



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

**PROGRESA and its Impacts on the Human Capital and
Welfare of Households in Rural Mexico:
A Synthesis of the Results of an Evaluation by IFPRI**

Emmanuel Skoufias

**International Food Policy Research Institute
Food Consumption and Nutrition Division
2033 K Street NW
Washington, D.C. 20006, USA**

December 2001

CONTENTS

Executive Summary	iii
1 — Background and Program Description	1
2 — General Economic Framework for Evaluating PROGRESA	11
3 — Empirical Methods for Evaluation and Information Sources.....	27
4 — The Selection of Beneficiary Households and an Evaluation of PROGRESA's Targeting.....	42
5 — Summary of Impact Evaluation Results and Cost Analysis of PROGRESA.....	47
6 — Policy and Research Considerations	73
References	76
Appendix A: Summary of Mexican Anti-Poverty Programs	82
Appendix B: A Description of PROGRESA's Benefits and Requirements	86
Appendix C: Characteristics of the Localities in the Evaluation Sample.....	89
Appendix D: On the Size of the PROGRESA Cash Transfers	92
Appendix E: On The Impact of PROGRESA on Poverty.....	95

Executive Summary

In early 1998, the International Food Policy Research Institute (IFPRI) was asked to assist the PROGRESA administration to “determine if PROGRESA is functioning in practice as it is intended to by design.” PROGRESA is one of the major programs of the Mexican government aimed at developing the human capital of poor households. Targeting its benefits directly to the population in extreme poverty in rural areas, it aims to alleviate current poverty through monetary and in-kind benefits, as well as reduce future levels of poverty by encouraging investments in education, health and nutrition. This document synthesizes the findings contained in a series of reports prepared by IFPRI for PROGRESA between November 1998 and November 2000. A more detailed description of the research, rationale and methods appears in the list of supporting documents from which this document has been derived. The evaluation is based on data collected from seven states that were among the first states to receive PROGRESA, including Guerrero, Hidalgo, Michoacán, Puebla, Querétaro, San Luis Potosi, and Veracruz. A total of 24,000 households from 506 localities in these states were interviewed periodically between November 1997 and November 1999. Focus groups and workshops with beneficiaries, local leaders, PROGRESA officials, health clinic workers, and schoolteachers were also carried out. The following are some key highlights beginning to emerge from this study related to the impact of PROGRESA on its target group, Mexico’s rural poor.

- At the end of 1999, PROGRESA covered approximately 2.6 million families or about 40% of all rural families and one-ninth of all families in Mexico. At that time the program operated in almost 50,000 localities in more than 2,000 municipalities and 31 states. PROGRESA’s budget of approximately \$777 million in 1999 was equivalent to 0.2% of Mexico’s GDP.
- Research indicates that from November 1998 to October 1999 the average monthly transfer equaled 238 pesos per beneficiary household per month - equivalent to 19.5% of the mean value of consumption of poor households in non-PROGRESA areas.
- After three years poor children in rural areas of Mexico where PROGRESA is currently operating are more likely to enroll in school. Mexico’s primary school children typically maintain a primary school enrollment rate of 93% but generally begin dropping out of school after completing the 6th grade. Enrollment rates in general witness another steep decline as children transition to senior high school where enrollment typically drops again. Research reveals that PROGRESA has had the largest impact on children who enter secondary school and represents a percentage increase of enrollment over 20% for girls and 10% for boys. The research revealed that much of the positive impact on enrollment is due to increasing continuation rates rather than on getting children who were out of school to return.

- The accumulated effect of increased schooling from grades 1-9 suggests that the program can be expected to increase educational attainment for the poor by .66 years of additional schooling by grade 9 (.72 years of additional schooling for girls, .64 years for boys). Given that the average youth aged 18 typically achieved 6.2 years of completed schooling, PROGRESA effectively can be expected to increase educational attainment of poor Mexican rural children by 10%.
- Improved livelihood security for the poor depends on improving early childhood health care. Frequency and duration of illness have profound effects on the development and productivity of populations. The IFPRI analysis indicates that improved nutrition and preventative health care in PROGRESA areas have made younger children more robust against illness. Specifically, PROGRESA children 1-5 years have a 12% lower incidence of illness than non-PROGRESA children.
- Adult PROGRESA beneficiaries on average have 19% fewer days of difficulty with daily activities, 17% fewer days incapacitated by illness, 22% fewer days in bed, and are able to walk about 7% more than non- beneficiaries.
- In January 1996, more than a year before PROGRESA began, average visits to health clinics were identical in PROGRESA and non-PROGRESA localities. In 1998, the first full year in which PROGRESA was operational in all treatment localities, visit rates in PROGRESA areas were shown to grow fast than in non-PROGRESA areas.
- PROGRESA increased the number of first visit in the first trimester of pregnancy by about 8%. This shift to early pre-natal care significantly reduced the number of first visits in the second and third trimester of pregnancy. This positive change in behavior is documented to have a significant improvement in the health of babies and pregnant mothers.
- In 1999, median food expenditures were 13% higher in PROGRESA households when compared with control households. This increase was driven largely by higher expenditures on fruit, vegetables, meats and animal products. By November 1999, median caloric acquisition had risen by 10.6 %. Beneficiaries felt that since PROGRESA, poor households are eating better.
- The nutrition of preschool children is of considerable importance not only because of concern over their immediate welfare, but also because their nutrition in the formative stages of life is widely perceived to have substantial and persistent impact on their physical and mental development and on their health status as adults. Stunting - low height-for-age - is a major form of protein-energy malnutrition. In 1998, survey results indicated that 44% of 12-36 month old children in PROGRESA regions were stunted.
- Data suggest that PROGRESA has had a significant impact on increasing child growth and in reducing the probability of child stunting; an increase of 16% in mean growth rate per year

(corresponding to 1 cm) for children who received treatment in the critical 12-36 month age range.

- The analysis suggests that PROGRESA may be having a fairly substantial effect on lifetime productivity and potential earnings of currently small children in poor households. IFPRI estimates that the impact from the nutritional supplements alone and their effect on productivity into adulthood could account for 2.9% increase in lifetime earnings.
- The administrative costs employed in getting transfers to poor households appear to be small relative to the costs incurred in previous programs and for targeted programs in other countries. According to the program costs analysis, for every 100 pesos allocated to the program 8.9 pesos are “absorbed” by administration costs. Dropping household targeting would reduce program costs from 8.9 pesos to 6.2 pesos per 100 pesos transferred, while dropping conditioning would reduce the program cost from 8.9 pesos to 6.6 pesos per 100 pesos transferred. Dropping both would reduce these costs to 3.9 pesos per 100 pesos transferred.

Chapter 1

Background and Program Description

In 1997, the federal government of Mexico introduced the Programa de Educación, Salud y Alimentación (the Education, Health, and Nutrition Program), known by its Spanish acronym, PROGRESA, as part of its renewed effort to break the intergenerational transmission of poverty. The program has a multiplicity of objectives, primarily aimed at improving the educational, health and nutritional status of poor families, and particularly of children and their mothers. PROGRESA provides cash transfers linked to children's enrollment and regular school attendance and to clinic attendance. The program also includes in-kind health benefits and nutritional supplements for children up to age five, and pregnant and lactating women.

The expansion of the program across localities and over time was determined by a planned strategy that involved the annual budget allocations and logistical complexities associated with the operation of the program in very small and remote rural communities (such as verification that the localities to be covered by the program had the necessary educational and health facilities). In consequence the expansion of the program took place in eleven phases.¹ In phase one that began in August 1997, 140,544 households in 3,369 localities were incorporated. Phase two of the program began in November 1997 when a further 160,161 households in 2,988 localities were incorporated. The greatest expansion occurred in 1998 (i.e., phases 3-6) when nearly 1.63 million families in 43,485 localities were incorporated. By phase eleven, the final phase of the program in early 2000, the program included nearly 2.6 million families in 72,345 localities in all 31 states. This constitutes around 40% of all rural families and one ninth of all families in Mexico. The total annual budget of the program in 1999 was around \$777 million, equivalent to just under 20% of the Federal poverty alleviation budget or 0.2% of GDP.

As part of an overall strategy for poverty alleviation in Mexico, PROGRESA works in conjunction with other programs that are aimed towards developing employment and income opportunities (such as the Temporary Employment Program, PET) and facilitating the formation of physical capital, such as the State and Municipal Social Infrastructure Fund (FAIS) (for a more detailed description of the various anti-poverty programs in Mexico, see Appendix A).

For Mexico, the design of PROGRESA represents a significant change in the provision of social programs. Firstly, in contrast to previous poverty alleviation programs in Mexico, PROGRESA applies targeting at the household level in order to ensure that the resources of the program are directed and delivered to households in extreme poverty, i.e., the households that can most benefit from the program. General food subsidies, such as the tortilla price subsidy (FIDELIST) are widely acknowledged to have had a high cost on the government budget and a negligible effect on poverty because of the leakage of benefits to non-poor households. In addition, more decentralized, community based, demand-driven program such as the earlier anti-poverty program PRONASOL, in place during 1988 and 1994, were thought to be susceptible to local

¹ For more details see section 4 and table 1 in Coady (2000).

political influences and not very effective at reaching the extreme poor.² Under PROGRESA, communities are first selected using a marginality index based on census data. Then, within the selected communities, households are chosen using socio-economic data collected for all households in the community.

