a working member k is

$$\frac{\partial u}{\partial x_{ik}} + \frac{\partial u}{\partial h}\frac{\partial h}{\partial x_{ik}} = \lambda\left(p_x - w\frac{\partial n}{\partial h}\frac{\partial h}{\partial x_{ik}}\right) \tag{7}$$

where λ is the marginal utility of income. Conditions (6) and (7) clearly show how the health input will be distributed within the household. As the marginal cost of allocating an additional unit of the health input to working member k is less than the marginal cost of allocating it to nonworking member j, working household members will receive greater allocations of the health input than nonworking members. That is, household members working in the market receive more health inputs not only because working deteriorates their health level, but also because consuming health inputs improves their health status, which, in turn, increases their returns.[3]

Complete solution to the household problem yields the following reduced form demand equations for each member j of household i:

$$\begin{pmatrix} x_{ij} \\ y_{ij} \\ l_{ij} \\ h_{ij} \\ s_i \\ d_{ij} \end{pmatrix} = D_{ij}^{k}\left(p_x, p_y, W_i\left(a_i, w, m_i^n\right)\right), \qquad k = x, y, l, h, s, d, \tag{8}$$

where

$$W_i\left(a_i, w, m_i^n\right) = a_i + w \sum_{k=1}^{m_i^n+1} n_{ik}.$$

That is, the choice of x_{ij}, y_{ij}, l_{ij}, h_{ij}, e_i, d_{ij}, of household i depends on the market prices p_x and p_y, and on its available income, W_i, which is itself a function of the household's assets or nonlabor income, a_i, the market wage, w, and the number of working children, m_i^n. Making the reasonable assumption that health input goods, leisure, health and the regular check-up visits to health clinics are normal goods, household i's aggregate demand of each of them will increase as its available income increases:

$$\frac{\partial D_i^{k'}}{\partial W_i} > 0,$$

where $D_i^{k'} = \sum_{j=1}^{m_i} D_{ij}^{k'}$ for all $k' = x, l, h, d$.

2.1 The intrahousehold distribution of additional health inputs

Knowing that household i's aggregate demand for a given good increases is of little help if interest lies in the intrahousehold distribution of that good, as is the case for health inputs. In order to

[3] As I assume that the effective number of hours worked in the market is a function of the health level of the individuals, it is effective market work time (as in Rosenzweig and Schultz, 1982) and not the amount of effort demanded by the different activities performed by the household members (as in Pitt, Rosenzweig and Hassan, 1990) what matters for the intrahousehold health input distribution.

analyze how a household distributes any additional health input it can afford to buy among its members, it is useful to consider a simplified version of the model above.

Assume that household i is composed of only two members, a nonworking member 1 and a working member 2, such that household i's aggregate consumption of health inputs is given by $X_i = x_{i1} + x_{i2}$. The first order necessary conditions for the health inputs in this simplified version of the model look the same as conditions (6) and (7). Combining them into a single equation, the intrahousehold allocation rule is obtained:

$$\frac{\partial u}{\partial x_{i1}} + \frac{\partial u}{\partial h}\frac{\partial h}{\partial x_{i1}} = \frac{\partial u}{\partial x_{i2}} + \frac{\partial u}{\partial h}\frac{\partial h}{\partial x_{i2}} + \lambda w \frac{\partial n}{\partial h}\frac{\partial h}{\partial x_{i2}}. \tag{9}$$

Substituting $x_{i2} = X_i - x_{i1}$ in (9) and totally differentiating with respect to X_i and x_{i1}, I obtain the relationship between changes in aggregate household health inputs X_i, and the consumption of them by nonworking household member 1:

$$\frac{dx_{i1}}{dX_i} = \frac{\varepsilon + \phi}{\varepsilon + \phi + \gamma}$$

where $\varepsilon = \frac{\partial^2 u}{\partial x_{i2}^2} + \frac{\partial^2 u}{\partial h^2}\left(\frac{\partial h}{\partial x_{i2}}\right)^2 + \frac{\partial u}{\partial h}\frac{\partial^2 h}{\partial x_{i2}^2}$, $\phi = \lambda w \left[\frac{\partial^2 u}{\partial h^2}\left(\frac{\partial h}{\partial x_{i2}}\right)^2 + \frac{\partial u}{\partial h}\frac{\partial^2 h}{\partial x_{i2}^2}\right]$, and $\gamma = \frac{\partial^2 u}{\partial x_{i1}^2} + \frac{\partial^2 u}{\partial h^2}\left(\frac{\partial h}{\partial x_{i1}}\right)^2 + \frac{\partial u}{\partial h}\frac{\partial^2 h}{\partial x_{i1}^2}$. If $x_{i1} = X_i - x_{i2}$ is substituted in (9) instead, I obtain the relationship between changes in X_i and x_{i2}, after totally differentiating with respect to X_i and x_{i2}:

$$\frac{dx_{i2}}{dX_i} = \frac{\gamma}{\varepsilon + \phi + \gamma}.$$

Thus, I have that household i will choose to give a greater share of any additional health inputs it can afford to working member 2 whenever doing so brings greater utility gains to the household. This will be the case if:

$$\varepsilon + \phi < \gamma. \tag{10}$$

For a given marginal utility of income and wage rate (λw), condition (10) is more likely to hold the more health inputs the household assigns to working members than to nonworking members. Similarly, for any initial difference in the allocation of health inputs between working and nonworking members, the lower the value of the household's marginal utility of income and wage rate (λw), the more probable the inequality holds. However, whether condition (10) holds or not in rural Mexico is an empirical question. If it does indeed hold, the health level of working household members will improve more than the health level of nonworking household members as a result of an exogenous increase of available income at the household level.

2.2 The effect of Conditional Cash Transfers

Assume a conditional cash transfer (CCT) program is introduced in the economy. The program works as follows: If household i's assets or nonlabor income, $a_i < \bar{a}$, then household i enters into a lottery where it can be randomly chosen to receive CCTs; if on the other hand, household i's assets or nonlabor income, $a_i \geq \bar{a}$, the household does not qualify to participate in the lottery to receive CCTs. There are two types of transfers, one is conditional on all household members attending the health clinic at least $\bar{d}$ hours; the other is conditional on the children's attendance to school at least $\bar{s}$ hours. Health conditional transfers, T^h, are a lump sum payment to each household independent of its size. Education conditional transfers, $T_i^s = T^s(m_i^s)$, depend on the demographic structure of the household. A certain payment amount is given for each qualifying child and the payment amounts vary in size depending on the grade the child is in.

As a result of the introduction of the CCT program, the budget constraint specified in (4) is no longer valid for those households with $a_i < \bar{a}$, selected to participate in it. The available income of each of these households will include the following transfer amount:

$$T(m_i^s, d_i, s_i) = T^h * I\left(d_i = (1+m_i)\,\bar{d}\right) + \sum_{j=1}^{m_i^s} T_{ij}^s * I\left(s_{ij} \geq \bar{s}\right),$$

where $d_i = \sum_{j=1}^{1+m_i} I\left(d_{ij} \geq \bar{d}\right)$ and $s_i = \left(s_{i1}, ..., s_{i,m_i^s}\right)$. Thus, the reduced form demand equations of those selected households with $a_i < \bar{a}$ will differ from the ones specified in (8). Let the new demand equations of a selected household i be:

$$\begin{aligned}
\begin{pmatrix} \hat{x}_{ij} \\ \hat{y}_{ij} \\ \hat{l}_{ij} \\ \hat{h}_{ij} \\ \hat{e}_i \\ \hat{d}_{ij} \end{pmatrix} &= D_{ij}^k\left(p_x, p_y, W_i\left(a_i, w, m_i^n\left(T\left(m_i^s, d_i, s_i\right)\right)\right) + T\left(m_i^s, d_i, s_i\right)\right), \qquad (11) \\
k &= x, y, l, h, e, d.
\end{aligned}$$

Given the conditionality structure of the transfers it is hard to tell a priori the precise effect of the program on each single good and service the different household members choose, in particular on the health of the household members. The transfers have a direct effect on the labor-leisure, education, and health care visits choices of the households. Members may substitute work for leisure and may devote more time to get their health check-ups. Given the properties of the health technology, the former action will, by itself, have a positive impact on the health outcome of working household members, while the latter on the health status of the whole family. Furthermore, children may be taken out of work and sent to school. This CCTs-induced behavioral change will also translate in a health improvement for school-age children. However, forgone child labor–which is an indirect effect of the program–may cause the parents to work more, compromising their health level, or may reduce the disposable income of the households, affecting the health status of, at least some, household members. Thus, as a result of conditionality, it is not obvious whether,

$$W_i\left(a_i, w, m_i^n\left(T\left(m_i^s, d_i, s_i\right)\right)\right) + T\left(m_i^s, d_i, s_i\right) \lesseqgtr W_i\left(a_i, w, m_i^n\right).$$

If indeed $W_i\left(a_i, w, m_i^n\left(T\left(m_i^s, d_i, s_i\right)\right)\right) + T\left(m_i^s, d_i, s_i\right) > W_i\left(a_i, w, m_i^n\right)$ an increase in the aggregate household demand of all normal goods would be the expected effect of the program. In particular, beneficiary household i would be able to afford more health inputs which may benefit members differently as shown above. Thus, it would be easy to analyze whether condition (10) holds empirically or not by simply comparing the health outcomes for different household members living in selected households to receive the benefits of the program, against the outcomes of individuals living in similar households–with $a_i < \bar{a}$–but not selected to receive CCTs.

In the next section I describe the Mexican CCT program PROGRESA, its evaluation data set and show some descriptive statistics. Then I present evidence that suggests that the available income of beneficiary households actually increased, which sets the stage to confront condition (10) with the data.

3 PROGRESA

This section presents a succinct description of PROGRESA, its evaluation data set and descriptive statistics of the variables used in the empirical analysis. It draws extensively on Gertler (2000) and Skoufias (2005) where a much more detailed description of the program and evaluation data set can be found.

3.1 The program

In 1997, the Mexican federal government started the *Programa de Educación, Salud y Alimentación* (the Education, Health, and Nutrition Program), PROGRESA, in rural Mexico, in an effort to break the intergenerational transmission of poverty. The program has a number of objectives, but it is primarily aimed at improving the educational, health and nutritional status of poor families, and particularly of children and their mothers (Skoufias, 2005). It is made up of three closely linked components related to health, nutrition and education.

Participation into the health component is a pre-condition for receiving the benefits of the nutritional component. The female head of the household must attend educational talks aimed at improving information about vaccination, nutrition, contraception and hygiene, and *every* family member must visit health centers for scheduled preventive and/or monitoring check-ups for the household to qualify to receive the benefits of the nutritional component. In particular, pregnant women are required to have five prenatal care visits starting in their first trimester; children less than 24 months are required to visit the clinic every two months for growth monitoring, immunizations, and well-baby care; children between 24 and 60 months are required to visit every three months for growth monitoring, well-child care, and immunizations; lactating women are required to have two visits a year where their nutrition is monitored and they obtain family planning information and have physical check-ups; other adolescents and adults are required to visit clinics once a year for physical check-ups (Gertler, 2000). Qualified households secure a small monetary (health-conditional) transfer, fixed in size for all households independently of their size, as well as nutritional supplements for children less than 24 months (and children between 24 and 60 months if they present stunning symptoms) and for pregnant and lactating women.

The largest component of the program is the educational one. Beneficiary households with children between 6 and 17 years old enrolled and attending at least 85% of the school days in each month as well as during the whole academic year, receive an education-conditional grant. In this case, the size of the grant increases with grade and, for secondary education, the grant is slightly higher for girls than for boys. In addition, these households with school-age children receive a grant for school supplies. Table 1, presents the schedule of transfers from 1998 to 2000. On average, beneficiary households receive around 197 pesos per month (expressed in November 1998 pesos);[4] this amount represents 19.5% of the mean value of consumption of eligible households in

[4] The calculation of this average includes households that did not receive any benefits due to non-adherence to the conditions of the program, or delays in the verification of the requirements of the program or in the delivery of the monetary benefits (Skoufias, 2005).

control localities (Skoufias, 2005).

Gertler (2000) and Gertler and Boyce evaluate the total effect of PROGRESA on the health status of families in rural Mexico. In this paper, I first run Gertler-type regressions using my sample of households to analyze the total effect of the program, and then focus on the effect of the monetary transfers on the health outcome of the families. Performing this latter analysis will allow me to get an idea of what would happen if the transfers given by PROGRESA were not conditional on the attendance to health clinics. The design of the program allows me to test the effect of the two different transfers the households may receive: a health-conditional and relatively small transfer and an education-conditional relatively bigger transfer. Although the decision to attend school or not is endogenous to the household, it is reasonable to assume that the number of children in the qualifying school age it had by the time PROGRESA began is not. Exploiting this particularity of the program design I conduct my analysis.

3.2 The data

An extraordinary characteristic of PROGRESA is that the essential elements for a rigorous evaluation of its impact were taken into consideration since the beginning of its implementation. Exploiting the program's sequential expansion, an experimental design for its evaluation was adopted. A subset of 506 eligible localities in the seven states of Guerrero, Hidalgo, Michoacán, Puebla, Querétaro, San Luis Potosí and Veracruz, was randomly chosen to participate in the evaluation sample. 320 localities were randomly chosen as beneficiaries and started receiving benefits in May 1998. The remaining 186 were used as controls and started receiving treatment in December 1999. In these control localities, none of the households were informed that PROGRESA would have started to give them benefits at a later date. The data collected consists of repeated observations over eight survey rounds for 24,000 households.