Secondly, unlike earlier social programs in Mexico, PROGRESA contains a multi-sectoral focus. By design, the program intervenes simultaneously in health, education and nutrition. The integrated nature of the program reflects a belief that addressing all dimensions of human capital simultaneously has greater social returns than their implementation in isolation. Improved health and nutritional status are not only desirable in themselves, but have an indirect impact through enhancing the effectiveness of education programs since, for example, school attendance and performance are often adversely affected by poor health and nutrition. Poor health is therefore both a cause as well as a consequence of poverty. Also by design, PROGRESA differs in the mechanism of delivering its resources. Recognizing the potential of mothers to effectively and efficiently use resources in a manner that reflects the immediate needs of the family, PROGRESA gives benefits exclusively to mothers

These features of the program in combination with its enormous scale suggest that the program has the potential to have a significant impact on current and future poverty in Mexico. PROGRESA distinguishes itself further by the fact that the elements essential for a rigorous evaluation of the program's impact were taken into consideration since the very early stages of the implementation of the program. For example, the PROGRESA administration took advantage of the sequential expansion of the program and adopted a quasi-experimental design for its evaluation. This permitted the collection of repeated observations from beneficiary households surveyed before and after the implementation of the program as well as the collection of similar data from comparable households that were not yet covered by the program. This quasi-experimental evaluation design of PROGRESA offers the opportunity to evaluate the impact of the program on beneficiary households by measuring the changes that have taken place in the indicators of household investment in human capital and other economic and social measures while systematically isolating the influence of other factors that might have contributed to the observed changes.³

This document synthesizes 24 months of extensive research by IFPRI researchers, academic collaborators and PROGRESA staff, designed to evaluate the impact of PROGRESA and the extent to which the measured impacts are delivered in a cost-effective manner. The impact evaluation focuses primarily on three poverty reduction areas: improving school enrollment, improving health and nutrition outcomes, and increasing household consumption for poor rural families. Other topics such as the impact of PROGRESA on women's status, intra-household transfers, and work incentives are also examined. The synthesis presented here builds on a

² See Yaschine (1999) and Levy (1994) for a description of the program.

³ For a more detailed discussion of the variety of quasi-experimental designs available in the evaluation literature, see Valadez and Bamberger (1994).

series of reports presented by IFPRI to PROGRESA from November 1998 through November 2000. A more detailed description of the research, rationale and methods appears in the list of supporting documents from which this synthesis has been derived.

Our analysis of the PROGRESA program comes at a crucial time as other Latin American countries (such as Honduras, Nicaragua, Colombia, Brazil and Argentina) are in the process of revising their social program along lines similar to those of the PROGRESA program in Mexico with out any prior knowledge as to whether a social program of the nature of PROGRESA has any measurable impact on the human capital investment decisions of households and poverty alleviation in general.

To provide readers with a common knowledge about the program the requirements and the benefits of the program, as well as some of its operational aspects are described in detail. Most of the presentation below is drawn from documents prepared by the PROGRESA administration as well as from discussions of IFPRI researchers with PROGRESA administration officials.

Description of the Educational Benefits and Program Requirements

Education is seen as a pivotal component of PROGRESA reflecting the strong empirical link between human capital, productivity and growth, but especially because it is seen as a strategic factor in breaking the vicious circle of poverty. Investments in education are therefore seen as a way of facilitating growth while simultaneously reducing inequality and poverty.

The stated objectives of the program are to improve school enrolment, attendance and educational performance. This is intended to be achieved through four channels:

- (i) A system of educational grants;
- (ii) Monetary support for the acquisition of school material;
- (iii) Strengthening the supply and quality of education services; and
- (iv) Cultivation of parental responsibility for, and appreciation of the advantages stemming from, their children's education.

These are obviously inter-related in that each is thought to enhance the effectiveness of the others in improving attendance and performance.

The system of educational grants is intended to encourage regular and continuous attendance, especially for females. This is reflected in two crucial design features (Appendix B Table 1). Firstly, the size of the grant increases through grades. Secondly, at the secondary level, grants are higher for females. The latter is meant to address the cultural gender bias against female social participation as well as being an attempt to internalise education externalities that accrue to other families after the marriage of females. The level of the grants was set with the aim of compensating for the opportunity cost of children's school attendance.

The program tries to maintain the real value of the cash benefits stable over time. The nominal value of the educational cash benefits and the cash benefit granted for food consumption is adjusted every six months to account for changes in the cost of living. The program design also tries to avoid diluting a household's incentives for self-help. The total monthly monetary transfer (i.e., from education grants and food support) a family can receive is capped (for the period July-December 1999) at 750 pesos (including 125 pesos for food). This may possibly impact on family education decisions, e.g., how many and which eligible children to enrol. Also, as stated in PROGRESA documents, in order to avoid adverse fertility incentives, only children over the age of seven years (the standard age of 3rd year primary students) are eligible for education grants.⁴

The grants are awarded to mothers every two months during the school calendar and all children over the age of 7 years and under the age of 18 years are deemed eligible. To receive the grant parents must enrol their children in school and ensure regular attendance (i.e., students must have a minimum attendance rate of 85%, both monthly and annually). Failure to fulfil this responsibility will lead to the loss of the benefit, at first temporarily, but eventually permanently.

There are two forms that contain registration and attendance information. Beneficiaries are provided with a form (E1) at the general assembly that contains a list of the names of eligible children. This has to be taken to the specific school where each child is to be registered and must be signed by a school teacher/director to certify enrolment. This form is then returned to, and retained by, the district level PROGRESA representatives (UAEP) when the first payment is collected. The second form (E2), for maintenance of detailed attendance records, is sent directly to the schools: one form per school with names of registered children taken from the E1 forms returned by beneficiaries. Also, valid justification for absences (e.g., sickness) is to be maintained by the school authorities with the cooperation of parents' associations.⁵

The amounts for the support of school materials differ according to educational level. For example, for the period of July to December 1999, for primary school students from beneficiary families, the support consists of 165 pesos of which 110 pesos are paid at the beginning of the school year and 55 pesos are paid half-way through the school year (i.e., in January/February 2000, for the replacement of materials, as long as children continue to attend school.⁶ For secondary school students, this support rises to 205 pesos and is delivered in a single payment,

⁴ As it is outlined in the model of chapter 2, as long as families consider the full lifetime costs and benefits of having an additional child, this feature of the program is unlikely to leave the fertility decisions of families unaffected.

⁵ Recent changes now mean that schools will only return details for those who do *not* meet attendance requirements.

⁶ Note that for the midyear cash transfer of 45 pesos listed in Appendix B table 1 is for the 1998-1999 school year.

at the beginning of the school year, once pupils have enrolled. Children attending primary schools that are supplied by the state-run CONAFE suppliers (under the Ministry of Education), i.e., essentially all schools except those located in very marginal communities receive school materials directly from their schools rather than a cash transfer. These are delivered at the beginning of the school year and CONAFE informs PROGRESA which schools received the school materials and how much they received.

Description of the Health and Nutrition Component

The health and nutrition component can be seen as a collection of a number of inter-related sub-components, namely:

- (i) A basic package of primary health care services;
- (ii) Nutrition and health education and training for families and communities;
- (iii) Improved supply of health services (including annual refresher courses for doctors and nurses);
- (iv) Nutrition supplements for pregnant and lactating mothers and young children.

While the general focus is on improving the health and nutritional status of all household members, special emphasis is placed on the welfare of mothers and children. Some components are more important than others in this regard.

Primary Health Care Services

The basic approach of PROGRESA is that of preventative health care which enables households to anticipate both the causes and presence of illnesses, with the objective of decreasing the incidence and duration of these illnesses. This is reflected in the nature of the package of health services provided (Appendix B Table 2). The most important actions are related to maternal and child health (e.g., pre- and post-natal health care) and family planning services. A crucial ingredient in the program is the emphasis put on regular visits to health centres and the setting up and monitoring of a schedule of appointments. This includes the setting of appropriate health-centre timetables that minimize the inconvenience associated with the making and keeping of appointments. To facilitate this, upon registration at a health clinic beneficiaries are given an appointments booklet containing a specified schedule of appointments for each household member, with particular attention placed on visits by vulnerable members, according to Appendix B Table B.3. This information is entered on the S1 form brought to the clinic by the beneficiary, ensuring that a record of attendance by household members is kept at the clinic. The other part of the form ("*formato CRUS*") is returned to the beneficiary who uses it as proof of registration in order to receive cash grants for food. For the period between July and December 1999 the value of the cash grant for food consumption was 125 pesos per month.

Beneficiaries are also asked to attend health and nutrition talks (referred to as “*pláticas*”) at the clinic. Each clinic⁷ receives an S2 form from the UAEP every two months that contains the names of beneficiaries as compiled from the CRUS form. The S2 form, which contains only the beneficiary's name with two columns (one for health centre visits, another for attendance at *pláticas*) for registering compliance or non-compliance by the household, must be filled out by a nurse or doctor at the health unit every two months, certifying whether family members visited the health units as recommended (and presumably scheduled). This form is then submitted to the UAEPs, via the state health authorities (“*Juridicion Sanitaria*”), in order to trigger the receipt of the bi-monthly food support. In principle, if at least one member did not comply with scheduled visits then the household is considered not to have complied and thus will not receive food support. However, since adults are only asked to comply with one visit per year, if the appointment date is changed in advance, the health centre will focus only on the compliance of women and children. Very often, though, adult members complete their required visit at the time of registration. Also, since a household may visit a clinic other than the one at which it is registered, the UAEPs require information from more than one clinic in order to register compliance correctly. This information is entered onto a computer and a computerized file sent to CONPROGRESA.