To analyze the relationship between health and the two different types of transfers the households may receive, nutritional and educational, I only use the third, fourth and fifth survey rounds, when I analyze the health status of children 0-5. Given that information about the health of members older than 5 was not included in the third survey round, when I analyze the health status of children 6-17, adults (age 18-64), and older members (age 64 and over) I use only rounds four and five. The main reason why I only use these survey rounds, considering that data on health is also available for rounds six through eight, is to be able to compare my results, as much as possible, with the results obtained by Gertler (2000) and Gertler and Boyce (2001). They use, for the case of members older than 5 the same data as I do, while for children 0-5 they also use the baseline survey in addition to the rounds that I use. I do not use the baseline survey, because there is no information in that round for two of the control variables that I use in the regressions and the survey does not include information on whether an individual is living permanently in a household or not.[5] In order to build the panel data set, I used only the observations of those households whose interview process was completed successfully, that were eligible to receive the program's benefits, that had at least one member that usually lived there, and that once they entered into the sample, did not exit. This resulted in a panel of around 13,400 households.

The data set has information on at least two different types of health indicators: Self-reported normal activity and self-reported physical functioning. The self-reported normal activity measures available in the data set differ for the different household members. For children 0-5 years old, a simple question was asked in the surveys requiring the mother to tell whether the child was sick or not during the previous four weeks. For children 6-17 and all adults that simple question was not asked. Instead, they were told to report the number of days an individual had difficulties to perform daily tasks due to illness, the number of days an individual was unable to perform daily tasks due to illness, and the number of days an individual spent in bed due to illness, during the previous month.

Although I analyze the health status of individuals, I conduct the analysis at the household level.[6] That is, when I consider the health status of children 0-5 years old, I focus on the proportion of children of that age range that were reported sick within a household. For the health status of the rest of the household members, I consider the average number of days each member of each category had difficulties or was unable to perform daily tasks, or had to stay in bed due to illness. If a household does not have any members from a given category, a missing value is assigned to it, and thus is not considered in the analysis.

Table 2, shows the descriptive statistics of the different dependent and independent variables used in the analysis. Looking at the dependent variables, it is evident that members of eligible households living in PROGRESA villages enjoy, in general, a better health status than members of eligible households living in control villages. The only members for whom this fails to be

[5] The encel98m baseline survey does not include information about the amount of land the households own or use or on the education level of their members.

[6] I follow this strategy since the data sets were designed to be matched from one round to the next at either the locality or household level, but not at the individual level. While from round to round the demographic composition of the households does not present big changes, on average, trying to match individuals result in many incongruences. Parker, Rubalcava and Teruel (2007) acknowledge that there have been some reported problems with matching identifiers at the individual level and refer the reader to Teruel and Rubalcava (2007) for further discussion.

the case are girls 13-17 years old. Girls in this age group living in control villages seem to be healthier than those living in treatment villages. It is also for this group of household members that there are differences between treatment and control groups when attention is put into the set of independent variables. Households in PROGRESA villages have significantly less girls aged 13-17 than households in control localities. Girls in this age group provide a great deal of help to their mothers performing household chores (Parker and Skoufias, 2000). The fact that domestic work is divided between less members in households living in treatment villages than in households in control villages, may be the cause of poorer health for girls 13-17 living in treatment villages.

4 Evidence on the effect of PROGRESA on available income

Due to the conditionality structure of the transfers it is hard to tell *a priori* whether the available income of beneficiary families increases or not as a result of the health-conditional and education-conditional (henceforth called health-unconditional) monetary transfers of PROGRESA.[7] The program has a direct effect on the labor-leisure, education, and health care visits choices of the households. In particular, members may substitute work for leisure and children may be taken out of work and sent to school. These two actions may reduce the earned income of the household. However, due to the health effects of the program, working members may be more productive, which may result in an increase in their earned income.

Parker and Skoufias (2000) analyze the impact of PROGRESA on the labor market participation of all household members and on the way they spend their leisure time. They find that PROGRESA successfully increases enrollment in school and reduces the probability of working for children aged 8-15. Particularly, they note that the impact is especially important for boys and girls 12-15 years old.[8] For members aged 16-17 they do not find any effects of the program. They also check whether it is salaried work or nonsalaried work the one that is not being done anymore by these children and they find that both types of work are being affected. Finally, Parker and Skoufias do not find evidence of a decrease in the labor market participation of adults.

A couple of remarks are relevant here. First, the empirical evidence seems to suggest that, on average, adults may be substituting with their labor the forgone child labor. This can be

[7] Furthermore, families that accept the benefits of PROGRESA should give up the benefits from any other social program they were previously receiving, such as *Niños de Solidaridad*, *Abasto Social de Leche*, or *de Tortilla*, and *Instituto Nacional Indigenista* (Skoufias, 2005).

[8] Parker and Skoufias (2000) report that the probability of working for boys 12-15 years old, diminishes between 15 to 20%, relative to their probability of working prior to the implementation of the program. For girls in the same age range, they report decreases in the probability of working between 15 to 25%.

accomplished either by a parent working more herself or by hiring outside labor. Hence, if the latter case is the one prevailing, it is not clear that the transfers the children are getting will help to increase the available income of the household. They will simply be used to pay for the hired labor. Second, the transfers were calculated taking into account the opportunity cost of the children (Skoufias, 2005). Thus, even if no outside labor is being hired, the transfers are simply substituting the wages the children were previously earning in the market. In summary, for transfers the beneficiary households are receiving to have any positive effect augmenting the household's available income, they must not be used to substitute either forgone labor or forgone wages.

Parker and Skoufias (2000) present a set of figures in which they show the proportion of children 8-17 years old enrolled in school and participating in the labor market. I follow them, and present a similar analysis in Figures 1, 2, 3, and 4. Figures 1 and 2 show the proportion of girls and boys, respectively, enrolled in school and working in the market in 1997, before the implementation of the program. For both, boys and girls, there is a huge and persistent decline in enrollment after they turn 11 years old. However, it seems to be only the boys the ones that engage in the labor market. At age 15 more than half of the boys report to be working while less than half report to be enrolled in school. Girls, on the other hand do not seem to engage in labor market activities, despite not enrolling in school either. However, it is important to note that girls in rural Mexico usually stay at home to help their mothers with the household's chores (Parker and Skoufias, 2000).

Figures 3 and 4 corroborate this assertion. These two figures show, in addition to the proportion of girls and boys, respectively, enrolled in school and working in the market, the proportion of children working at home for households living in control villages in 1999. These figures are very similar to the previous ones and show that as early as age 13, half of the girls were already not enrolled at school and helping their mothers at home. Hence this set of graphs imply that the transfers received by boys are more likely to be used to substitute forgone labor or forgone wages than the transfers received by the girls. Furthermore, when the children enroll and attend secondary school, that is when they are about 13 years old, the health-unconditional transfers are higher for girls than for boys, as can be seen from Table 1. Thus, it is more likely that the money received by girls 13-17 years old, who were not working in the market and who are enrolling in school thanks to PROGRESA's incentives, be the one having an impact in increasing the available income of the beneficiary households. These transfers are almost 100% additional money to the households previous available income. Another source of new money could be the transfers received by children ages 8-12 given their low labor market participation. However, the amount they are entitled to receive is quite small in comparison to that of the girls (see Table 1). Hence, it is reasonable to assume that indeed $W_i\left(a_i, w, m_i^n\left(T\left(m_i^s, d_i, s_i\right)\right)\right) + T\left(m_i^s, d_i, s_i\right) > W_i\left(a_i, w, m_i^n\right)$ for beneficiary households thanks, in particular, to the health-unconditional transfers received by girls 13-17 years old.[9]

5 Empirical framework

PROGRESA aims to improve the health status of the individuals through two different paths (Gertler, 2000). The first one is through the direct provision of free health care and nutrition interventions. The second path comes into action if the households are liquidity constrained. In this case, the monetary transfers may raise the household members' health by increasing the household's available income which may, in turn, loosen its liquidity constraint. Households can devote the additional available income to buy food–particularly, more nutritious one–, medicines and/or health related services. The first path can fail if the family chooses not to visit the health centers; the second if the household has competing priorities and chooses not to use the cash transfers for their intended purpose, or if it discriminates among its working and nonworking members as suggested by the model presented above. As stated in Gertler (2000), PROGRESA combines the two strategies by relaxing budget constraints with the nutritional and educational cash transfers, but using the nutritional transfer as an incentive to increase take-up rates in the direct provision of free health care and nutrition interventions.

Gertler also acknowledges that the combination of strategies implemented by PROGRESA creates the possibility of large complementarities. In fact he shows that the utilization of public health clinics increased faster in PROGRESA villages than in control areas, while the utilization of public hospitals fell, which he considers consistent with the hypothesis that PROGRESA's incentives for preventive care and nutrition improved health and lowered the incidence of severe illness. Moreover, he shows that there was no reduction in the utilization of private providers, which leads him to suggest that the increase in utilization at public clinics was not substituting public care for private care.

In this section I analyze the effect of PROGRESA on health. First, I follow Gertler (2000)

[9] Skoufias (2005) presents simulation-based and econometric-based results suggesting that PROGRESA's cash transfers have reduced the number of people below the poverty line by 10-17%. Furthermore, Hoddinott, Skoufias and Washburn (2000) show that consumption of beneficiary households is around 14.5% higher, one year and a half after the start of the program.

and Gertler and Boyce (2001) and show the total impact of PROGRESA–i.e. the program as a black-box–on health. Then, I analyze two specific components of the program's black-box: The effect of the health-conditional and health-unconditional transfers on health. Results show that while the total effect of PROGRESA positively improves the health status of children 0-5 and adults–mothers included–, the additional available income of the households is used to improve the health of potential income earners only. Children and their mothers do not benefit from the additional health inputs the households can afford as a result of participation in the program, despite the fact that transfers are given to the mothers.[10]

5.1 Total effect of PROGRESA on health

Analyzing PROGRESA as a black-box–i.e., as the whole package it is–Gertler (2000) and Gertler and Boyce (2001) find a significant improvement in the health of PROGRESA beneficiaries, both children and adults. Specifically, they detect that PROGRESA children between 0 and 5 years of age have a lower incidence of illness than nonPROGRESA children.[11] They shows as well that PROGRESA adults (18-50) have fewer days of difficulty to perform daily tasks due to illness than nonPROGRESA individuals, and are able to walk more without getting tired; also that PROGRESA beneficiary household members over 50, have fewer days of difficulty with daily activities, spend fewer days incapacitated and fewer days in bed, and are able to walk more than nonbeneficiaries.

Gertler and Gertler and Boyce use in their analysis individuals as the units of information. Since the data sets were designed to be matched at higher levels of aggregation, I conduct my analysis at the household level. Additionally, Gertler and Gertler and Boyce divide individuals in the following groups: children 0-2, 3-5 and 6-17 years old, adults 18-50, and 50+ years old. Furthermore, they do not analyze whether PROGRESA effects differ by gender or between the head of the household and its spouse, as is suggested in the health and nutrition literature.[12] In my analysis, I focus on children 0-5, 6-12 and 13-17 years old, and on adults 18-64 and 65+ years old, and pay attention to differing effects by gender and between the head of the household and its spouse. Hence, in order facilitate the comparison of our results, I run the following closed form

[10] In general, all the transfers are received by the female head of the households. The exception is for scholarships for children in upper-secondary school (children around 13-17 years old), which can be received by the children themselves.

[11] Furthermore, Gertler (2000) also finds that the addition of income as a control variable in his regressions, does not alter this result. This finding leads him to suggest that PROGRESA's impact on child health is not directly through the cash transfers. This conjecture gets confirmed below.

[12] Behrman and Deolalikar (1988) argue, for instance, that in the case of food price increases children or women in the household may face the burden of price increases, while adult males might be relatively protected.

regression used by both Gertler (2000) and Gertler and Boyce (2001) in their analysis, but with my sample:[13]

$$h_{jivt} = \alpha_0 + \alpha_1 Treatment_v + \sum_{r \in R} \alpha_2^r x_{ivt} + e_i + u_{ivt} \qquad (12)$$

where h_{ijvt} refers to the sickness (health) status of the group of members or member j in household i in village v at time t, $Treatment_v$ is a dummy variable indicating whether village v is a treatment locality, the x_{ivt}'s are household controls, e_i is a household's random effect, and u_{ivt} is an idiosyncratic disturbance.

In the case of children 0-5 years old, the dependent variable is the proportion of children that were reported to have been sick by their mothers during the four weeks prior to the survey within a household. In the case of children 6 years old and up and adults there are three dependent variables: Number of days with difficulty to perform daily tasks, number of days unable to perform daily activities, and number of days spent in bed due to illness. Finally, in the case of adults, there is an additional dependent variable: Number of kilometers a member is able to walk without getting tired. As control variables, Gertler and Gertler and Boyce use the age, gender and education level of the individuals. Since my analysis is at the household level, I use instead the average age of each specific group of members within a household, the proportion of male household members within each group and the highest educational level of the household.

Results of estimating equation (12) using random effects and robust standard errors clustered at the village-year level for children 0-5 dividing the sample into girls and boys are presented in Table 3; for girls and boys 6-12 and 13-17 in Table 4; for the spouse of the head of the household, the head, adults and older members in Tables 5 and 6. As expected, the results coincide with Gertler and Gertler and Boyce's ones.[14] In particular, PROGRESA, is shown to have a positive total

[13] For children 0-5 Gertler estimates a difference-in-difference model. Since the data that I use below does not allow me to use such estimators, I use this alternate specification for children 0-5 as well. The sign of the results are the same, but the coefficients of the difference-in-difference estimates are greater in absolute terms.

[14] As them, I find that PROGRESA has a positive impact improving the health status of children 0-5 and no effect on the health status of children 6-17. As for this latter group of children I divide the sample into two age groups (6-12 and 13-17) and by sex, I find that apparently the health of girls 13-17 years old worsens as a result of the program. Girls in this age group provide a great deal of help to their mothers performing household chores (Parker and Skoufias, 2000) and, as shown in Table 2, households in PROGRESA villages have significantly less girls aged 13-17 than households in control localities. Thus, the fact that domestic work is divided between less members in households living in treatment villages than in households in control villages, may be the cause of poorer health for girls 13-17 living in treatment villages, not the program per se. Finally, as Gertler and Gertler an Boyce divide their adult sample into adults 18-50 and 50+ years old, they find that the health status of both groups improves as a result of the program. The magnitude of the effect on adults 18-50 is relatively small and moderate for adults 50+ years old. In my case the sample is divided into adults 18-64 and 64+ years old. The results show that the magnitude of the impact of PROGRESA on the health level of adults 18-64 is also small and not significantly different from zero, but quite big and significant at the 1% level for adults 65+ years old. This implies that adults aged 51-64 are relatively healthier that adults 18-50 and adults 65+, in particular. This is not surprising taking into account that adults 18-50 must work more intensely–and thus compromise their health level–than adults 51-64 and, in turn,

effect decreasing the proportion of sick children (boys and girls) 0-5 years old. PROGRESA, as a whole, also has a positive impact on the health status of the spouse of the head of the household. Participation in the program reduces the number of days mothers present difficulty to perform daily tasks and the number of days they are unable to perform daily activities. Furthermore, PROGRESA increases the number of kilometers they are able to walk without getting tired. These results mean that PROGRESA, as a whole, has been successful in accomplishing its stated goal of improving the health status of children and their mothers.

Next, I stop analyzing PROGRESA as a black-box. Instead, I turn to analyze the impact of the monetary cash transfers on health. That is, I study how changes in the available income–and, presumably, in the quantity and quality of the health inputs a household can afford–of beneficiary households due to the program's health-conditional and health-unconditional transfers, affect the health status of the different household members.

5.2 Effect of PROGRESA's cash transfers on health

5.2.1 Empirical strategy

According to demand equations (8) a household that does not receive transfers will choose the health level of each of its members depending on the prices of health inputs, p_x, nonhealth related goods, p_y, and on its available income, W_i, which, in turn, will vary according to the household's assets or nonlabor income a_i, the market wage, w, and the number of working household members, m_i^n. Demand equations (11), show, on the other hand, that if a household receives transfers, its choice of health level for its members will additionally be influenced by the transfers, $T\left(m_i^s, d_i, s_i\right)$. However, these transfers, which depend on the demographic structure of the household, m_i^s, and on the household members' visits to the health center, d_i, and school attendance, s_i, will, by themselves, affect the available income of the household, W_i. Hence, the health level of the individuals can be expressed as a function of household characteristics, which are the only exogenous variables in the model:

$$health_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \sum_{s \in S} \beta_3^s m_{ivt}^s, \tag{13}$$

where $S = \{\text{children ages 8-12, girls ages 13-17, boys ages 13-17}\}$. That is, the health output of member j of household i, in village v at time t is a linear function of the household's assets or

this latter group must be healthier than adults 65+ simply due to age considerations. Hence, depending on where the line between prime-age adults and older members is drawn, the results increase (decrease) in magnitude and significance level.

nonlabor income, a_{ivt}, the household's size, m_{ivt}, the number of children in it between the ages 8-12, m_{ivt}^{8-12}, the number of girls 13-17, $m_{ivt}^{girls\ 13\text{-}17}$, and of boys 13-17, $m_{ivt}^{boys\ 13\text{-}17}$.

To test the effect of the two types of transfers, the health-conditional and the health-unconditional one, on the health outcome of the different household members, I base my regression specification on the reduced form equation (13). While the decision to comply with PROGRESA's conditions is endogenous to the households, it is reasonable to assume that their demographic structure by the time PROGRESA began is not. Thus, in order to capture the effect of the PROGRESA transfers, I simply compare the health outcome of individual members of households living in PROGRESA villages with the health outcome of individual members of households living in control villages. That is, I run the following regression using OLS with robust standard errors:

$$\begin{aligned} health_{jivt} &= \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \sum_{s \in S} \beta_3^s m_{ivt}^s + X_{ivt}\beta_4 \\ &\quad + \left(\beta_5 a_{ivt} + \beta_6 m_{ivt} + \sum_{s \in S} \beta_7^s m_{ivt}^s + X_{ivt}\beta_9 \right) * PROGRESA_v \\ &\quad + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}. \end{aligned} \tag{14}$$

I use the amount of land a household owns or uses as a proxy for the household's assets or nonlabor income, and include the age of the head of the household and the maximum educational level by anyone in the household as control variables, in response to the differences found in the descriptive statistics between households living in treatment and control villages. I further include household, village, time, and village-time fixed effects, δ_i, γ_v, μ_t, η_{vt}, respectively. ε_{ivt} is a household specific term independent of the other regressors.

The effect of the health-conditional cash transfers is estimated in equation (14) using the size of the household, m_{ivt}, as a proxy for the transfers the beneficiary families may get if all the household members attend the health clinics for check-ups. Assuming it is equally costly to take any member to health clinics, larger households will find it more difficult to comply with the program's health check-ups requirement. Also, the larger a household is, the smaller the fix-sized monetary transfer becomes in per capita terms. Hence, the first coefficient of interest, β_6, is expected to show a negative impact on health, reflecting the effect of the health-conditional transfers.

The effect of the health-unconditional cash transfers, on the other hand, is estimated in equation (14) using the number of children in school age in the household as a proxy for the educational grants. Thus, the rest of the coefficients of interest, β_7^{8-12}, $\beta_7^{girls13-17}$, and $\beta_7^{boys13-17}$ will capture its magnitude. It has been argued that the transfers received by boys are likely to be used to substitute forgone labor or forgone wages. As such, these transfers are not expected to increase the available income of the households. Hence, they are expected to have no effect on the health status of the household members $\left(\beta_7^{boys13-17} = 0\right)$.

On the other hand, transfers received by children 8-12 and girls 13-17 are basically additional money to the households previous available income. Nevertheless, the size of the transfers received by 8-12 years olds is rather small in comparison to that of 13-17 years old girls (see Table 1). Thus, it is reasonable to expect that β_7^{8-12} will reflect zero or maybe a slightly positive effect on the health level of all household members in whom the household chooses to invest its additional resources. Accordingly, $\beta_7^{girls13-17}$ is expected to reflect a positive impact on the health status of this select group of household members.

The model developed in Section 2 specifies that a household will invest a greater share of its additional resources on either its nonworking or its working members. The results below show that condition (10) holds in rural Mexico. That is, households choose to invest their additional resources on members working in the market. Children 0-5 and their mothers, the principal target of PROGRESA, fail to receive any health benefits from the monetary health-unconditional cash transfers of the program.

5.2.2 Results

5.2.2.1 Children 0-5 years old Results of regression (14) for children 0-5 years old are reported in Table 7. In this case, the dependent variables used are the proportion of all children, girls, and boys reported to have been sick during last four weeks. Hence, a negative sign in any of the estimates coefficients is interpreted as a positive effect on health.

As shown above, PROGRESA, as a whole package, has a positive impact in reducing the probability of having a child sick (Table 3). In contrast, looking at the effect of the health-conditional and health-unconditional transfers, it is obvious that they do not affect in a positive manner the children's health.[15] As expected, the health-conditional transfers have a negative effect on the health level of these members: the proportion of all children and boys falling ill during the previous four weeks, columns (1) and (3), increases with the transfers. Furthermore, the health-unconditional transfers received by children aged 8-12 seem to raise the proportion of girls falling sick, column (2).

Nevertheless, it may be the case that rather than capturing the effect of the health-unconditional

[15] This finding ratifies Gertler's (2000) conjecture that PROGRESA's impact on child health is not achieved through the cash transfers.

transfers, the coefficient associated with the number of children 8-12 interacted with PROGRESA, is simply reflecting the effect of having siblings 8-12 years old attending school as a result of participation in the program. Being in contact with many other children at school–some of them sick–may cause the siblings to come back home bringing unwanted germs, bacteria, and viruses which, ultimately, may affect the health status of the youngest and more vulnerable household members.

5.2.2.2 Children 6-12 and 13-17 years old The results of running regression (14) for girls and boys aged 6-12 and 13-17 are shown in Table 8. For these household members, the surveys contain information on the number of days they reported to have difficulties to perform their daily activities, to be unable to perform daily activities and to have been forced to spend the day in bed, due to illness. Thus, again, a negative coefficient sign gets interpreted as a positive impact on health.

In line with the findings of Gertler (2000) and Gertler and Boyce (2001), my results for this group of household members show that the unconditional transfers do not have any effect on their health status. Gertler argues that this is not surprising since this is generally a healthy group to start with. Looking at Table 2, this seems to be a reasonable assumption. First, with the exception of girls 13-17 who appear to be healthier in control villages, there are no statistical differences between children in PROGRESA villages, who are required to receive health care, and children in control localities, who are not required to receive health care (and most probably do not receive any). Second, children of these ages have difficulties to perform their daily tasks due to illness around 0.1 days per month, are unable to perform their daily duties around 0.8 days month, and spend about 0.05 days in bed (see Table 2). In contrast these figures for the average head of the household in a PROGRESA village are: 0.9, 0.74, and 0.48, respectively.

With respect to the health-conditional transfers, it is interesting to see that, contrary to what is expected from these type of transfers, they seem to diminish the days a girl 13-17 years old has difficulties to perform her daily tasks, column (3). Nevertheless, the coefficient is statistically significant only for this dependent variable. When the number of days unable to conduct daily activities due to illness (column (7)), or the number of days spent in bed (column (11)) are used instead as dependent variables for this group of girls, the coefficients do not turn out to be significantly different from zero.

5.2.2.3 Spouse, head, adults and older members Table 9 shows the results of running equation (14) for the spouse of the head of the household, the head of the household itself, all the adults (18-64 years old) in the household and older household members (65+ years old), using as dependent variables the self-reported normal activity measures: number of days an individual had difficulties to perform daily tasks due to illness, number of days an individual was unable to perform daily tasks due to illness, and number of days an individual spent in bed due to illness during the previous month. As usual, a negative coefficient is interpreted as a positive impact on health.

As Table 9 shows, the health-conditional cash transfers of PROGRESA, do not seem to have an impact on the sickness level of these individuals, with the exception of the number of days older members are unable to perform their daily tasks, column (8). In this specific case, the sign of the coefficient is, as expected, positive; i.e., the health-conditional transfers deteriorate the health level of these individuals.

The interesting feature of these results, is the fact that the money that girls between 13 and 17 years old are receiving from the program does seem to have, a positive impact on improving the health of adults and household head's. The health status of both types of members improves when the illness measures considered are the number of days with difficulties to perform daily tasks (columns (2) and (3), respectively) and the number of days unable to perform daily tasks (columns (6) and (7), respectively). The health-unconditional transfers received by girls 13-17 also have an effect in reducing the number of days the head spends in bed due to illness, column (10). Furthermore, the magnitude of the effects is big if we compare it to the unconditional means reported in Table 2. For the head they represent reductions of 63%, 76%, and 84%, respectively; for the adults of 77% and 69%.

In contrast to these findings, when analyzing the total effect of the program (Table 5) it was shown that PROGRESA has a positive impact reducing the health problems of mothers and older household members. The total effects of the program on the health status of the head and adults, in general, are negligible. Hence, so far evidence suggests that the requisites imposed to the families of visiting health clinics regularly is actually benefiting the program's target family members: children 0-5 and their mothers. Instead, the allocation of the additional health inputs the households can afford thanks to PROGRESA's monetary cash transfers seem to be biased towards potential income earners: Adults and, particularly, the head of the household. This action, is being reflected by an improvement in the health level of these members.

5.2.3 Robustness checks

5.2.3.1 A "true" health measure An important and distinctive feature of health is that it has many dimensions. Furthermore, many health indicators are measured with error that is systematically related to the demand for health, labor supply and other socioeconomic characteristics. However, the extent and nature of errors vary from measure to measure. Therefore, it is recommended, if possible, to use multiple health indicators whenever the health status of an individual is being analyzed, and to be careful interpreting the empirical relationships found (Strauss and Thomas, 1998).

Self-reported normal activity health measures have the problem that what is understood as "normal" daily tasks most probably will differ among individuals. Thus, while the "normal" activities of an individual are pretty light, they can be quite heavy for another one. In addition, individuals with a high opportunity cost of time will have less incentives to miss activities due to illness. That is, these type of individuals will appear to be in *better* health than individuals with a lower value of time. On the other hand, it can be the case that better educated or wealthier individuals, report their children or themselves as being in *worse* health due to their better knowledge or greater exposure to health services (Strauss and Thomas, 1998).[16] While the net impact is not clear, the relationship between these types of indicators and "true" health can be expected to be rather noisy. In a way, each of these measures is the summary of two events: (i) the member felt sick and (ii) the member decided that it was difficult for her to perform her daily tasks, or that she was unable to perform them, or even that it was better to stay in bed.

The head or the adults of a wealthy household may be able to loose one day of work or work with less intensity without any major consequence. Poor households whose consumption depends on whether the head is able to bring money back at the end of the day, may not be able to skip a day of work or may decide to have difficulties to work when their health level is in a much worse state than when a wealthy head decides so.