Nutrition and Health Education

An underlying assumption in PROGRESA is that effective health care requires active community participation and a culture of preventive care. In order to empower individuals and communities to take control over their own health, beneficiaries are required to attend nutrition and health education lectures (*pláticas*). Up to 25 themes are discussed in the lectures, including nutrition, hygiene, infectious diseases, immunization, family planning, and chronic diseases detection and prevention. Because mothers are the primary care takers, the *pláticas* are mainly directed to them, but other members of beneficiary families as well as non-beneficiaries are invited to attend. Participants are trained in various aspects of health and nutrition, with a special emphasis on preventive health care, more specifically they are taught about: (a) ways to prevent and reduce health risks (e.g., prenatal care, early detection of malnutrition, childhood immunizations, safe food and water treatment), (b) how to recognize signs or symptoms of sickness, and (c) how to follow appropriate primary-care procedures (e.g., such as treatment of diarrhea by means of oral rehydration). Participants are also trained in the use of the nutritional supplement provided by the program, as well as in optimal breastfeeding and complementary feeding of young children. Efforts are also made to broaden the information for adolescents and young people, particularly women, to favor the adoption of appropriate behaviors to protect their health from an early age.

⁷Regarding mobile clinics (“*Unidad Móbiles*”) which already existed in some localities, PROGRESA reached agreement with another program (“*Programas de Ampliación de Cobertura*”) on a new frequency of visits to beneficiary localities in order to facilitate the expected increase in demand.

Supply of Health Services

All public-sector health institutions are to provide the package of basic health-care services. To facilitate this, especially in the face of anticipated increased demand, resources will be devoted to strengthening the supply of health services as follows:

- (i) Ensuring adequate supply of equipment to units;
- (ii) Encouraging staff working in remote rural areas to remain there on a long-term basis;
- (iii) Ensuring that health-care units have the necessary medicines and materials (including educational health materials to distribute to families);
- (iv) Providing extra training to improve both the quality of the medical attention and the operational dimensions of the service.

These resources are deemed necessary if the public health sector is to meet the additional demands placed on it by the program and provide an efficient and high quality service. Although the greatest efforts made by the institutions involved will concentrate on primary care, mechanisms will also be established for the timely detection and referral (free of charge) of the beneficiaries who need attention in units at the second and third levels of health care.

Nutritional Supplement

Special attention is given to the prevention of malnutrition in infants and small children, which is a crucial determinant of their future development. Therefore, an additional component of the program is the provision of food (nutritional) supplements to pregnant and lactating women and to children between the ages of four months and two years. These supplements will also be given to children between two and five years if any signs of malnutrition are detected or to non-PROGRESA households under similar circumstances.

Two different supplements were formulated specifically for the program: one for pregnant or lactating women and the other one for young children. Both supplements contain whole dry milk, sugar, maltodextrin, vitamins, minerals, and artificial flavours and colours, but their specific macro and micronutrient content is adapted to meet the specific nutritional needs of mothers and children, respectively. The supplements are distributed in 240 grams packages and are ready to eat after they are hydrated. The child supplement produces a type of pap and is available in banana, vanilla, and chocolate flavours. A 40 g daily ration (of dry product) supplies 194 kilocalories, 5.8 grams of protein and approximately one recommended daily allowance (RDA) of selected micronutrients (see Table B.4). The supplement for women is intended to be consumed as a beverage after rehydration, and is available in banana, vanilla or natural flavour.

The daily ration is 52 grams and provides 250 kilocalories of energy, 12-15 grams of protein and selected vitamins and minerals.⁸

The supplements are prepared at one production plant devoted solely to this task and then distributed to health centres through DICONSA, which is an operational arm of the Ministry of Social Development (SEDESOL) and also the largest distributor of food in rural areas. There are about 18,000 DICONSA stores in rural areas. The supplements have a long shelf life of about one year.

Mothers visit the clinic at least once a month (more if they are pregnant or have small children) and are expected to pick up a one-month supply of the supplement for each targeted household member. Appropriate use of the supplements and other concepts of optimal child feeding and feeding during pregnancy and lactation are reinforced during the nutrition and health *pláticas* provided in the clinics.

PROGRESA and Benefits from Other Programs

One additional requirement of the PROGRESA program is that households benefiting from PROGRESA are supposed to stop receiving benefits from other pre-existing programs. For example, according to the operational guidelines of PROGRESA, households receiving PROGRESA benefits should not be receiving other similar benefits from programs such as *Niños de Solidaridad*, *Abasto Social de Leche*, *de Tortilla* and the National Institute of Indigenous people (*INI*). This requirement of the PROGRESA program represents the short-run objective of the new poverty alleviation strategy of the Mexican government to minimize duplication of benefits to poor families. A longer run objective is to absorb the variety of poverty alleviation programs within one program such as PROGRESA that represents an integrated approach to poverty alleviation. Before the establishment of PROGRESA, previous government interventions in the areas of education, health and nutrition in the rural sector of the country consisted of many programs each intervening separately in health, education or nutrition with little prior coordination or consideration of the potential synergies that could result from a better coordinated and simultaneous intervention.

Size of Monetary Transfers Received by PROGRESA Beneficiary Households

The average monthly transfers during the twelve-month period from November 1998 to October 1999 are around 197 pesos per beneficiary household per month (expressed in November 1998 pesos). 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. These transfers are 19.5% of the mean value of consumption of poor households in control

⁸ A complete description of the design, formulation and composition of the supplement is available in Rosado et al. (2000) and Rivera et al. (2000).

localities. On average, households receive 99 pesos for food support (*alimento*), and 91 pesos for the educational grant (*beca*). The *alimento* accounts for 68% of the transfers received by households headed by individuals 60 years or older, a finding not surprising, given that such households will tend to have fewer children of school age.

Scope of Evaluation

The structure of the benefits and requirements of the program naturally poses some limitations on the types kinds of questions that the evaluation can and cannot address.

First, the evaluation of PROGRESA, as well as of any other social program, requires a clear definition of its objectives. Clearly specified objectives provide a benchmark against which the performance of the program can be evaluated. PROGRESA has multiple and interlinked objectives. At the risk of oversimplifying, the objectives of PROGRESA are to alleviate poverty by inducing households through conditional cash transfers to invest in their human capital, such as health, education and nutrition.⁹ Clearly the main objectives of the program are long-run objectives that can only be evaluated over the lifetime of program participants. The PROGRESA evaluation data are limited to only two years of observations since the start of the program. This implies that the evaluation results presented herein can provide little information about the long-term consequences of the program on the human capital and lifetime welfare of beneficiaries. The evaluation of PROGRESA conducted by IFPRI is based on more short-term indicators of program impact on human capital such as whether children from beneficiary households are more likely to enroll or remain in school, exhibit higher attendance rates and improved scores in educational achievement examinations, whether beneficiaries make more frequent use of the health services provided by the program, whether morbidity among beneficiaries decreases, whether food consumption and nutrition at the household level increases, and whether the intervention especially on the nutritional side has any measurable impact on the nutritional status of children. In addition, given that this is certainly an implicit objective of PROGRESA, IFPRI's evaluation includes the potential impact of the cash transfer component of the program on short-run poverty measures and household welfare.

Second, it is important to note that the educational and health services of the program as well as the nutritional supplement and *platicas* are all provided as a package. This feature of the program makes it impossible to evaluate the impact of individual program components (e.g., on the impact of the health component of the program on school attendance) or shed any light on program design (e.g., what if the cash transfers were awarded to fathers instead of mothers). It is certainly possible that households can choose to comply with some of the requirements of the program such as visiting health centers and not with others, such as enrolling their children of eligible age into school. Although selective take-up of specific program components is a real possibility this is an issue not directly addressed in this evaluation but left for left for analyses of the program in the future.

⁹ See Skoufias, Davis, and Behrman (1999) for a more detailed presentation of the stated objectives of the PROGRESA program.

Lastly, although PROGRESA is primarily a demand-side program meaning that its main objective is to induce households (through cash transfers and conditions associated with the receipt of these cash transfers) to make more intensive use of the existing educational and health facilities, it is important to keep in mind that it is also accompanied by complimentary efforts and resources directed at the supply and quality of the educational and health services. Thus although the program does not aim to increase the quantity of educational and health facilities (such as building new schools and health centers) it does try to anticipate and ease potential capacity constraints that might arise as a result of the more intensive use of the existing facilities. Since these increased resources related to the quality of services are part of the overall PROGRESA benefit package provided, the its evaluation of the program can provide little direct evidence on whether a demand-side intervention is more effective (in terms of impact and/or in terms of cost) relative to a supply-side intervention.

Chapter 2 of this synthesis report contains a detailed description of the general economic framework used to evaluate PROGRESA. Chapter 3 discusses the empirical methods and information sources used in the evaluation. Chapter 4 contains a summary of the quantitative and qualitative results of the evaluation of PROGRESA and summarizes the cost analysis of the program. Chapter 5 contains a summary of the policy considerations derived from the evaluation of the program.

Chapter 2

General Economic Framework for Evaluating PROGRESA

The major component of IFPRI's evaluation of PROGRESA focuses on the identification of the impact of the program (i.e., reductions in poverty levels, increased school enrollment and attendance, increased use of health services for preventative care, and improved nutritional status). Knowledge of program impacts is an essential component of any economic evaluation. However, in isolation impact evaluation provides limited guidance for policy. For this reason an analysis of the costs and the cost effectiveness of the program is also conducted. There are a number of policy instruments that could be employed to generate a given impact and these may differ substantially in terms of cost. Cost effectiveness analysis quantifies the costs associated with bringing about a given impact. This aspect of policy choice is particularly important when budget allocations are tight.