Fortunately, the data set contains information on another health variable, a self-reported physical functioning measure. The survey asked the individuals to report the maximum number of kilometers they could walk without getting tired. However, this question was asked only to household members aged 18 and older. This type of health measure is more precisely defined than "normal" activities. Hence, the measurement error problems discussed above are less likely to

[16] However, in all estimation results shown so far, Tables 3-9, the higher the level of education in the household the better the level of health of the individuals–at least in all the cases where the coefficient related to education is significant.

appear in it. Unfortunately, most of the limitations captured by this measure are normally due to physical health problems such as shortness of breath, joint problems, back problems, etc. (Stewart et al., 1978). As in general, prime-age adults do not have these kind of problems, this health measure may not be very useful.[17]

Table 10 presents the results of running regression (14) using the self-reported physical functioning measure: the maximum number of kilometers an individual can walk without getting tired. In this case, a positive coefficient is associated with an improvement in health status. Using this health measure, as was expected, the effect of the grants received by girls disappears.

5.2.3.2 One-sided test While it is true that the unconditional transfers received by girls 13-17 years old seem to have a positive impact on the health status of adults and the head in particular, it is also true that the unconditional transfers received by children 8-12 years old, and perhaps even boys 13-17 could have a positive impact. Nevertheless, although the coefficients of these latter explanatory variables are not significantly different from zero, they do seem to change sign somewhat arbitrarily from one regression to another in Tables 8 and 9.

Hence, in order to check that overall, all coefficients of interest (i.e., all coefficients representing unconditional-health transfers), are negative for all the regressions presented in Tables 8 and 9, I perform the following one-sided test:

$$H_0 : \beta = 0 \text{ versus } H_1 : \beta \leq 0$$

where β is the (12×1) vector of coefficients of β_7^{8-12}, $\beta_7^{girls13-17}$, and $\beta_7^{boys13-17}$ of each regression of girls 6-12, boys 6-12, girls 13-17, boys 13-17–in the case of children–, and spouse, head, adults, and older members–in the case of adults–, for the set of regressions using as dependent variables the the number of days with difficulty to perform daily tasks due to illness, the number of days unable to perform daily tasks due to illness, and the number of days spent in bed due to illness.

Given that conventional two-sided multivariate tests are not designed to test these null hypotheses, I follow Gouriéroux, Holly, and Monfort (1982) and simulate 10,000 replicas of β, the vector of true coefficients. Using these true coefficient vectors, I compute the following weighted-averaged Chi-Square statistic, which gives me the critical values against which to compare the Chi-Square

[17] As an example, according to the data reported in Table 2, the head of the household is able to walk 63% more kilometers than an older member in treatment villages, and 57% more in control ones. Thus, it is hard to expect to find a positive impact of the unconditional-transfers on this variable. On the other hand, Table 6 shows that PROGRESA, as a whole, increases the number of kilometers the spouse, head and adults can walk without getting tired. The program does not have a significant effect for older members.

statistic given by the coefficients of my regressions:

$$\sum_{i=0}^{12} \omega\,(12, i)\,\chi^2(i).$$

In order to construct the weights, $\omega\,(\cdot,\cdot)$, I followed the methodology detailed in Wolak (1987). Table 11 shows the 10%, 5%, and 1% critical values of the simulated weighted-averged Chi-Square statistic for each set of regressions for children 6-17 and adults using the dependent variables specified on the left column, along with the Chi-Square statistic of my regressions.

What Table 11 tells us is that the null hypothesis for each set of regressions in the case of children cannot be rejected. That is, it cannot be proved that the coefficients of the health-unconditional transfers are jointly different from zero. On the other hand, in the case of the regressions for adults, the null hypothesis gets rejected at the 5% level when the dependent variables are the number of days the spouse, head, adults and older members had difficulties or were unable to perform daily tasks for due to illness, and at the 10% level when the dependent variable is the health measure in number of days spent in bed. That is, the coefficients of the health-unconditional transfers are jointly negative in the case of adults for each of the three health measures used, at least at the 10% level.

With this latter result, it is possible to conclude that indeed the health-unconditional transfers help to improve the health status of the adult members of the household, whereas they do nothing to improve the health status of children 6-12.

5.2.4 Are the benefits of the unconditional grants biased towards potential income earners?

The results presented so far seem to confirm that condition (10) actually holds in rural Mexico; i.e., there seems to be a bias towards potential income earners of the impact of the unconditional health transfers received by the household. In particular, of transfers that are a new influx of money to the household: The transfers received by girls 13-17 years old. In order to explore this idea further, I divide the sample into potential and nonpotential income earners and run the regressions specified in (14) for these two new groups of household members.

Before going into details on how I divide the sample, I follow Parker and Skoufias (2000) and present in Figures 5 and 6 the proportion of women and men, aged 18 and higher who declared to work in the market at baseline considering all eligible households, and the proportion of women and men in control villages who declared to work at home or in the market in 1999. The figures confirm the trends that started to develop in the figures that presented the case of children. Only around 20% of women participate in market activities while around 90% of men do. These percentages switch when domestic labor, instead of market labor, is considered.

Thus, given that the decision on whether or not to work or go to school is endogenous to the household, I build two different potential-nonpotential income earners samples trying to avoid this endogeneity problem. For the first division, I consider as potential income earners for the period under study–1999–, all male individuals between 13 and 64 years old at baseline (1997) that declared to be working. All the rest of the sample is considered nonpotential income earner. For the second division, I consider only male members who are between 15 and 64 years old in each of the two survey rounds used, as potential income earners, independently of what they are were doing then or in 1997. All the rest of the sample is considered nonpotential income earners. Considering only men as potential income earners seems to be a reasonable assumption given that it is basically them the only ones that work in the market, and hence, perceive a wage.

Results of running regression 14 using these two new samples are presented in Table 12 for the baseline-based division and in Table 13 for the age-based division. The results are practically identical. The unconditional transfers received by girls 13-17 years old significantly improve the level of health for the three variables considered, in the case of potential income earners (columns (2), (4) and (6) in each table). However, they do nothing to nonpotential income earners (columns (1), (3) and (5) in each table). No other transfer has an impact on the health variables of these household members. Hence, the empirical evidence in rural Mexico implies that given the household's marginal utility of income and the prevailing market wage rate, households find it optimal to allocate a greater share of the additional health inputs they can afford as a result of participation in PROGRESA towards working members than towards nonworking members.

6 Conclusion

Conditional Cash Transfer programs have become quite popular, in part, due to the short-run success that PROGRESA has shown to have. Nevertheless, given the complexity of the programs it has been hard to disentangle which components work and which ones do not. In particular, there is an ongoing debate regarding whether conditioning the delivery of cash transfers is key to the success of the program or not.

Recent papers have tried to study the problem focusing on the educational component of the programs. That is, on whether conditioning the delivery of monetary cash transfers increases school enrollment, attendance and/or school entry more than simple unconditional cash transfers would do. So far, all the evidence points in that direction. Without conditioning, children would not enroll, attend and/or entry school as much as they do thanks to the current program's requirements. With respect to health and nutrition, however, there is much less evidence on whether conditioning cash transfer improves the desired impacts of the programs or not.

This paper attempts to fill-in this gap answering the following question: Is it relevant for a program like PROGRESA to condition the delivery of its benefits on certain behavior by the households? Using the fact that PROGRESA gives transfers to children conditional on their school attendance–but independent of whether the household attends regular health check-ups–and transfers conditional on all members in the household attending health clinics for preventive health care, I analyze the effect of the cash transfers on the health status of all household members. My findings show that the new money the households are getting is channeled mainly to improve the health status of potential income earners: in particular the head of the household. None of this additional money helps to reduce illness of children, mothers, or older household members. These results contrast with previous impact evaluations of PROGRESA, as a whole package, on the health status of the household. In particular, Gertler (2000) and Gertler and Boyce (2001) find that the program successfully accomplishes one of its stated goals: improve the health status of children 0-5 years old and their mothers.

My interpretation of the difference between the results of Gertler and Gertler and Boyce and mine is that conditioning is key in order for PROGRESA to achieve its goal of fighting the intergenerational transmission of poverty through investment in human capital of children. If PROGRESA were a simple cash transfer program, giving the same amounts of cash as it is giving now, households would not invest this money on their children's health. The transfers would go to potential income earners in order to satisfy short-term objectives of the parents. The reason why Gertler and Gertler and Boyce find that the health of children and their mothers is improving is because the households are given nutritional supplements for these members and are required to take them to receive health care in order to get part of their bimonthly transfers.

My results are in line with evidence found in the United States in the sense of conditional transfers being more effective than cash transfers in bringing health improvements to children (Currie, 1995; Mayer, 1997). However, they contradict the two main findings of Duflo (2003). Duflo studies the impact of a large cash transfer program in South Africa on children's nutritional status and investigates whether the gender of the recipient affects that impact. She finds that transfers received by women had a large impact of the nutritional status of girls, but not on that of boys. On the other hand, she did not detect any effect on either girls or boys when the transfers were received by men. My results suggest that in rural Mexico, cash transfers are not used to improve the health of children even if mothers or young girls are the recipients of them. As explained by Duflo herself, a possible explanation for the difference in findings are nonlinearities in the effect of cash transfers. While cash transfers given in South Africa represent around twice the median per capita income in rural areas (Duflo, 2003), in rural Mexico average PROGRESA cash transfers represent only 19.5% of the mean value of consumption of eligible households in control localities (Skoufias, 2005). In this sense, my results could be more easily generalized than hers as cash transfer programs are usually not as big as the South African one she analyzes.

Nevertheless, two important remarks are in order. First, while my results suggest that benefits from the cash transfers are not reaching children even though the transfers are received by the mothers, this does not imply that the transfers are not being used to buy more food and, especially, more nutritious one. Adato, de la Brière, Mindek and Quisumbing (2000) present anecdotal evidence of this being the case. Furthermore, Hoddinott, Skoufias and Washburn (2000) have shown that as a result of the program, not only has the level of consumption of the households increased, but also their nutritional intake. My results just reflect the fact that these nutritional improvements are biased against children and their mothers within the households. As such, the results of this paper may simply be reflecting that either Mexican parents are myopic and do not understand the benefits of investing in the health of their children or that their objective function is not aligned with their children's welfare.

This latter observation leads to the second remark. It may be the case that parents do care a great deal about the health of their children. But, as a result of the nonmonetary benefits of the program towards children and their mothers, they feel that these members have no need of any additional resources. In fact there is evidence that food programs targeted to children and pregnant and lactating women tend to result in considerable offsets in the food available to such individuals from the household (Behrman and Deolalikar, 1988). Nevertheless, in the case of PROGRESA, Adato, Coady and Ruel (2000) report as a serious problem the "widely admitted" sharing of the supplements given to children and pregnant and lactating women. That is, not even the targeted health inputs given by the program are reaching the intended recipients as they should. This casts some doubts about the parents priorities with respect to the households' health and nutritional status. The authors hypothesize that the leak may be towards other children in the household, but the results of this paper suggest a different direction. Undoubtedly, more research is due in order to correctly assess the preferences of parents towards their children's health and nutrition in rural Mexico.

References

Adato, M., D. Coady, and M. Ruel (2000), "An Operations Evaluation of PROGRESA from the Perspective of Beneficiaries, *Promotoras*, School Directors, and Health Staff," August, International Food Policy Research Institute, Washington, D.C.

Adato, M., B. de la Brière, D. Mindek, and A. Quisumbing (2000), "The Impact of PROGRESA on Women's Status and Intrahousehold Relations," July, International Food Policy Research Institute, Washington, D.C.

Barker, D. J. P. (1990), "The Fetal and Infant Origins of Adult Disease," in *British Medical Journal*, 301.

Behrman, J. R., and A. B. Deolalikar (1987), "Will Developing Country Nutrition Improve with Income? A Case Study for Rural South India," in *Journal of Political Economy*, 95.

Behrman, J. R., and A. B. Deolalikar (1988),"Health and Nutrition," in *Handbook of Development Economics*, Volume 1, North Holland, eds. H. Chenery and T. N. Srinivasan.

Behrman, J. R., A. D. Foster, and M. R. Rosenzweig (1997), "The Dynamics of Agricultural Production and the Calorie-Income Relationship: Evidence from Pakistan," in *Journal of Econometrics*, 77.

Bouis, H. E. (1994), "The Effect of Income on Demand for Food in Poor Countries: Are Our Food Consumption Databases Giving Us Reliable Estimates?," in *Journal of Development Economics*, 44.

Bouis, H. E., and L. J. Haddad (1992), "Are Estimates of Calorie-Income Elasticities Too High? A Recalibration of the Plausible Range," in *Journal of Development Economics*, 39.

Bourguignon, F., F. Ferreira, and P. Leite (2003), "Conditional Cash Transfers, Schooling, and Child Labor: Micro-Simulating Brazil's Bolsa Escola Program," in *World Bank Economic Review*,17.

Currie, J. (1995), *Welfare and the Well-Being of Children*; *Fundamentals of Pure and Applied Economics 59*, Harwood Academic Press, Chur, Switzerland.

de Brauw, A., and J. Hoddinott (2007), "Must Conditional Cash Transfer Programs be conditioned to be effective? The impact of conditioning transfers on school enrollment in Mexico," Preliminary Draft, International Food Policy Research Institute, Washington, D.C.

de Janvry, A., and E. Sadoulet (2006), "When to use a CCT versus a CT approach?," Presentation at the Third International Conference on Conditional Cash Transfers, Istanbul, Turkey, June 26-30.

de Janvry, A., E. Sadoulet, P. Solomon, and R. Vakis (2006), "Uninsured risk and asset protection: Can conditional cash transfer programs serve as safety nets?," The World Bank, Social Protection Working Paper.

Duflo, E. (2003), "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa," in *World Bank Economic Review*, 17.

Gertler, P. (2000), "Final Report: The Impact of PROGRESA on Health," November, International Food Policy Research Institute, Washington, D.C.