In general, a complete economic evaluation of a program of the nature of PROGRESA requires not only the identification of the impacts of the program, and the costs of bringing about these impacts, but also a comparison of these two key factors in order to determine the overall welfare impact of the program and how effectively the program achieves these welfare impacts relative to alternative policy instruments. This immense task typically requires the measurement of the benefits associated with higher investments in human capital. Assigning a monetary value to the increased nutrition, health and education of a child over his/her lifetime as a result of the social program requires a series of assumptions that stretch the limits of credibility. Nevertheless, in some instances, assumptions of this nature are made in order to provide readers and policy makers with a rough quantitative estimate of the benefits of the program.

With these caveats in mind, the first part of this chapter outlines the economic framework that has guided IFPRI's impact evaluation of PROGRESA. In very simple terms, households have preferences that are summarized by a welfare function, a set of constraints, such as expenditures cannot exceed income, and a set of variables, some of which are under the control of the agent (endogenous or choice variables) and some are taken as given (exogenous variables or parameters). The main objective of a household is to determine the values for the variables that are under its control so as to get the maximum level of welfare as possible while at the same time satisfying the constraints faced. The key feature of this economic framework is that a household will determine all its choice variables so that the ratio of the marginal benefit (MB) to the marginal cost (MC) associated with a small change in each of its choice variable is equated across all choice variables.

In the remainder of the chapter, the main insights derived from this economic framework about the direct as well as indirect impacts of the program, the nature and the size of these impacts, as well as some of the factors that could limit the impact of the program.

An Economic Model of Human Capital Investment within Households

The design of the PROGRESA program and the structure of its cash benefits and requirements suggest that the program is well aware of the direct costs involved in inducing households to invest in human capital. For example, the size of the educational grant varies with child gender and age and is based on the labor income children contribute to households. In addition, the fact that the educational benefits are given for children greater than 7 years of age suggests that the design of the program is also cognizant of the possible indirect effects of the program on fertility.

In this section I present in detail a simple model of household decision-making that highlights the various costs and benefits associated with the decision to invest in the human capital of children. The model is sufficiently flexible to embody the production of human capital by heterogeneous households (Rosenzweig and Schultz 1983; Rosenzweig, 1988), the role of the mother's time (Willis 1973), the interaction between child quantity and quality in the household budget constraint (Becker, 1981), the economic value of children (Rosenzweig and Evenson 1977), and the biology of reproduction (Rosenzweig and Schultz 1983) emphasized in prior studies formulating models of the household.

To simplify the presentation, I assume full information and collapse all the decisions of the household made early in life and the outcomes of these choices in the adult life of children into one-period. Fertility is initially treated as exogenous. Later the model is amended to allow households to make decisions about the number of children they have and considers the possible interaction effects of PROGRESA with fertility. The model is a unitary model, which means that it treats the household as if it were maximizing a single welfare function without specifying exactly whether this welfare function reflects the preferences of the adult male or the mother in the household.

Clearly, this assumption may be subject to criticism as attested by the amount of theoretical and empirical work that has been conducted on the alternative model of collective decision making within families (e.g., Behrman, 1997; Bergstrom, 1997). There is growing evidence that the household cannot be characterized as one where individuals share the same preferences or pool their resources. New research has shown that the unitary model of the household has been rejected in a variety of country settings in both developed and developing countries (see Strauss and Thomas 1995; Behrman 1997; Haddad, Hoddinott, and Alderman 1997 for reviews). Although the unitary model continues to be extremely powerful in explaining many phenomena, the evidence in favor of a model where individuals within the household have different preferences, or maintain control over their own resources, is of interest to researchers and policymakers alike. Indeed, Haddad, Hoddinott, and Alderman (1997) argue that using the unitary model of the household as a guideline for policy prescriptions may lead to policy failures. First, the effect of public transfers may differ depending on the identity of the income recipient. Second, the response of nonrecipients of the income transfer must also be considered. If households reallocate resources away from the transfer recipient to compensate for the transfer

receipt, the intended effect of the income transfer may not be realized. Third, at the project level, the unitary model predicts that it does not matter to whom policy initiatives are addressed, since information, like other resources within the household, will be shared.

Given that it is not possible to determine conclusively whether the unitary model or the collective model of the household are exclusively better representations of household behavior, IFPRI's evaluation of PROGRESA has determined to adopt a balanced approach to this issue. The unitary model of the household is used to present some of the pathways through which PROGRESA affects the human capital investments of families. However, the potential implications of PROGRESA in the allocation of resources within households and the status of women are also highlighted and examined in detailed at the empirical level.

For the purposes of keeping the model simple, the term human capital will be used to summarize the investments of families in both education and health. One essential feature of the model is that human capital (H) per child is produced by the household using as inputs the time of family members and other goods and services purchased from the market.¹⁰ The function describing the effects of changes in household resources on the level of human capital invested in each child is given by

$$H = h(t_H^c, t_H^m, X; Z, \mathbf{m}K). \quad (2.1)$$

The first partial derivatives for the first three arguments of the human capital production function are assumed to be positive (i.e., $h_1, h_2, h_3 > 0$). These restrictions on derivatives of the production function are equivalent to assuming that as children or their mothers devote more time to schooling the stock of human capital embodied on children increases. Here, there are three important human capital inputs highlighted: the time of the child t_H^c (in school, medical care), the time of the mother t_H^m , and purchased goods and services X (e.g., books, medical care). The human capital production function (2.1) also contains the terms Z , \mathbf{m} and K . The term Z summarizes observable child characteristics such as gender or the birth order of the child, which also directly, but exogenously influence H . The term \mathbf{m} captures, for example, the influence of biological factors, possibly genetically transmitted such as child ability, or health endowment, which also directly, but exogenously influence H . Typically, the term \mathbf{m} can be observed by the parents of the child but is an unobservable to outsiders. The third term K reflects the role of parental education, community characteristics such as distance from the market, health or educational center, environmental factors and the general availability of knowledge and information about the production of human capital. It is possible that some of

¹⁰ In reality, since families produce more than one form of human capital simultaneously, there may be some important feedbacks or synergies involved in the production of education and health. The health status of a child, for example may be an important factor in the child's school attendance rate. In order to keep the model simple, these types of synergies are left out of the model but are discussed in more detail below.

the components of K may act as substitutes or complements for each other. For example, parental education may be a substitute for the lack of information available about sanitary practices. Thus both the human capital “endowment” and increased access to relevant information about human capital production may influence household decisions.

Thus both the human capital “endowment” and increased access to relevant information about human capital production may influence household decisions. For example, increased awareness about sanitation, proper cooking methods that retain the nutrients in food and other health maintenance practices, can affect the productivity of the other inputs.

The income of an adult child is assumed to be determined by the stock of human capital accumulated through parental investments. Thus child earnings when he/she becomes an adult denoted by E are

$$E = \mathbf{a}m + \mathbf{b}H = \mathbf{a}m + \mathbf{b}h(t_H^c, t_H^m, X; Z, \mathbf{m}K), \quad (2.2)$$

where \mathbf{a} is the market return to the genetic endowment of an individual and \mathbf{b} is the market rental rate on accumulated human capital.

The budget constraint incorporates the possibility that children contribute income to the household when not engaged in human capital accumulation (e.g., in school) and parents receive some fraction \mathbf{q} of the earnings of “grown” children. Specifically, the budget constraint of the households is

$$V + W^c(\Omega - t_H^c)N + W^m(\Omega - Nt_H^m) + \mathbf{q}NE = Np_x X + Y, \quad (2.3)$$

where N denotes the number of children in the household, V is nonemployment sources of income including the labor income of adult males in the household, W^c is wage rate of children, W^m is the wage rate of the mother, Ω = time available, p_x is the price of X , and Y is household consumption (assumed to be the numeraire) excluding the purchased goods and services for human capital accumulation.¹¹

Finally, parents are assumed to “care about” the number and adult earnings of their children, and the level of household consumption.¹² These parental preferences can be summarized by the parental welfare function

¹¹Note that the health of the family members may also be modeled as increasing the amount of the time endowment of the family.

¹²In this specification of parental preferences, parents value child human capital only by its effect on the adult earnings of children. Another feasible specification is that parents care about the stock of their children’s human capital directly (e.g., parents derive direct pleasure from having healthier or more educated children).

$$U = U(E, Y). \quad (2.4)$$

which is assumed to possess the usual neoclassical properties.¹³

Assuming that parents maximize (4) subject to (1) – (3) by choosing the levels of X , Y and by allocating parental (t_H^m) and child time (t_H^c) across activities, the first order necessary conditions from the optimization problem of the household for each of its control variables are (in addition to the budget constraint described by equation (3) above):

$$MRS_{EY} = \frac{U_E}{U_Y} = N \left(\frac{W^c}{bh_1} - q \right) = MC_{t_H^c}. \quad (2.5)$$

$$MRS_{EY} = \frac{U_E}{U_Y} = N \left(\frac{W^m}{bh_2} - q \right) = MC_{t_H^m}. \quad (2.6)$$

$$MRS_{EY} = \frac{U_E}{U_Y} = N \left(\frac{P_x}{bh_3} - q \right) = MC_X, \quad (2.7)$$

Expressions (5), (6) and (7) highlight the fact that at the optimum households equate the marginal rate of substitution between adult children's earnings and household consumption (denoted by the ratio of the partial derivatives of the utility function with respect to E and Y) with the marginal cost (MC) or "shadow price" of investing in the human capital of a child. In addition, the combination of these three equations implies that household will allocate child time (t_H^c), parental (t_H^m) time and market resources (X) so as to equalize the marginal costs associated with each activity and resource (i.e., $MC_{t_H^c} = MC_{t_H^m} = MC_X$).

For example, expression (5) implies that the marginal cost of children's time in human capital production depends positively on W^c the wage rate children could earn (opportunity cost of time in school) and negatively on the marginal increases in earnings associated with a unit increase in school time. Moreover, all else equal for households with a larger number of children (higher N) the marginal cost of investing in child human capital is higher. Along similar lines the MC of the time a mother allocates to human capital production depends on the wage rate of the mother and the marginal productivity of her time in the production of human capital. In combination expressions (5) and (6) imply that at the optimum the household will allocate the time children and mothers spend in human capital production so as to equalize the marginal costs associated with these two activities.

¹³ Meaning that it has positive partial derivatives for each of its arguments and that it is strictly concave.

Changes in non-employment income V alone leave the shadow prices of the resources unchanged since V does not enter directly into any of the expressions (5) through (7). Provided that E and Y are “normal” commodities then increases in V result in “pure income effects” that increase human capital, and consumption. In contrast, changes in any of the factors that affect the marginal cost of time and goods used in producing human capital can trigger substitutions among the resources used in human capital production as the household minimizes its production costs and maximizes its welfare by using more of the input whose shadow price decreased and less of the input whose shadow price increased.¹⁴

At the risk of oversimplifying, the key features of PROGRESA are the cash transfers to beneficiaries, the conditioning of these transfers on a specific type of behavior, the distribution of the nutritional supplement (*papilla*) to families with 0-2 year old children, the award of these benefits exclusively to the mother of the child, and the requirement to attend the *platicas* where general information about sanitation, proper cooking methods and better nutrition is made available. It is instructive to follow through some of the pathways in which these key components of the PROGRESA program can have an impact on the investments of families in the human capital of their children. Such an exercise, at a minimum, provides useful guidance about the cases or types of households where impact can be expected.

Consider, first, the cash transfers alone ignoring for the moment that these transfers are awarded conditionally. In this very simple example participation in the program increases the term V in equation (3) while leaving the determinants of the marginal costs unaffected. Then the cash transfers of PROGRESA act as an income effect that tends to increase the human capital invested in children.

Next consider the requirements associated with the program. Participation in and compliance with the conditions of PROGRESA may result in changes in the shadow price or marginal cost of investment in human capital. For example, consider a household with a child enrolled in school and with an attendance rate less than the 85% rate required by PROGRESA. Assuming full compliance with the requirements of the program, the changes in the amount of time the child and the mother devote to schooling, and in the amount of the school supplies X (such as textbooks, pencils and paper) made available by the program are likely to change the marginal costs or shadow prices of the household. Specifically, consider the impact of the program on the MC of t_H^c (see equation 5). Even though the extra time the child devotes to schooling has a cost in terms of the lost child wage W^c what matters to the household is the ratio of child wage to the marginal increase in earnings given by the term $b_h(t_H^c, t_H^m, X; Z, \mathbf{m}K)$ that enters in the denominator. Thus the impact of PROGRESA on the MC of t_H^c is determined by how the marginal product of the time of a child in human capital is affected by various components and

¹⁴ See Behrman and Knowles (1999) for a similar approach to the determination of human investments within families.

requirements of the program (i.e., the signs of the second own and cross partial derivatives (i.e., h_{11}, h_{12}, h_{13})). The higher amount of t_H^c required by the program is likely to decrease h_1 in expression 5 given the diminishing marginal productivity of own time in human capital production (i.e., $h_{11} < 0$). However, this negative effect on h_1 is likely to be counteracted by the enhanced productivity of the child's time due to the higher time spent by the mother in producing child education and the higher amount of textbooks available (i.e., $h_{12} > 0, h_{13} > 0$).¹⁵

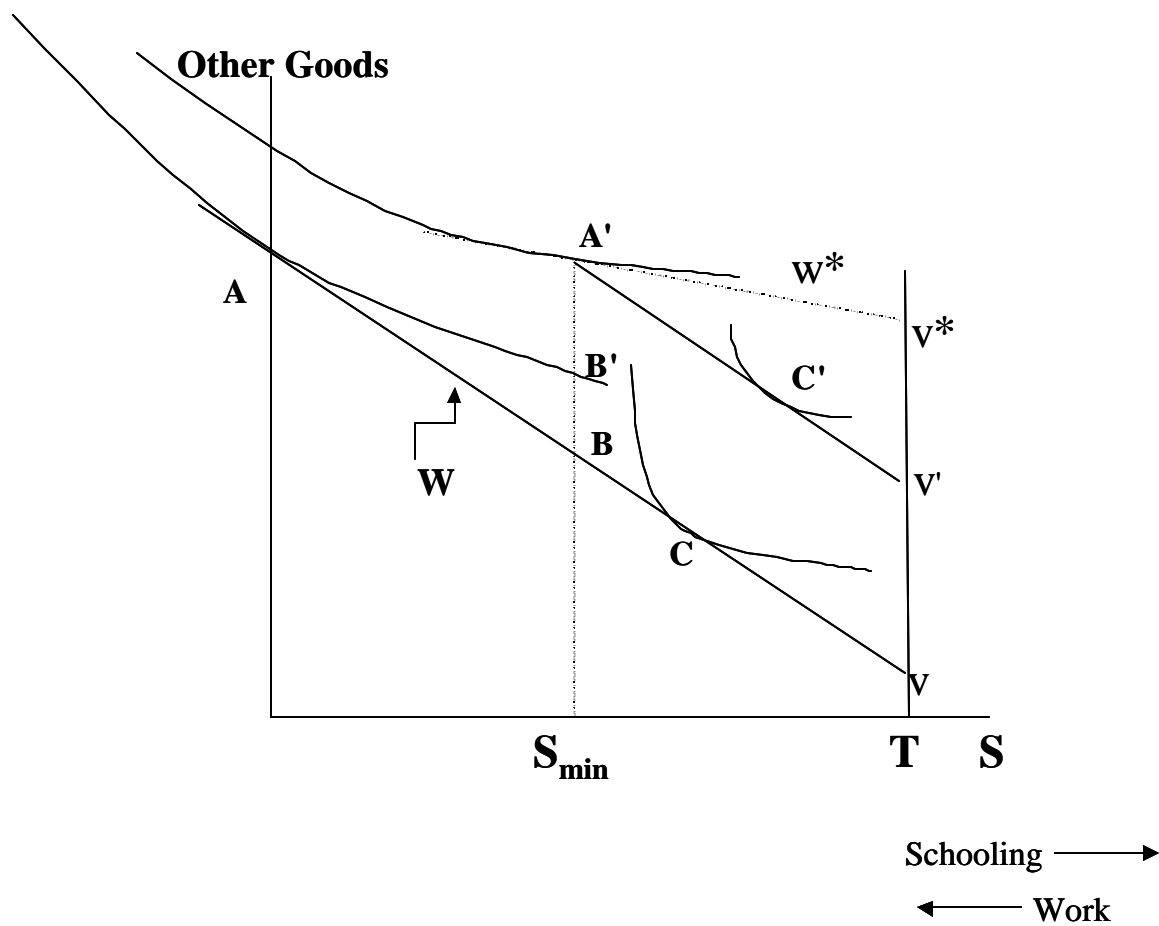
Whether the marginal cost of time decreases or increases depends on how strong these effects are in relation to each other. Since most of the program components work at increasing the marginal product of time in human capital production it is safe to say that the program is likely to decrease the MC of time and thus result in further reallocation of inputs within the household. In other words the requirements of the program tend to generate additional shadow price effects that lead to further substitution and income effects that have the potential of reinforcing the income effect resulting from the receipt of monetary benefits.

Figure 1 below illustrates some of these effects graphically. The vertical axis of the graph depicts the quantity of other goods available for consumption in the household, whereas the horizontal axis measures the time a child devotes to schooling (or in human capital investment). Full or 100 percent attendance rate occurs when the child devotes all non-leisure time in school attendance (including school-related homework) (i.e., $S=T$ where T denotes the amount of time available after excluding leisure time which for simplicity is assumed to be fixed). The vertical line of height V at the value of $S=T$ denotes the maximum amount of other goods available in the household when a child devotes all her time in schooling and not working. When a child divides her time between work and schooling then the line TVA describes the opportunity set of the household. The negative slope of this line is given by the real market wage W for child labor, which describes the trade-off in the market between the consumption of other goods and schooling (or work).¹⁶ By devoting one hour less in schooling and working one extra hour in market work the household can earn W additional units of other goods.

¹⁵ Note that in the case of health production the *platicas* may enhance the marginal productivity of time further ($h_{1K} > 0$).

¹⁶ It is assumed that the opportunity cost of child schooling is the fixed market wage for child labor. The assumption of a perfectly competitive labor market can be replaced by (or combined) with the assumption that children work at home producing home produced commodities that are perfectly substitutable with market purchased commodities with no additional complications (see Skoufias, 1994).

Figure 1 — The Effect of Conditional Cost Transfers on Children’s School Attendance and Work



A — Initially not attending.
C — Initially attending full time.
T — Maximum amount of time available excluding leisure.
 S_{\min} — Program's required school attendance.

Let S_{min} denote the 85% attendance rate required by the PROGRESA program. Eligibility for the benefits of PROGRESA, causes the budget line in the region between points T and S_{min} to shift up without changing its slope and increases the non-labor component of income upward to the point V' . To the extent that the household fulfills all the requirements of the program then $V' - V$ equals the maximum amount of benefits that the household can obtain from the program. In consequence the feasible budget constraint of an eligible family is now described by the line $TV' A' BA$ that is discontinuous at the point S_{min} .