Gertler, P., and S. Boyce (2001), "An Experiment in Incentive-Based Welfare: The Impact of PROGRESA on Health in Mexico," Haas School of Business, University of California, Berkeley.

Gouriéroux, C., A. Holly, and A. Monfort (1982), "Likelihood Ratio Test, Wald Test, and Kuhn-Tucker Test in Linear Models with Inequality Constraints on the Regression Parameters," in *Econometrica,* 50.

Haas, J., S. Murdoch, J. Rivera, and R. Martorell (1996), "Early Nutrition and Later Physical Work Capacity," in *Nutrition Reviews*, 54.

Hoddinott, J., E. Skoufias and R. Washburn (2000), "The Impact of PROGRESA on Consumption: A Final Report," September, International Food Policy Research Institute, Washington, D.C.

Jamison, D. T. (1986), "Child Malnutrition and School Performance in China," in *Journal of Development Economics*, 20.

Kakwani, N., F. Veras, and H. Son (2005), *Conditional Cash Transfers in African Countries*, Working Paper No. 9, International Poverty Center, UNDP.

Levy, S. (2006), *Progress against poverty: sustaining Mexico's Progresa-Oportunidades program*, Brookings Institution Press, Washington, D.C.

Matorell, R. (1999), "The Nature of Child Malnutrition and its Long-Term Implications," in *Food and Nutrition Bulletin*, 20.

Matorell R., J. Rivera, and H. Kaplowitz (1989), "Consequences of Stunting in Early Childhood for Adult Body Size in Rural Guatemala," Stanford University, Food Research Institute, Stanford, California.

Mayer, S. E. (1997), *What Money Can't Buy: Family Income and Children's Life Chances*, Harvard University Press, Cambridge, Massachusetts.

Mook, P. R., and J. Leslie (1986), "Childhood Malnutrition and Schooling in the Terai Region of Nepal," in *Journal of Development Economics*, 20.

Parker, S. W., L. Rubalcava, and G. Teruel (2007), "Evaluating Conditional Schooling and Health Programs," forthcoming in *Handbook of Development Economics*, Volume 4, North Holland, eds. T. P. Schultz and J. Strauss.

Parker S. W., and E. Skoufias (2000), "Final Report the Impact of PROGRESA on Work, Leisure, and Time Allocation," October, International Food Policy Research Institute, Washington, D.C.

Pitt, M. M., M. R. Rosenzweig, and Md. N. Hassan (1990), "Productivity, Health, and Inequality in the Intrahousehold Distribution of Food in Low-Income Countries," in *American Economic Review*, 80.

Rosenzweig, M. R., and T. P. Schultz (1982), "Market Opportunities, Genetic Endowments, and Intrafamily Resource Distribution: Child Survival in Rural India," in *American Economic Review*, 72.

Schady, N., and M. C. Araujo (2006), "Cash Transfers, conditions, school enrollment, and child work: Evidence from a randomized experiment in Ecuador," World Bank Policy Research Working Paper No. 3930.

Skoufias, E. (2005), "PROGRESA and its Impacts on the Human Capital and Welfare of Households in Rural Mexico," Research Report No. 139, International Food Policy Research Institute, Washington, D.C.

Stewart, A. et al. (1978), *Conceptualization and measurement of health status for adults in the Health Insurance Study:* Vol. II. *Physical health in terms of functioning.* R-1987/2-HEW, RAND, Santa Monica, CA.

Strauss, J., and D. Thomas (1998), "Health, Nutrition, and Economic Development," in *Journal of Economic Literature*, 36.

Subramanian, S., and A. Deaton (1996), "The Demand for Food and Calories," in *Journal of Political Economy*, 104.

Teruel, G., and L. Rubalcava (2007), "Attrition in PROGRESA," mimeo.

Todd, P., and K. Wolpin (2003), "Using a Social Experiment to Validate a Dynamic Behavioral Model of Child Schooling and Fertility: Assessing the Impact of a School Subsidy Program in Mexico," Unpublished manuscript, University of Pennsylvania.

Wolak, Frank A. (1987), "An Exact Test for Multiple Inequality and Equality Constraints in the Linear Regression Model," in *Journal of the American Statistical Association*, 82.

Table 1: Descriptive statistics by treatment status

(Nominal Mexican Pesos[a])

	1998		1999		2000	
	January - June	July - December	January - June	July - December	January - June	July - December
Consumption grant per household						
(conditional on attending scheduled visits to health centers)						
Cash transfer	95.00	105.00	115.00	125.00	130.00	135.00
Educational grant per child						
(conditional on child enrollment and regular school attendance)						
Primary level						
Third grade	65.00	70.00	75.00	80.00	85.00	90.00
Fourth grade	75.00	80.00	90.00	95.00	100.00	105.00
Fifth grade	95.00	105.00	115.00	125.00	130.00	135.00
Sixth grade	130.00	135.00	150.00	165.00	170.00	180.00
Secondary level						
Male						
First grade	185.00	200.00	220.00	240.00	250.00	260.00
Second grade	195.00	210.00	235.00	250.00	265.00	275.00
Third grade	205.00	225.00	245.00	265.00	280.00	290.00
Female						
First grade	195.00	210.00	235.00	250.00	265.00	275.00
Second grade	220.00	235.00	260.00	280.00	295.00	305.00
Third grade	240.00	255.00	285.00	305.00	320.00	335.00
Grants for school materials per child						
Primary level						
Beginning of school year	does not apply	90.00	does not apply	110.00	does not apply	120.00
Middle of school year	45.00	does not apply	55.00	does not apply	60.00	does not apply
Secondary level						
Beginning of school year	does not apply	170.00	does not apply	205.00	does not apply	225.00
Maximum grant per household						
Cash transfer	585.00	630.00	695.00	750.00	780.00	820.00

[a] Approximately, MX$10.00 = US$1.00.
Source: www.oportunidades.gob.mx

Table 2: Descriptive statistics by treatment status

	Treatment			Control			
	N	Mean	St. Dev.	N	Mean	St. Dev.	**t-stat**
			A. Dependet variables				
Proportion of children 0-5 years old sick							
All	12,372	0.22	0.386	7,944	0.24	0.399	-2.261**
Girls	7,740	0.21	0.395	4,956	0.23	0.408	-1.875*
Boys	8,049	0.21	0.398	5,103	0.23	0.412	-2.022**
Number of days with difficulty to perform daily tasks due to illness							
Girls 6-12 years old	7,094	0.10	1.301	4,654	0.07	0.824	1.419
Boys 6-12 years old	7,563	0.10	1.322	4,802	0.07	0.963	1.308
Girls 13-17 years old	4,545	0.13	1.578	3,247	0.07	0.944	1.756*
Boys 13-17 years old	5,056	0.09	1.282	3,306	0.11	1.429	-0.782
Adults	15,154	0.40	2.211	10,128	0.47	2.369	-2.312**
Spouse	15,166	0.59	3.646	10,188	0.72	4.060	-2.192**
Head	15,532	0.90	4.595	10,429	1.09	5.072	-1.789*
Older members	3,321	3.16	8.150	2,413	3.80	8.869	-2.384**
Number of days unable to perform daily tasks due to illness							
Girls 6-12 years old	7,093	0.08	1.230	4,654	0.06	0.878	1.316
Boys 6-12 years old	7,560	0.08	1.200	4,801	0.09	1.249	-0.378
Girls 13-17 years old	4,543	0.11	1.480	3,247	0.05	0.769	2.194**
Boys 13-17 years old	5,055	0.09	1.362	3,305	0.09	1.381	-0.213
Adults	15,149	0.33	2.013	10,126	0.40	2.154	-2.421**
Spouse	15,161	0.49	3.312	10,185	0.61	3.721	-2.818***
Head	15,527	0.74	4.137	10,426	0.94	4.697	-2.107**
Older members	3,321	2.71	7.562	2,412	3.31	8.322	-2.456**
Number of days spent in bed due to illness							
Girls 6-12 years old	7,090	0.05	0.797	4,652	0.04	0.737	0.408
Boys 6-12 years old	7,556	0.05	1.015	4,799	0.05	0.840	0.397
Girls 13-17 years old	4,542	0.06	1.059	3,246	0.05	0.899	0.661
Boys 13-17 years old	5,053	0.05	0.944	3,303	0.06	1.038	-0.552
Adults	15,148	0.23	1.638	10,120	0.26	1.628	-1.931*
Spouse	15,160	0.33	2.694	10,180	0.41	2.988	-2.369**
Head	15,524	0.48	3.330	10,419	0.62	3.783	-1.073
Older members	3,320	1.83	6.291	2,410	2.33	7.037	-2.410**
Number of kilometers able to walk without getting tired							
Adults	15,161	5.81	8.023	10,128	5.28	6.508	2.193**
Spouse	14,828	4.85	8.858	9,916	4.41	7.657	2.011**
Head	15,544	5.82	9.013	10,427	5.40	8.050	2.632***
Older members	3,317	3.57	11.934	2,412	3.42	11.757	0.431
			B. Independet variables				
Plot size (in hectares)	21,807	1.49	3.719	14,307	1.43	2.853	0.474
Household size	21,825	5.66	2.477	14,310	5.69	2.538	-0.308
Number of children aged 8-12	21,825	0.98	1.003	14,310	0.96	0.992	0.709
Number of girls 13-17	21,825	0.36	0.632	14,310	0.39	0.638	-1.712*
Number of boys 13-17	21,825	0.41	0.658	14,310	0.40	0.645	0.764
Age of the head	21,813	45.92	15.537	14,302	46.65	15.846	-1.492
Household's highest education level	20,105	6.40	2.355	13,227	6.27	2.429	1.268

Note: T-stat of difference in means computed clustering at the village level. Differences significant at the *10%, **5%, or ***1% level.
Source: Own calculations using data from the ENCEL surveys.

Table 3: Effects of PROGRESA, as a whole, on the sickness of children 0 to 5 years old (Gertler-type regressions)

$$h_{jivt} = \alpha_0 + \alpha_1 Treatment_v + \Sigma_r \alpha_{2r} x_{ivt} + e_i + u_{ivt}$$

	Dependent variable: Proportion of children 0 to 5 years that fell sick last month		
	All children (1)	Girls (2)	Boys (3)
Treatment	-0.022**	-0.023**	-0.019*
	(0.009)	(0.01)	(0.01)
Mean age of children 0-5	-0.028***		
living in the household	(0.002)		
Mean age of girls 0-5		-0.023***	
living in the household		(0.003)	
Mean age of boys 0-5			-0.028***
living in the household			(0.003)
Proportion of male children 0-5	0.001	-0.057***	0.058***
living in the household	(0.007)	(0.015)	(0.014)
Household's highest	0.002	0.002	0.000
education level	(0.001)	(0.002)	(0.002)
Constant	0.306***	0.296***	0.268***
	(0.014)	(0.015)	(0.018)
Number of observations	19,565	12,258	12,659

Note: Robust standard errors clustered at the village-year level in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level.
Source: Own calculations using data from the ENCEL surveys.

Table 4: Effects of PROGRESA, as a whole, on the sickness of children 6 to 17 years old (Gertler-type regressions)

$$h_{jivt} = \alpha_0 + \alpha_1 Treatment_v + \Sigma_r \alpha_{2r} x_{ivt} + e_i + u_{ivt}$$

	Dependent variable:											
	Number of days with difficulty to perform daily tasks due to illness by:				Number of days unable to perform daily tasks due to illness by:				Number of days spent in bed due to illness by:			
	Girls 6-12	Boys 6-12	Girls 13-17	Boys 13-17	Girls 6-12	Boys 6-12	Girls 13-17	Boys 13-17	Girls 6-12	Boys 6-12	Girls 13-17	Boys 13-17
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	0.026	0.030	0.059**	-0.025	0.023	-0.009	0.065**	-0.006	0.007	0.007	0.019	-0.011
	(0.02)	(0.023)	(0.029)	(0.031)	(0.02)	(0.023)	(0.026)	(0.031)	(0.017)	(0.017)	(0.023)	(0.022)
Mean age of girls 6-12	0.008				0.002				0.007			
living in the household	(0.006)				(0.006)				(0.005)			
Mean age of boys 6-12		-0.006				-0.009				0.000		
living in the household		(0.006)				(0.006)				(0.004)		
Mean age of girls 13-17			-0.011				-0.005				0.012	
living in the household			(0.013)				(0.011)				(0.009)	
Mean age of boys 13-17				-0.002				-0.005				-0.008
living in the household				(0.013)				(0.013)				(0.009)
Proportion of male children 6-12	-0.046	0.036			-0.043	0.039			-0.033	0.042		
living in the household	(0.037)	(0.041)			(0.039)	(0.042)			(0.032)	(0.03)		
Proportion of male children 13-17			-0.073	0.023			-0.098**	0.007			-0.064	-0.019
living in the household			(0.059)	(0.058)			(0.049)	(0.061)			(0.04)	(0.045)
Household's highest	-0.005	-0.002	-0.001	-0.01*	-0.006	-0.001	-0.013*	-0.013**	-0.004	0.000	-0.007	-0.006
education level	(0.004)	(0.005)	(0.007)	(0.006)	(0.004)	(0.004)	(0.008)	(0.006)	(0.004)	(0.003)	(0.005)	(0.004)
Constant	0.051	0.116	0.260	0.204	0.094	0.149*	0.234	0.254	0.016	0.016	-0.060	0.241
	(0.064)	(0.073)	(0.185)	(0.206)	(0.067)	(0.079)	(0.191)	(0.218)	(0.047)	(0.056)	(0.14)	(0.172)
Number of observations	11,701	12,335	7,764	8,351	11,700	12,331	7,762	8,349	11,696	12,325	7,760	8,345

Note: Robust standard errors clustered at the village-year level in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level.
Source: Own calculations using data from the ENCEL surveys.