Of course, differences in family non-earned income and market opportunities may be one important reason as to why some children are enrolled or not enrolled in school. To keep the exposition simple, we assume that the income opportunities of households are identical and consider the case when we have two different types of households represented by two different indifference curves. The household denoted by the tangency at point C represents households with a child that has an attendance rate close to 100% ($S > S_{min}$) and works only a very small fraction of her time. The indifference curve that crosses the vertical axis at point A represents households with a child that does not attend school at all ($S = 0$) and devotes all of her free time to market work. Although it does not have to be so, for simplicity point A is depicted as a tangency point between the indifference curve of the household and the real wage line W .

The discontinuity of the budget constraint of the household in combination with the assumption of utility maximization imply that there is a minimum conditional cash transfer that will induce the household to send its child to school. Let B' denote the point of intersection of the indifference curve of household A with the vertical line at S_{min} . Then the vertical difference $B' - B$ represents the minimum cash transfer that will make household A just indifferent between complying with the 85% attendance requirement and keeping their child out of school. A conditional cash transfer less than $B' - B$ is insufficient to induce the household to induce the household to enroll its child its school. This is because by having its child work, the family gets a higher level of utility compared to sending the child to school.

In figure 1, it is implicitly assumed that the size of the conditional cash transfer $V' - V$ is greater than the minimum amount $B' - B$ needed to induce household A to enroll the child in school and comply with the 85% attendance requirement. In consequence, household A finds it to its advantage to enroll the child in school. As it can be inferred from this figure, participation in the program is likely to affect households differently depending on their location on the budget line before the administration of the program. Consider household C for example. Such a household, for example, can represent households with children of primary school age where enrollment rate is close to 95 percent or the households with children of secondary school age who are regularly attending school even before the administration of the program. Since the conditions are not binding, the program is likely to have only a pure income effect represented in figure 1 by the parallel upward shift in the portion of the budget constraint between points T and

S_{min} .¹⁷ For these households the impact of the program may be concentrated at increasing the time they devote to schooling such as spending more time studying rather than enrollment.¹⁸

For a contrast consider household A. With the cash transfer conditioned on an 85% attendance rate, and with amount of the cash transfer greater than the minimum cash transfer $B' - B$ such a household will choose to send (enroll) its child to school. This new equilibrium is represented by the point A' .¹⁹ At first sight, it appears that for this household it is very hard to any attribute income and substitution effects to the program since the final equilibrium point A' is not a tangency point. Yet, one can still apply the familiar concepts of income and substitution effects using the analytical framework of “linearizing the budget constraint” (discussed in detail in Killingsworth, 1983). Linearizing the budget constraint amounts to transforming point A' into a tangency point by drawing a line tangent to the indifference curve at A' (i.e., finding the shadow wage W^*) and finding the corresponding level of non-earned income (or shadow income) V^* that corresponds to the shadow wage W^* . As it becomes apparent, household's A's participation in the program results in both substitution and income effects that tend to reinforce each other. The cash transfer component of the program leads to a pure income effect that increases schooling, while the condition that the child devote at least 85% of its time in school leads to a price effect. Based on standard economic theory the price effect may be further decomposed into a substitution and income effect. At the final equilibrium point A' the lower shadow wage $W^* (< W)$ represents the lower price of schooling as a result of the program while the total increase in household income as a result of the program may be considered to be the cash transfer $V' - V$ plus the implicit extra income $V^* - V'$ earned as a result of the lower price of schooling.²⁰

¹⁷ In terms of the more detailed human capital model discussed above, the program will have negligible effects on the marginal product of the child's time at school. In so far as the cross effects of the other program inputs are negligible (i.e., $h_{12} = 0, h_{13} = 0$) then the MC of its time would be unchanged.

¹⁸ It should be noted that the program may also have important dynamic effects by increasing the probability that children continue on to higher grades in school. These dynamic effects of PROGRESA are explored by Behrman, Sengupta, and Todd (2001).

¹⁹ It should be noted that with the same cash transfer of $V' - V$, not conditioned on an 85% attendance rate, this household could achieve a higher level of welfare (be on a higher indifference curve) than at point A' . However, in this case the attendance rate may end up being less than the 85% rate deemed as necessary.

²⁰ In terms of the model above the attendance requirements of the program will affect the marginal product of the child's time at school. Assuming that the positive cross-effects on the household the productivity of the child's time due to the higher time spent by the mother in production child education and the higher amount of textbooks available (i.e., $h_{12} > 0, h_{13} > 0$) are greater than the negative effect of the higher attendance requirement on h_1 ($h_{11} < 0$) then the MC of its time is likely to decrease (see equation 5 above).

To summarize, the economic framework presented above implies that participation in the program is likely to affect households differently depending on their constraints and preferences (or location on the budget line) before the administration of the program. For households for which the program constraints are binding, the program results in income and substitution effects that can reinforce its impact. For households for which the constraints of the program are non-binding the program is likely to have only income effects. Given the heterogeneity of households' preferences and constraints, the extent to which the program has a significant impact on the human capital and work of children can only be determined through empirical analysis. We now turn to a description of information sources and methods we use to evaluate empirically the impact of PROGRESA on children's human capital investment and work.

Additional Considerations and Topics in the Evaluation of PROGRESA

Synergy

One important assumption in the design of PROGRESA was that positive synergies among interventions affecting different types of human capital, nutrition, health and schooling are important. Two distinctions are useful in considering possible synergies among human resource investments. First, there is the distinction between production function synergies and total synergies. The former refers only to whether the production function technology implies that two inputs are complements (positive synergies) or substitutes (negative synergies). The latter incorporates all behavioral adjustments to a change affecting one human resource investment and, depending on all production technologies and preferences that are relevant for household's decisions, may imply larger or smaller synergies than the pure production function synergies. Second, there is the distinction between synergies among human resources that are more-or-less concurrent (e.g., current nutrient intakes might increase the effectiveness of current time in school in learning) and lagged effects over the life cycle (e.g., infant malnourishment might affect adult productivities).

The PROGRESA evaluation data are not well suited to investigate much about such possible synergies. Given that the nutritional intervention focused on children 0-5 years of age, and the educational intervention is focused on children 8-18 years of age, there is no way to determine or quantify the impact of the nutritional intervention at an early age on the educational and cognitive achievement of these children. The PROGRESA data also do not include critical information about various possibly relevant human resources and related outcomes for the same individuals. For example, for infants and small children they include some measures of nutrition, but not of cognitive development. For children in school, they include information on school enrollment, attendance and test scores, but not on longer-run health and nutrition status nor on short-run nutrient intakes. For adults they include information on school attainment and, for those who receive them, wage rates, but not on longer-run cognitive development nor longer-run health and nutrition nor on shorter-run nutrient intakes. And of course, given that individuals are followed over three years at most, effectively individuals cannot be followed across life-cycle stages. Therefore, though analysis of the PROGRESA data can provide useful

information about some pieces of human resource effects that may be helpful in understanding possible synergies, the PROGRESA data in themselves can not provide much insight into the importance of such synergies nor even whether most of them exist.

However, an extensive review of the currently available nutrition/epidemiological and socioeconomic literatures by Behrman (2000) reveals that human resource investments in nutrition, health and schooling do reflect considerably behavioral decisions at the household level. Therefore preferences and other constraints matter, not just pure production function characteristics. In fact the few available estimates directed to this issue indicate that parental preferences are such as to reinforce differentials among their children so that the total synergistic effects are likely to be greater than the pure production function effects. This literature does not include much persuasive evidence on more-or-less concurrent synergies during the preschool and school age stages. But there does seem to be evidence of significant positive synergies between concurrent short-run nutrition and schooling in terms of adult wages and productivities. And more important from the point of view of the human resource emphasis in PROGRESA, there also seems to be cross-life-cycle-stage positive synergies, particularly regarding the impact of preschool nutrition on schooling success and possibly on adult wages and productivities. Illustrative simulations based on the available estimates of the impact of human resources on outcomes of interest and on the persistence of human resources for individuals over their life cycles suggest that such synergies may importantly increase the returns of human resource investments, through a number of channels, of the types emphasized by PROGRESA beyond the effects of the individual human resource investments. Indeed the whole impact of the combined PROGRESA interventions in nutrition, health and schooling is likely to be significantly more than the sum of the parts.

Fertility

Improvements in the “quality” or the human capital embodied in children may also have an effect on the “quantity” or the number of children families would like to have. For example, changes in fertility could be one of the unanticipated consequences of the program (e.g., Rosenzweig and Wolpin, 1982). It is quite straightforward to extend the simple human capital model presented above to allow for households to determine their fertility endogenously. Fertility is a biological process; resources must be used by households to limit the supply of births rather than to increase supply, as for most other “goods.” This can be expressed in its most basic form by using the construct of a reproduction function, as in

$$N = j + n(Z), \quad n' < 0, \quad (2.8)$$

where N = number of births (children), Z = resources used to control births, with $n' < 0$, and j = fecundity, the number of births that would occur in the absence of control ($Z=0$).²¹ The household chooses its level of control Z , but fecundity is biologically determined.

²¹ Other reproductive inputs – e.g., age, breastfeeding – can readily be incorporated.

With the addition of the reproduction function and its determinants, the budget constraint equations changes to

$$V + W^c(\Omega - t_H^c)N + W^m(\Omega - Nt_H^m) + qNE = Np_N + Np_x X + p_z Z + Y, \quad (2.9)$$

where p_N is the direct cost of having a child and p_z is the price of the Z good. Then parents may be modeled as maximizing a welfare function that includes the number of children as one of its arguments, i.e., $U = U(N, E, Y)$, subject to (1) – (3) and (8)-(9) by choosing the levels of Z , X , Y and by allocating parental and child time across activities.

In this revised maximization problem, the same MC expressions presented above (i.e. expressions 6-8) remain valid still whereas the marginal cost or shadow price of having an extra child is given by the expression

$$MC_N = p_N = p_N + W^m t_H^m + p_x X - qE - W^c(\Omega - t_H^c) + p_z / n' \quad (2.10)$$

Expression (10) indicates that the resource costs associated with the addition of one child include the direct costs of a child, the value of the mother's time in child care, the value of the purchased human capital inputs X , the children's contributions to the household when young and when grown. Also in the numerator is the ratio of the per-unit cost of the fertility control resource to the "effectiveness" of control denoted by the derivative of the control function (8) with the respect to Z .

Increases in the direct costs of children, or adult female wages or in the prices of human capital inputs increase the marginal cost of having a child, whereas increases in the children's wages or in their potential contribution to the family as adults act so as to reduce the marginal cost of having a child. Moreover, reductions in the "costliness" of fertility control – decreases in the purchase price of contraception, p_z , and/or increases in the effectiveness with which a given increase in the fertility control resource reduces fertility (a change in the absolute value of n') – influence in the same way the marginal cost of fertility.

The revised model suggests that increases in the quality or the human capital of children are likely to have an effect on the marginal cost of having an extra child and thus on the number of children desired by families. For example, the basic health package offered to households participating in the PROGRESA program increases the effectiveness with which a given increase in the fertility control resource reduces fertility, which tends to increase the MC of an additional child. On the other hand, the higher earnings of children with more education when adults tend to decrease the MC of having an additional child. Which of the two effects dominates can only be determined empirically by observing families over long periods of time. The available empirical evidence to date (Rosenzweig and Wolpin, 1982), however, suggests

that rural households view schooling and child health as complements, while these two human capital characteristics of children are viewed by households as substitutes for fertility. This implies that the incentives provided by PROGRESA for families to invest in the health and education of their children are mutually reinforcing alternatives and that they will over time tend to decrease fertility and population growth in rural areas.

Intra-household Resource Allocation, Power and Status of Women within the Household

By design PROGRESA gives transfers directly to mothers. This decision is motivated by growing evidence that resources controlled by women are more likely to manifest greater improvements in child health and nutrition than resources placed in the hands of men.²²

The allocation of resources within households is intricately related to the questions of whether resources in the household are controlled by adult males or females. For example, both unitary (e.g., Becker and Tomes, 1979) and collective models emphasize that a household is likely to allocate resources differentially among its children. Without introducing more complex notation, in the context of the unitary model outlined above, in families with more than one child the amount of resources allocated to each child is likely to depend on its health endowment and ability summarized by the term θ_i . As long as two children in a family are endowed with different amounts of θ_i , households are likely to allocate different resources to them even if all the other variables affecting the decisions of households are the same for both children. As a consequence, policies and government interventions aimed at having a positive impact on specific target groups such as girls versus boys may be weakened or neutralized through adjustments in the distribution of resources within the households. It is possible, for example, for the availability of the nutritional supplement to younger children in households that are PROGRESA beneficiaries induces these households to decrease the share of food allocated to children. Along similar lines, the cash transfers received by PROGRESA households may displace or “crowd-out” the remittances beneficiary households received from older children and relatives working in the United States. Also, the loss of time in household and on-farm productive time incurred by enrolling eligible boys and girls in school may place serious time constraints on mothers and other household members as they try to replace for the time lost from children.

Incentive Effects and Impact on Poverty

Cash transfers, whether they are conditioned on some kind of household behavior or not, can have “incentive effects” on the income obtained from work by adult household members as well

²² Duflo (2000), for example, provides some of the first rigorous evidence that the impact of a cash transfer on children’s nutritional status is affected by the gender of its recipient. Specifically, she finds that pensions received by women in South Africa had a large impact on the anthropometric status of girl but little effect on that of boys. The pensions received by men had no effects on the anthropometric status of either boys or girls.

as “general equilibrium” effects meaning that the actual transfer of cash and the method of used to finance these transfers may have secondary effects that could work to reinforce or weaken the effects of the program. A naïve approach to cash transfers is that they lead unambiguously to increases in household income and welfare and reductions in poverty. The description of the program requirements and the model above suggests that the effect of conditional cash transfers such as those associated with PROGRESA may be more complex. The “pure income effect” of the cash transfers needs to be contrasted against the income losses or marginal cost increases associated with adhering to the requirements of the program. The cash transfers household receive may be just compensating for the income lost by beneficiary households ending their participation in other programs such as *Niños de Solidaridad*, *Abasto Social de Leche*, *de Tortilla*. In addition households incur time costs when they adhere to the requirements of the program. To the extent that these costs are high, then there is a possibility that the cash transfers of the program have no measurable effect on the income of participating households or the poverty rate in these communities.

Another possibility is that the cash transfers associated with the program are high enough to cover the income households forego when they satisfy the requirements of the program. In this case households may experience an increase in their income that in turn may affect the willingness of adult members to accept low paying work or physically demanding work. Incentive effects of this type have been empirically documented in program evaluations in other countries (Sahn and Alderman, 1995). One important implication of the discussion above concerns the impact of the program on measured poverty. Poverty measures are typically based on measured income or consumption. It is possible that poverty measures based on income or consumption may show little or no impact on poverty as long as households chose to use their cash transfers to “buy” more leisure. Under these circumstances it is important not to ascribe any negative connotations to the incentive effects of the program since households may simply be choosing to increase their welfare by having more leisure rather than having higher consumption of goods and services. The report of Parker and Skoufias (2000) makes an explicit effort to investigate the possibility of such incentive effects as a result of participation in PROGRESA.

Community and General Equilibrium Effects

The discussion so far has been limited to evaluating the effects of the program by simply focusing on the behavior and human capital outcome indicators of beneficiary households. PROGRESA, however, can also affect non-beneficiary households residing in the same community as well as households in other communities urban or rural where PROGRESA does not operate. The presence of PROGRESA a community, for example, may affect the behavior of non-beneficiary households in that community through the “demonstration” or “peer-group” effect. It is also possible that the availability of *platicas* in localities covered by PROGRESA may have spillover effects on the types of food consumed by non-beneficiary households as information about healthier foods and diets and better sanitary practices becomes spread in the community. At the community level, the selection of specific households into PROGRESA and

the exclusion of others may introduce a new type of social differentiation within communities that could diminish social cohesion within these communities.

In addition to the effects of PROGRESA on communities covered by the program it is also important to recognize that PROGRESA may also have an indirect effect on the welfare of households living in communities not covered by PROGRESA. When one takes into consideration the fact that the cash transfers distributed by PROGRESA have to be financed domestically as they are in the case of Mexico, through the elimination of distortionary price subsidies or value-added tax reforms then the possibility of a variety of indirect or multiplier effects arises. A closer consideration of these indirect effects in measuring program impacts in overall social welfare raise the possibility that the first-round positive effects of the program may be offset by the second-round negative indirect effects of the program.

To summarize, the economic framework presented above implies that participation in the program results in income effects and in a multitude of substitution effects that can reinforce the impact of the program on participating households. Depending on the specific circumstances of the household, the constraints it faces and its preferences towards human capital, fertility and consumption of goods and services, the substitution effects induced by the program may work against the positive income effect resulting from the cash transfer component of the program. The theoretical model also makes it clear that it is necessary to adopt an empirical approach to evaluating the impact of a program like PROGRESA. Ultimately, the question of whether the program has a significant impact on the investments of households in the education, health and nutrition of their children can only be determined by observing the behavior of households participating in the program. The next chapter describes the quantitative and qualitative methods and information sources used to evaluate empirically the impact of PROGRESA.

Chapter 3

Empirical Methods for Evaluation and Information Sources

The central problem in the evaluation of any social program is the fact that households participating in the program cannot be simultaneously observed in the alternative state of no treatment. To illustrate, let Y_1 be the outcome for a given individual or household in the treated state (i.e., during or after participation in the program) and Y_0 is the outcome in the untreated state (i.e., without participating in the program). Then the gain for any given individual or household from being treated by the program is $\Delta = (Y_1 - Y_0)$. However, at any time a person is either in the treated state, in which case Y_1 is observed and Y_0 is not observed, or in the untreated state, in which case Y_1 is unobserved and Y_0 is observed. Given that missing Y_1 or Y_0 preclude measurement of this gain for any given individual, one has to resort to statistical methods as a means of addressing this problem (e.g., see Heckman, LaLonde and Smith, 1999). The statistical approach to this problem replaces the missing data on persons using group means or other group statistics, such as medians.

For example, the majority of the studies on evaluation of social programs focus on the question of whether the program changes the mean value of an outcome variable among participants compared to what they would have experienced if they had not participated. The answer to this question is summarized by one parameter called the “the mean direct effect of treatment on the treated.” Using formal notation, the mean effect (denoted by the expectation operator E) of treatment on the treated (denoted by $T=1$) with characteristics X may be expressed as

$$E(\Delta | T = 1, X) = E(Y_1 - Y_0 | T = 1, X) = E(Y_1 | T = 1, X) - E(Y_0 | T = 1, X). \quad (3.1)$$

The term $E(Y_1 | T = 1, X)$ can be reliably estimated from the experience of program participants. What is missing is the mean counterfactual term $E(Y_0 | T = 1, X)$ that summarizes what participants would have experienced had they not participated in the program.