Table 5: Effects of PROGRESA, as a whole, on the sickness of adults (Gertler-type regressions)

$$h_{jivt} = \alpha_0 + \alpha_1 Treatment_v + \Sigma_r \alpha_{2r} x_{ivt} + e_i + u_{ivt}$$

	Dependent variable: Number of days with difficulty to perform daily tasks due to illness by:				Number of days unable to perform daily tasks due to illness by:				Number of days spent in bed due to illness by:			
	Spouse (1)	Head (2)	Adults (3)	Old (4)	Spouse (5)	Head (6)	Adults (7)	Old (8)	Spouse (9)	Head (10)	Adults (11)	Old (12)
Treatment	-0.116**	-0.145	-0.039	-0.831***	-0.106**	-0.179***	-0.044	-0.83***	-0.067	-0.098	-0.010	-0.606***
	(0.056)	(0.075)	(0.037)	(0.302)	(0.05)	(0.064)	(0.033)	(0.277)	(0.039)	(0.051)	(0.024)	(0.227)
Spouse's age	0.044***				0.04***				0.027***			
	(0.003)				(0.003)				(0.003)			
Head's age		0.061***				0.052***				0.036***		
		(0.004)				(0.003)				(0.003)		
Mean age of adults living in the household			0.019***				0.016***				0.011***	
			(0.002)				(0.002)				(0.001)	
Mean age of old members living in the household				0.255***				0.254***				0.193***
				(0.023)				(0.022)				(0.02)
Spouse's sex	0.239**				0.295***				0.156**			
	(0.095)				(0.097)				(0.074)			
Head's sex		-0.212				-0.105				-0.183		
		(0.143)				(0.132)				(0.113)		
Proportion of male adults living in the household			0.053				0.146				0.026	
			(0.106)				(0.098)				(0.075)	
Proportion of male old members living in the household				-0.066				0.096				0.069
				(0.288)				(0.272)				(0.236)
Household's highest education level	-0.023	-0.059***	-0.005	-0.103**	-0.016	-0.034***	-0.004	-0.032	-0.011	-0.018	-0.002	-0.006
	(0.012)	(0.015)	(0.007)	(0.048)	(0.011)	(0.013)	(0.006)	(0.043)	(0.009)	(0.011)	(0.005)	(0.04)
Constant	-0.947***	-1.319***	-0.254***	-14.48***	-0.939***	-1.282***	-0.263***	-15.368***	-0.632***	-0.845***	-0.166***	-11.931***
	(0.134)	(0.203)	(0.095)	(1.696)	(0.13)	(0.187)	(0.091)	(1.63)	(0.106)	(0.154)	(0.063)	(1.431)
Number of observations	23,735	23,835	23,921	4,434	23,728	23,827	23,915	4,433	23,722	23,819	23,909	4,430

Note: Robust standard errors clustered at the village-year level in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level.
Source: Own calculations using data from the ENCEL surveys.

Table 6: Effects of PROGRESA, as a whole, on the health of adults (Gertler-type regressions)

$$h_{jivt} = \alpha_0 + \alpha_1 Treatment_v + \Sigma_r \alpha_{2r} x_{ivt} + e_i + u_{ivt}$$

	Dependent variable: Number of kilometers able to walk without getting tired by:			
	Spouse (1)	Head (2)	Adults (3)	Old (4)
Treatment	0.437**	0.362*	0.504**	0.221
	(0.212)	(0.211)	(0.206)	(0.43)
Spouse's age	-0.043***			
	(0.005)			
Head's age		-0.066***		
		(0.005)		
Mean age of adults living in the household			-0.05***	
			(0.007)	
Mean age of old members living in the household				-0.008
				(0.032)
Spouse's sex	1.629***			
	(0.297)			
Head's sex		1.122***		
		(0.229)		
Proportion of male adults living in the household			1.067***	
			(0.289)	
Proportion of male old members living in the household				0.75*
				(0.435)
Household's highest education level	-0.064**	-0.061**	-0.056**	0.061
	(0.027)	(0.025)	(0.026)	(0.07)
Constant	6.511***	7.957***	6.994***	3.360
	(0.34)	(0.421)	(0.445)	(2.442)
Number of observations	23,138	23,844	23,926	4,435

Note: Robust standard errors clustered at the village-year level in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level.
Source: Own calculations using data from the ENCEL surveys.

Table 7: Health-conditional and unconditional cash transfer effects of PROGRESA on the sickness of children 0 to 5 years old

$$h_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \Sigma_s \beta_{3s} m_{sivt} + \beta_4 x_{ivt}$$
$$+ (\beta_5 a_{ivt} + \beta_6 m_{ivt} + \Sigma_s \beta_{7s} m_{sivt} + \beta_8 x_{ivt}) * Treatment_v + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}$$

	Dependent variable: Proportion of children 0 to 5 years that fell sick last month		
	All children (1)	Girls (2)	Boys (3)
Plot size	-0.003	-0.004	0.000
	(0.003)	(0.004)	(0.004)
* Treatment	0.003	0.009**	-0.003
	(0.004)	(0.004)	(0.005)
Household size	-0.017**	-0.014	-0.012
	(0.008)	(0.013)	(0.011)
* Treatment	0.022**	0.003	0.032**
	(0.011)	(0.017)	(0.015)
Number of children	-0.008	-0.033	-0.010
aged 8-12	(0.017)	(0.024)	(0.023)
* Treatment	0.022	0.071**	0.003
	(0.021)	(0.03)	(0.029)
Number of girls	0.008	0.005	-0.010
aged 13-17	(0.023)	(0.033)	(0.032)
* Treatment	0.009	-0.012	0.037
	(0.029)	(0.041)	(0.04)
Number of boys	-0.005	0.047	-0.045
aged 13-17	(0.025)	(0.034)	(0.034)
* Treatment	0.049	0.011	0.049
	(0.031)	(0.043)	(0.042)
Age of the head	-0.004*	-0.002	-0.006*
of the household	(0.002)	(0.003)	(0.003)
* Treatment	0.001	-0.001	0.004
	(0.003)	(0.004)	(0.004)
Household's highest	-0.008	-0.025**	-0.002
education level	(0.008)	(0.011)	(0.011)
* Treatment	-0.004	0.016	-0.013
	(0.01)	(0.014)	(0.014)
Constant	0.455***	0.488***	0.412***
	(0.065)	(0.099)	(0.093)
Number of observations	19,546	12,251	12,644
R^2	0.52	0.55	0.56

Note: Robust standard errors in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level. Included in the regression, but not reported, are year and village-year dummies
Source: Own calculations using data from the ENCEL surveys.

Table 8: Health-conditional and unconditional cash transfer effects of PROGRESA on the sickness of children 6 to 17 years old

$$h_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \Sigma_s \beta_{3s} m_{sivt} + \beta_4 x_{ivt} + (\beta_5 a_{ivt} + \beta_6 m_{ivt} + \Sigma_s \beta_{7s} m_{sivt} + \beta_8 x_{ivt}) * Treatment_v + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}$$

	Dependent variable:											
	Number of days with difficulty to perform daily tasks due to illness by:				Number of days unable to perform daily tasks due to illness by:				Number of days spent in bed due to illness by:			
	Girls 6-12	Boys 6-12	Girls 13-17	Boys 13-17	Girls 6-12	Boys 6-12	Girls 13-17	Boys 13-17	Girls 6-12	Boys 6-12	Girls 13-17	Boys 13-17
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plot size	0.000	-0.006	0.003	0.002	0.004	0.002	0.003	0.003	0.004	0.001	0.006	-0.006
	(0.003)	(0.01)	(0.009)	(0.012)	(0.005)	(0.01)	(0.009)	(0.011)	(0.004)	(0.009)	(0.017)	(0.005)
* Treatment	0.023**	0.010	0.003	-0.006	0.012	-0.003	-0.005	-0.006	0.004	-0.008	-0.004	0.001
	(0.009)	(0.011)	(0.014)	(0.012)	(0.008)	(0.011)	(0.014)	(0.012)	(0.005)	(0.011)	(0.02)	(0.007)
Household size	0.016	-0.009	0.001	0.006	-0.010	-0.011	0.001	0.005	0.005	0.007	-0.023	0.025
	(0.024)	(0.029)	(0.03)	(0.071)	(0.028)	(0.035)	(0.029)	(0.065)	(0.013)	(0.027)	(0.035)	(0.045)
* Treatment	-0.052	0.009	-0.115*	-0.030	0.008	0.018	-0.009	0.020	-0.017	0.021	0.011	0.010
	(0.037)	(0.055)	(0.06)	(0.09)	(0.039)	(0.059)	(0.044)	(0.075)	(0.025)	(0.039)	(0.044)	(0.053)
Number of children	0.069	0.063	0.035	0.199	-0.071	-0.069	0.022	0.082	-0.037	-0.007	0.076	0.026
aged 8-12	(0.067)	(0.062)	(0.08)	(0.15)	(0.082)	(0.077)	(0.073)	(0.091)	(0.036)	(0.03)	(0.111)	(0.062)
* Treatment	-0.109	-0.019	0.042	-0.306	0.028	0.064	-0.078	-0.238	0.026	0.052	-0.064	-0.067
	(0.089)	(0.078)	(0.111)	(0.195)	(0.104)	(0.096)	(0.103)	(0.151)	(0.052)	(0.052)	(0.12)	(0.082)
Number of girls	0.006	0.004	-0.019	-0.060	-0.030	-0.065	-0.005	-0.039	0.037	-0.020	-0.040	-0.033
aged 13-17	(0.052)	(0.058)	(0.11)	(0.151)	(0.056)	(0.052)	(0.104)	(0.127)	(0.043)	(0.034)	(0.112)	(0.12)
* Treatment	-0.051	-0.081	0.156	-0.037	0.014	-0.071	-0.056	0.037	-0.065	-0.016	0.173	0.017
	(0.103)	(0.095)	(0.22)	(0.202)	(0.092)	(0.096)	(0.221)	(0.157)	(0.061)	(0.052)	(0.163)	(0.134)
Number of boys	0.008	0.026	-0.127	0.140	-0.078	0.008	-0.111	0.062	-0.008	-0.025	-0.042	0.016
aged 13-17	(0.069)	(0.064)	(0.09)	(0.102)	(0.074)	(0.088)	(0.078)	(0.069)	(0.045)	(0.047)	(0.057)	(0.051)
* Treatment	-0.045	0.015	-0.014	-0.118	0.010	0.013	-0.025	-0.123	-0.052	0.006	-0.050	-0.001
	(0.11)	(0.089)	(0.203)	(0.143)	(0.116)	(0.105)	(0.181)	(0.155)	(0.085)	(0.069)	(0.143)	(0.09)
Age of the head	0.011	0.007	-0.007	0.02*	0.006	0.005	-0.005	0.012	-0.002	0.008	0.001	0.006
of the household	(0.01)	(0.013)	(0.006)	(0.012)	(0.011)	(0.013)	(0.004)	(0.008)	(0.005)	(0.013)	(0.003)	(0.007)
* Treatment	0.018	-0.007	0.005	-0.015	0.031	-0.002	0.013	-0.010	0.032	-0.007	0.003	-0.001
	(0.027)	(0.014)	(0.008)	(0.019)	(0.029)	(0.014)	(0.009)	(0.016)	(0.026)	(0.013)	(0.005)	(0.015)
Household's highest	0.002	-0.013	0.073	-0.063	0.011	0.024	0.073	-0.055	-0.007	0.000	0.074	-0.066
education level	(0.026)	(0.023)	(0.049)	(0.045)	(0.016)	(0.02)	(0.048)	(0.044)	(0.012)	(0.016)	(0.049)	(0.041)
* Treatment	0.016	-0.019	-0.163**	0.088	0.029	-0.045	-0.161**	0.086	0.043	-0.021	-0.102*	0.083
	(0.052)	(0.043)	(0.075)	(0.06)	(0.032)	(0.033)	(0.079)	(0.06)	(0.027)	(0.029)	(0.058)	(0.058)
Constant	-0.826	0.061	0.829*	-0.335	-1.012	0.044	0.301	-0.155	-0.737	-0.203	-0.140	-0.255
	(0.657)	(0.307)	(0.457)	(0.693)	(0.688)	(0.281)	(0.302)	(0.588)	(0.616)	(0.233)	(0.212)	(0.54)
Number of observations	11,693	12,327	7,760	8,345	11,692	12,323	7,758	8,343	11,688	12,317	7,756	8,339
R^2	0.56	0.63	0.66	0.60	0.57	0.59	0.65	0.60	0.63	0.62	0.63	0.56

Note: Robust standard errors in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level. Included in the regression, but not reported, are year and village-year dummies.
Source: Own calculations using data from the ENCEL surveys.

Table 9: Health-conditional and unconditional cash transfer effects of PROGRESA on the sickness of adults

$$h_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \Sigma_s \beta_{3s} m_{sivt} + \beta_4 x_{ivt} + (\beta_5 a_{ivt} + \beta_6 m_{ivt} + \Sigma_s \beta_{7s} m_{sivt} + \beta_8 x_{ivt}) * Treatment_v + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}$$

	Dependent variable:											
	Number of days with difficulty to perform daily tasks due to illness by:				Number of days unable to perform daily tasks due to illness by:				Number of days spent in bed due to illness by:			
	Spouse	Head	Adults	Old	Spouse	Head	Adults	Old	Spouse	Head	Adults	Old
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plot size	0.043	0.085**	0.026*	0.125	0.046	0.074*	0.027**	0.113	0.040	0.072*	0.024*	0.151
	(0.033)	(0.042)	(0.015)	(0.153)	(0.031)	(0.041)	(0.013)	(0.141)	(0.029)	(0.038)	(0.014)	(0.107)
* Treatment	-0.036	-0.057	-0.026*	-0.020	-0.039	-0.054	-0.028**	-0.019	-0.037	-0.069*	-0.028*	-0.168
	(0.034)	(0.048)	(0.016)	(0.179)	(0.032)	(0.047)	(0.014)	(0.169)	(0.03)	(0.04)	(0.015)	(0.127)
Household size	0.017	-0.053	-0.049	-0.293	-0.001	-0.030	-0.043	-0.300	-0.022	-0.057	-0.034	-0.360
	(0.084)	(0.097)	(0.037)	(0.376)	(0.075)	(0.087)	(0.034)	(0.35)	(0.067)	(0.076)	(0.029)	(0.295)
* Treatment	-0.015	0.074	0.028	0.853	-0.059	0.033	0.007	0.926*	0.055	0.095	0.020	0.704
	(0.109)	(0.126)	(0.054)	(0.575)	(0.095)	(0.112)	(0.047)	(0.55)	(0.087)	(0.099)	(0.043)	(0.46)
Number of children	-0.134	0.035	-0.059	1.230	-0.075	-0.027	-0.042	1.512	-0.109	0.078	-0.016	1.278
aged 8-12	(0.19)	(0.193)	(0.111)	(0.985)	(0.153)	(0.174)	(0.086)	(0.93)	(0.124)	(0.156)	(0.074)	(0.838)
* Treatment	0.098	-0.147	0.002	-0.168	0.153	-0.101	0.047	-0.863	0.205	-0.124	0.064	-0.417
	(0.226)	(0.247)	(0.141)	(1.333)	(0.185)	(0.217)	(0.112)	(1.304)	(0.154)	(0.194)	(0.095)	(1.117)
Number of girls	-0.119	0.170	0.098	-0.580	-0.055	0.028	0.049	-0.846	-0.100	0.127	-0.002	-0.317
aged 13-17	(0.179)	(0.252)	(0.116)	(1.233)	(0.146)	(0.231)	(0.097)	(1.192)	(0.145)	(0.195)	(0.091)	(1.053)
* Treatment	-0.046	-0.568*	-0.303**	-0.840	-0.053	-0.56**	-0.225*	-1.563	0.015	-0.409*	-0.079	-2.102
	(0.215)	(0.31)	(0.15)	(1.771)	(0.183)	(0.283)	(0.129)	(1.71)	(0.173)	(0.228)	(0.114)	(1.454)
Number of boys	-0.101	-0.113	-0.055	0.447	-0.145	-0.005	-0.060	1.012	-0.020	-0.026	-0.006	0.567
aged 13-17	(0.235)	(0.291)	(0.145)	(1.556)	(0.186)	(0.241)	(0.115)	(1.467)	(0.163)	(0.207)	(0.103)	(1.184)
* Treatment	0.265	0.298	0.168	-0.770	0.350	0.109	0.129	-1.211	0.153	0.157	0.105	-0.093
	(0.284)	(0.372)	(0.183)	(2.016)	(0.233)	(0.31)	(0.15)	(1.894)	(0.212)	(0.267)	(0.139)	(1.535)
Age of the head	0.029*	0.054	0.018*	-0.160	0.023*	0.066**	0.014*	-0.130	0.013	0.035	0.008	-0.188
of the household	(0.017)	(0.035)	(0.009)	(0.168)	(0.014)	(0.032)	(0.008)	(0.168)	(0.01)	(0.024)	(0.005)	(0.162)
* Treatment	-0.004	-0.098**	-0.018	0.119	-0.002	-0.132***	-0.016	0.108	-0.001	-0.066**	-0.006	0.159
	(0.023)	(0.049)	(0.016)	(0.184)	(0.02)	(0.045)	(0.016)	(0.185)	(0.014)	(0.03)	(0.008)	(0.174)
Household's highest	0.058	0.052	0.044	0.435	0.030	0.041	0.035	0.423	0.015	0.015	0.028	0.419
education level	(0.054)	(0.064)	(0.032)	(0.326)	(0.044)	(0.058)	(0.027)	(0.31)	(0.035)	(0.047)	(0.023)	(0.263)
* Treatment	-0.067	-0.093	-0.089*	-0.981**	-0.020	-0.009	-0.057	-0.756*	-0.045	-0.022	-0.084*	-0.748**
	(0.08)	(0.09)	(0.052)	(0.46)	(0.065)	(0.08)	(0.046)	(0.419)	(0.055)	(0.063)	(0.046)	(0.371)
Constant	-0.763	1.079	0.392	7.760	-0.495	1.216	0.412	5.161	-0.308	0.583	0.255	7.014
	(0.609)	(1.215)	(0.429)	(5.569)	(0.538)	(1.116)	(0.422)	(5.575)	(0.406)	(0.741)	(0.263)	(5.199)
Number of observations	23,724	23,826	23,903	4,446	23,717	23,818	23,897	4,445	23,711	23,810	23,891	4,442
R^2	0.61	0.64	0.59	0.72	0.62	0.64	0.60	0.72	0.60	0.63	0.58	0.70

Note: Robust standard errors in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level. Included in the regression, but not reported, are year and village-year dummies.

Source: Own calculations using data from the ENCEL surveys.

Table 10: Health-conditional and unconditional cash transfer effects of PROGRESA on the health of adults

$$h_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \Sigma_s \beta_{3s} m_{sivt} + \beta_4 x_{ivt}$$
$$+ (\beta_5 a_{ivt} + \beta_6 m_{ivt} + \Sigma_s \beta_{7s} m_{sivt} + \beta_8 x_{ivt}) * Treatment_v + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}$$

	Dependent variable: Number of kilometers able to walk without getting tired by:			
	Spouse (1)	Head (2)	Adults (3)	Old (4)
Plot size	-0.024	0.032	0.030	-0.156
	(0.052)	(0.04)	(0.031)	(0.195)
* Treatment	0.012	-0.054	-0.044	-0.130
	(0.057)	(0.053)	(0.039)	(0.23)
Household size	0.021	-0.036	0.251**	0.321
	(0.147)	(0.179)	(0.116)	(0.557)
* Treatment	0.075	0.140	-0.017	-0.407
	(0.233)	(0.248)	(0.197)	(0.815)
Number of children	-0.159	-0.257	-0.390	0.790
aged 8-12	(0.415)	(0.426)	(0.264)	(2.438)
* Treatment	-0.624	-0.227	-0.281	1.499
	(0.603)	(0.588)	(0.448)	(3.002)
Number of girls	-0.156	-0.191	-0.335	-2.595
aged 13-17	(0.377)	(0.457)	(0.301)	(1.862)
* Treatment	-0.126	-0.405	-0.462	1.006
	(0.593)	(0.732)	(0.504)	(3.019)
Number of boys	0.178	-0.097	-0.215	-0.570
aged 13-17	(0.415)	(0.46)	(0.296)	(2.422)
* Treatment	-0.162	-0.358	0.125	-1.677
	(0.625)	(0.664)	(0.487)	(3.787)
Age of the head	-0.025	-0.071	-0.033	0.368*
of the household	(0.041)	(0.08)	(0.034)	(0.203)
* Treatment	0.036	0.131	0.059	-0.525**
	(0.053)	(0.102)	(0.046)	(0.255)
Household's highest	0.150	0.127	0.078	-0.170
education level	(0.138)	(0.125)	(0.125)	(0.399)
* Treatment	-0.196	-0.169	0.013	0.119
	(0.178)	(0.168)	(0.174)	(0.53)
Constant	5.591***	6.428***	5.104***	0.737
	(1.468)	(2.436)	(1.248)	(8.312)
Number of observations	23,128	23,835	23,908	4,440
R^2	0.55	0.58	0.56	0.67

Note: Robust standard errors in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level. Included in the regression, but not reported, are year and village-year dummies.
Source: Own calculations using data from the ENCEL surveys.

Table 11: One-sided tests
H_0: $R\beta = 0$ versus H_1: $R\beta$? 0

Set of regressions in the test	**Simulated weighted-averaged Chi-Square** 90th percentile	95th percentile	99th percentile	**Regressions' Chi-Square**
Children 6-17 years old				
Number of days with difficulty to perform daily tasks due to illness	10.121	11.825	16.112	6.051
Number of days unable to perform daily tasks due to illness	10.109	11.809	16.064	6.305
Number of days spent in bed due to illness	10.109	11.808	16.085	8.077
Adults				
Number of days with difficulty to perform daily tasks due to illness	10.132	11.861	16.116	12.516
Number of days unable to perform daily tasks due to illness	10.143	11.872	16.120	14.467
Number of days spent in bed due to illness	10.141	11.876	16.126	10.617

Source: Own calculations using data from the ENCEL surveys.

Table 12: Health-conditional and unconditional cash transfer effects of PROGRESA on potential and nonpotential workers according to baseline survey

$$h_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \Sigma_s \beta_{3s} m_{sivt} + \beta_4 x_{ivt} + (\beta_5 a_{ivt} + \beta_6 m_{ivt} + \Sigma_s \beta_{7s} m_{sivt} + \beta_8 x_{ivt}) * Treatment_v + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}$$

	Dependent variable:					
	Number of days with difficulty to perform daily tasks due to illness by:		Number of days unable to unable to perform daily tasks due to illness by:		Number of days spent in bed due to illness by:	
	NPW	PW	NPW	PW	NPW	PW
	(1)	(2)	(3)	(4)	(5)	(6)
Plot size	0.025	0.047	0.032	0.052*	0.041	0.05*
	(0.031)	(0.031)	(0.031)	(0.03)	(0.029)	(0.03)
* Treatment	-0.016	-0.046	-0.028	-0.055*	-0.044	-0.049
	(0.032)	(0.033)	(0.031)	(0.032)	(0.029)	(0.031)
Household size	-0.011	-0.031	-0.031	-0.020	-0.029	-0.025
	(0.039)	(0.065)	(0.038)	(0.055)	(0.034)	(0.045)
* Treatment	0.024	0.030	0.038	0.016	0.044	0.056
	(0.05)	(0.089)	(0.046)	(0.078)	(0.04)	(0.069)
Number of children	-0.013	0.042	-0.030	0.012	-0.014	0.065
aged 8-12	(0.08)	(0.143)	(0.062)	(0.13)	(0.057)	(0.104)
* Treatment	0.008	-0.141	0.050	-0.071	0.098	-0.102
	(0.099)	(0.182)	(0.083)	(0.162)	(0.072)	(0.129)
Number of girls	-0.093	0.229	-0.092	0.177	-0.105	0.180
aged 13-17	(0.093)	(0.17)	(0.084)	(0.163)	(0.084)	(0.146)
* Treatment	0.009	-0.562**	0.006	-0.552***	0.088	-0.397**
	(0.117)	(0.226)	(0.105)	(0.214)	(0.097)	(0.177)
Number of boys	-0.073	0.037	-0.044	-0.038	-0.005	-0.125
aged 13-17	(0.11)	(0.202)	(0.093)	(0.186)	(0.08)	(0.171)
* Treatment	0.015	0.224	0.021	0.293	0.044	0.319
	(0.151)	(0.268)	(0.135)	(0.233)	(0.107)	(0.208)
Age of the head	0.021**	0.013	0.02**	0.008	0.016**	-0.006
of the household	(0.01)	(0.018)	(0.009)	(0.017)	(0.007)	(0.011)
* Treatment	-0.018	-0.023	-0.018	-0.018	-0.007	-0.004
	(0.018)	(0.021)	(0.017)	(0.021)	(0.012)	(0.015)
Household's highest	-0.023	0.038	-0.010	0.037	-0.023	0.024
education level	(0.034)	(0.042)	(0.031)	(0.038)	(0.026)	(0.028)
* Treatment	-0.019	-0.046	-0.002	-0.022	0.001	-0.043
	(0.054)	(0.065)	(0.046)	(0.059)	(0.038)	(0.055)
Constant	0.234	0.450	0.088	0.425	-0.209	0.464
	(0.474)	(0.547)	(0.454)	(0.533)	(0.303)	(0.446)
Number of observations	23,689	20,713	23,684	20,707	23,679	20,699
R^2	0.66	0.61	0.66	0.61	0.64	0.64

Note: Robust standard errors in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level. Included in the regression, but not reported, are year and village-year dummies.
Source: Own calculations using data from the ENCEL surveys.

Table 13: Health-conditional and unconditional cash transfer effects of PROGRESA on potential and nonpotential workers according to age at each survey round

$$h_{jivt} = \beta_0 + \beta_1 a_{ivt} + \beta_2 m_{ivt} + \Sigma_s \beta_{3s} m_{sivt} + \beta_4 x_{ivt}$$
$$+ (\beta_5 a_{ivt} + \beta_6 m_{ivt} + \Sigma_s \beta_{7s} m_{sivt} + \beta_8 x_{ivt}) * Treatment_v + \delta_i + \gamma_v + \mu_t + \eta_{vt} + \varepsilon_{ivt}$$

	Dependent variable:					
	Number of days with difficulty to perform daily tasks due to illness by:		Number of days unable to unable to perform daily tasks due to illness by:		Number of days spent in bed due to illness by:	
	NPW	PW	NPW	PW	NPW	PW
	(1)	(2)	(3)	(4)	(5)	(6)
Plot size	0.022	0.037	0.026	0.046	0.036*	0.041
	(0.024)	(0.032)	(0.023)	(0.03)	(0.021)	(0.031)
* Treatment	-0.012	-0.038	-0.021	-0.051	-0.042**	-0.047
	(0.025)	(0.033)	(0.025)	(0.031)	(0.021)	(0.031)
Household size	0.038	-0.100	0.015	-0.070	0.014	-0.063
	(0.038)	(0.064)	(0.037)	(0.056)	(0.031)	(0.047)
* Treatment	-0.031	0.077	0.009	0.038	0.029	0.060
	(0.052)	(0.088)	(0.05)	(0.079)	(0.039)	(0.072)
Number of children	-0.014	0.115	-0.057	0.058	-0.025	0.119
aged 8-12	(0.078)	(0.142)	(0.069)	(0.121)	(0.059)	(0.114)
* Treatment	0.037	-0.166	0.062	-0.097	0.067	-0.135
	(0.096)	(0.186)	(0.088)	(0.159)	(0.071)	(0.141)
Number of girls	-0.161	0.208	-0.162*	0.162	-0.125	0.166
aged 13-17	(0.106)	(0.166)	(0.087)	(0.157)	(0.083)	(0.149)
* Treatment	0.088	-0.501**	0.072	-0.500**	0.078	-0.365**
	(0.133)	(0.221)	(0.114)	(0.209)	(0.101)	(0.181)
Number of boys	-0.171	0.063	-0.114	0.054	-0.115	0.008
aged 13-17	(0.117)	(0.239)	(0.093)	(0.192)	(0.08)	(0.183)
* Treatment	0.150	0.135	0.103	0.088	0.131	0.140
	(0.153)	(0.296)	(0.13)	(0.243)	(0.098)	(0.23)
Age of the head	0.020	0.010	0.019	0.006	0.009	-0.001
of the household	(0.014)	(0.014)	(0.014)	(0.014)	(0.01)	(0.01)
* Treatment	-0.013	-0.032	-0.012	-0.029	-0.001	-0.008
	(0.018)	(0.023)	(0.018)	(0.024)	(0.014)	(0.015)
Household's highest	-0.017	0.055	0.001	0.048	-0.021	0.037
education level	(0.041)	(0.045)	(0.039)	(0.042)	(0.032)	(0.034)
* Treatment	-0.037	-0.083	-0.025	-0.031	-0.019	-0.061
	(0.056)	(0.071)	(0.051)	(0.062)	(0.04)	(0.06)
Constant	0.039	1.071*	-0.171	0.998	-0.120	0.568
	(0.458)	(0.61)	(0.434)	(0.614)	(0.343)	(0.444)
Number of observations	21,574	21,904	21,571	21,898	21,564	21,889
R^2	0.67	0.63	0.68	0.63	0.66	0.63

Note: Robust standard errors in parenthesis. Each individual coefficient is statistically significant at the *10%, **5%, or ***1% level. Included in the regression, but not reported, are year and village-year dummies.
Source: Own calculations using data from the ENCEL surveys.

Figure 1: School enrollment and labor force participation at baseline of girls 8-17 years old

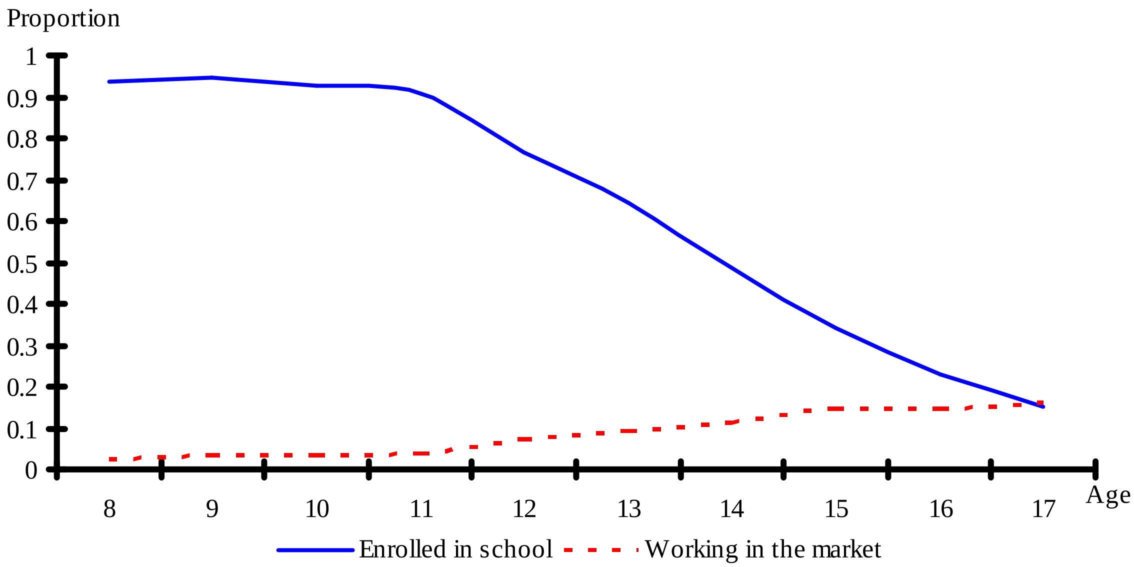

Figure 2: School enrollment and labor force participation at baseline of boys 8-17 years old

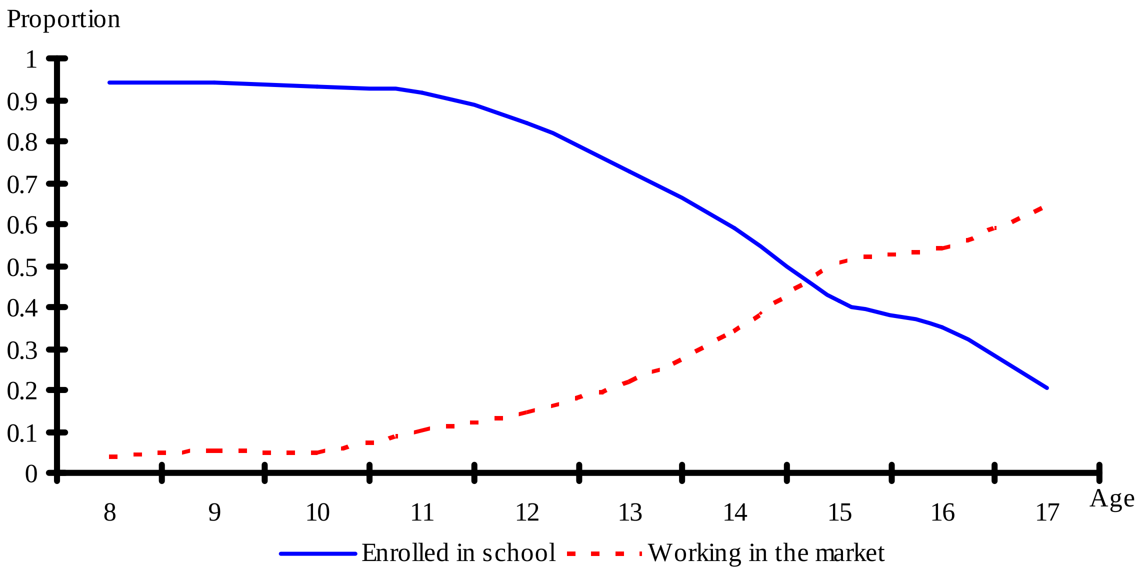

Figure 3: School enrollment and labor force participation of girls 8-17 years old living in control villages in 1999

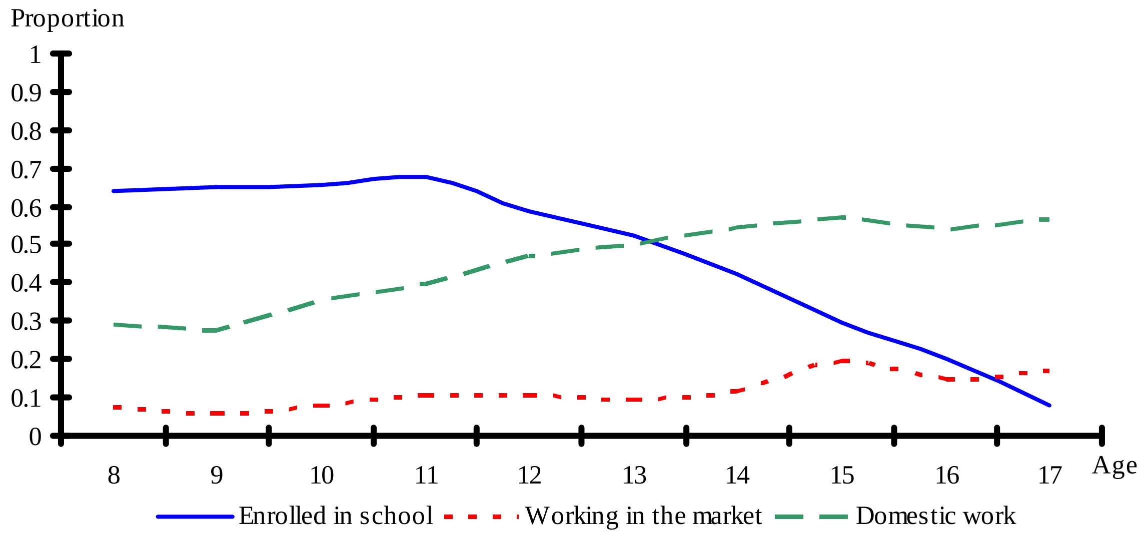

Figure 4: School enrollment and labor force participation of boys 8-17 years old living in control villages in 1999

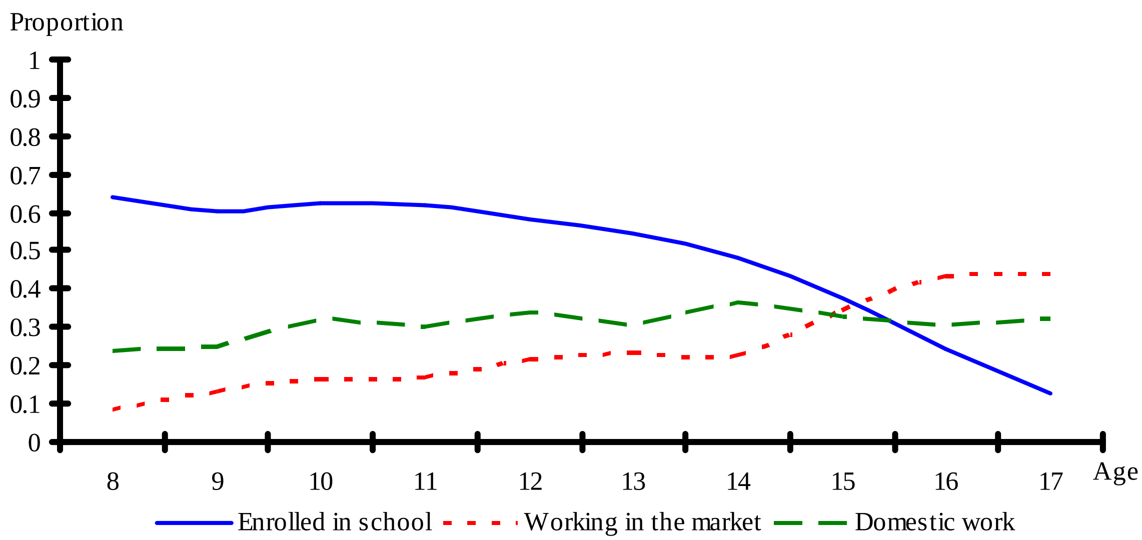

Figure 5: Labor force participation of adult women at baseline (1997) and living in control villages (1999)

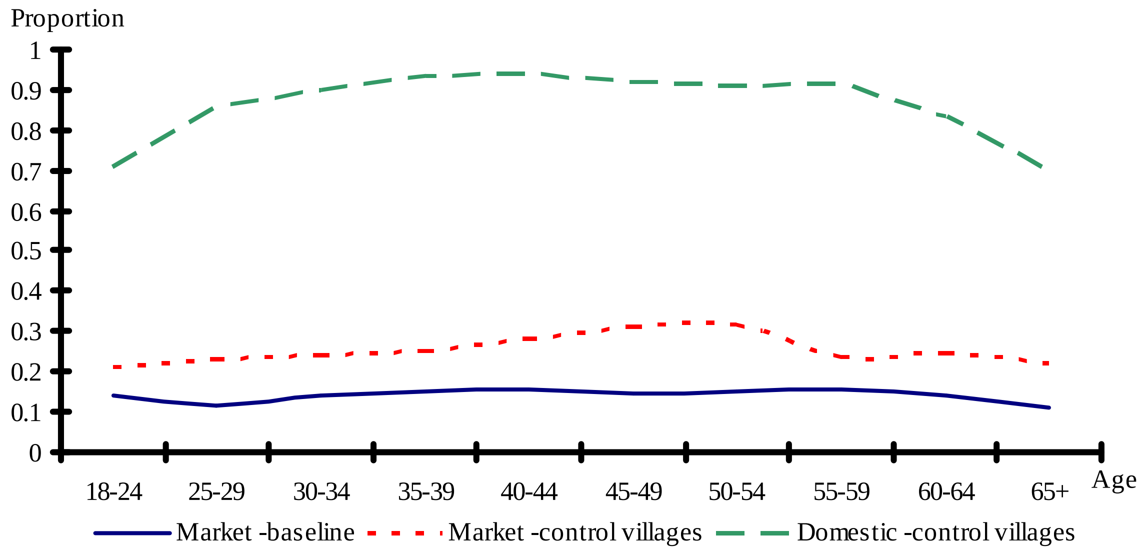

Figure 6: Labor force participation of adult men at baseline (1997) and living in control villages (1999)