The variety of solutions to the evaluation problem differ in the method and data used to construct the mean counterfactual term $E(Y_0 | T = 1, X)$. For example, one approach used frequently to evaluating social programs is based on the notion that all that is needed is repeated observations on a set of households before and after the start of a program. Thus observations on the same households before the implementation of a social can be used to estimate $E(Y_0 | T = 1, X)$. Another approach is that of social experimentation or randomization of individuals into treatment and control groups. Experimental designs use information from individuals or households in the control group to construct an estimate of what participants

would have experienced had they not participated in the program, i.e., the term $E(Y_0 | T = 1, X)$.²³

The empirical framework adopted by the PROGRESA administration for the purposes of evaluating the program's impact offers a very flexible approach to solving the evaluation problem. Its advantages are derived from two key features. Firstly, it is a quasi-experimental (QE) design with randomization of localities, rather than households or individuals, into treatment and control groups.²⁴ Secondly, data are collected from all households in both treated and control localities before and after the start the treatment. The combination of these two features permit researchers to evaluate the "mean direct effect of treatment on the treated" or in other words the impact of the program on program participants using any of the estimators available in the evaluation literature, including the before-after estimator, the difference-in-differences estimator, and the first-difference or (cross-sectional) estimator discussed in more detail below.

The expansion of the program across localities and over time was determined by a planned strategy that involved the annual budget allocations and logistical complexities associated with the operation of the program in very small and remote rural communities (such as verification that the localities to be covered by the program had the necessary educational and health facilities). In consequence the expansion of the program took place in phases.²⁵ In phase one that began in August 1997, 140,544 households in 3,369 localities were incorporated. Phase two of the program began in November 1997 when a further 160,161 households in 2,988 localities were incorporated. The greatest expansion occurred in 1998 (i.e., phases 3-6) when nearly 1.63 million families in 43,485 localities were incorporated. By phase 11, the final phase of the program in early 2000, the program included nearly 2.6 million families in 72,345 localities in all 31 states.

The experimental design used for the evaluation of PROGRESA takes advantage of the sequential expansion of the program in order to come up with a set of localities that serve the role of controls. Specifically, the sample used in the evaluation of PROGRESA consists of repeated observations (panel data) collected for 24,000 households from 506 localities in the seven states of Guerrero, Hidalgo, Michoacan, Puebla, Queretaro, San Luis Potosi and Veracruz.²⁶ Of the 506 localities, 320 localities assigned to the treatment group ($T=1$) and 186

²³ For a more thorough discussion of the various solutions to the evaluation problem see Heckman, LaLonde and Smith (1999).

²⁴ Valadez and Bamberger (1994) provide a detailed description of the elements of a quasi-experimental approach to program evaluation. For a review of evaluations of social sector programs using randomized control designs in Mexico and other countries see Newman, Rawlings, and Gertler (1994).

²⁵ For more details see section 4 and table 1 in Coady (2000).

²⁶ In addition to the seven states mentioned above the second phase of PROGRESA's expansion included the states of: Campeche, Coahuila, Chiapas, Chihuahua, Guanajuato, and

localities were assigned as controls ($T=0$). Specifically, the 320 treatment localities were randomly selected using probabilities proportional to size from a universe of 4,546 localities that were covered by phase II of the program in the 7 states mentioned above. Using the same method, the 186 control localities were selected from a universe of 1,850 localities in these 7 states that were to be covered by PROGRESA in later phases. As originally planned the localities serving the role of a control group started receiving PROGRESA benefits by December 2000.

It is important to clarify that there is a very important and crucial difference between making the best use of the constraints involved in the coverage of households and the “deliberate withholding of benefits for the purposes of the evaluation.” Annual fiscal constraints and logistical complexities associated with the operation of a social program like PROGRESA in very small and remote rural communities typically do not permit the program to cover all of eligible households at once. Instead, households have to be covered by the program in phases as was done in the case of PROGRESA. Rather than purposefully depriving households of program benefits, experimental or quasi-experimental designs simply take advantage of the sequential expansion of the program to select a comparable or control group from the set of households that are eligible for the program but have yet to be covered by the program. This practice offers the opportunity to conduct a scientifically rigorous evaluation of whether the program has an impact or not, and if so the size of this impact on beneficiary households. A scientifically rigorous evaluation is the best way of determining whether the scarce public funds are used effectively and efficiently towards the achievement of the short-run and long run objectives of the program.

As explained in more detail in chapter 3, all households were initially surveyed in October/November 1997, and based on the first survey the eligibility status of households was determined. Based on PROGRESA’s beneficiary selection method, all households in both treatment and control communities were classified as eligible and non-eligible for participation in the program. On average in our sample, 78 percent of the households were classified as eligible for program benefits.²⁷ A second survey took place in March 1998 before the initiation of payments in July 1998. The third round of the survey took place in October 1998, which was well after most households received some benefits as part of their participation in the program. The next round of the survey took place in June 1999, and the fifth round took place in November 1999. After that round, the benefits of the program started to be distributed in the control communities.

Oaxaca. The evaluation sample did not include localities from these six states for a variety of reasons. For example, the sociopolitical problems in the state of Chiapas led to exclusion of this state from the evaluation sample.

²⁷ As is explained below, in reality the percentage of beneficiary households in treatment localities turned out to be less than the numbers of eligible households due to some administrative mistakes.

A useful description of the general methodology and estimators used to evaluate the impact of PROGRESA on any given outcome indicator denoted by the letter Y is provided by the table below. Within any survey round before ($t = 0$) or after the start of the program ($t = 1, 2, 3, \dots$), the average value of the outcome indicator Y within the total survey population denoted by $[Y(t)]$, can be divided into 4 different components depending on whether an individual child or adult belongs in a household classified as eligible to receive PROGRESA benefits ($E=1$ for eligible households and $E=0$ for non-eligible households) and according to whether the household that the individual belongs in resides in a locality where PROGRESA is in operation (treatment locality or $T=1$) or not (control locality or $T=0$).

Table 3.1— A Decomposition of the Sample of All Households in Treatment and Control Villages

Household Eligibility Status	TREATMENT LOCALITY where PROGRESA is in operation ($T=1$)	CONTROL LOCALITY where PROGRESA operations are delayed ($T=0$)
Eligible for PROGRESA benefits ($E=1$)	A $E=1, T=1$	B $E=1, T=0$
Non-Eligible for PROGRESA benefits ($E=0$)	C $E=0, T=1$	D $E=0, T=0$

Given this decomposition of the sample one may then construct all of the estimators commonly used in program evaluation. These are:

- i) the cross-sectional difference estimator (CSDIF) that compares differences in the means of the outcome variable Y between groups A and B during the periods after the implementation of the program (i.e., $t=1, 2, 3, \dots$)

$$CSDIF = [E(Y(t) | T = 1, E = 1)] - [E(Y(t) | T = 0, E = 1)] \text{ for } t=1, 2, 3, \dots \quad (3.2)$$

- ii) the before and after estimator (BADIF) compares differences in the means of the outcome variable Y between group A during the periods after ($t \geq 1$) and before ($t=0$) the implementation of the program, i.e.:

$$BADIF = [E(Y(t=1) | T=1, E=1)] - [E(Y(t=0) | T=1, E=1)]; \text{ and} \quad (3.3)$$

- iii) the double differences or difference-in-differences estimator (2DIF) that measures program impact by comparing differences in the means of the outcome between group A and B in post survey rounds with the differences in the mean the means of the outcome between group A and B in the pre –program round. Formally,

$$2DIF = [E(Y(t=1) | T=1, E=1)] - [E(Y(t=1) | T=0, E=1)] - [E(Y(t=0) | T=1, E=1)] + [E(Y(t=0) | T=0, E=1)]. \quad (3.4)$$

Each of these estimators has some advantages and shortcomings associated with it. However, the 2DIF estimator in comparison to either the BADIF or CSDIF estimators is the preferred estimator for program evaluation. For example, one major advantage of the 2DIF estimator over CSDIF in evaluating the mean direct effect of treatment on the treated is that the former controls for any pre-existing differences in the expected value of Y between households in treatment and control localities. Measuring program impact based exclusively on post-program difference in the mean level of the outcome indicator between treatment and control localities, as done by the first difference estimator, may lead to potentially misleading conclusions about program impact. For example, consider the case where there are pre-program differences in the levels of Y between treatment and control localities. For example, suppose that the mean value of the outcome indicator is lower among eligible households in treatment localities than in eligible households in control localities, i.e., $[E(Y(t=0) | T=1, E=1)] < [E(Y(t=0) | T=0, E=1)]$. In addition suppose that the program is successful at bringing the level of Y in the treatment localities up to the level of Y in control localities in the period after the start of the program. Then a simple comparison of means between treatment and control localities after the start of the program is likely to show no impact whereas the program has had a significant impact.²⁸

Ultimately, the extent to which the CSDIF estimator may lead to biased results depends critically on whether the selection of treatment and control localities was indeed random. Pure and proper randomization of the selection of localities would ensure that there are no significant pre-program differences in the outcome variable of interest between treatment and control localities, i.e.,

$$[E(Y(t=0) | T=1, E=1)] = [E(Y(t=0) | T=0, E=1)]. \quad (3.5)$$

²⁸ Along parallel lines of reasoning the 2DIF estimator relative to the BADIF is able to yield an estimate of the program effect that is net of any time trends or aggregate effects present in the data (for more details see the discussion below and Heckman, LaLonde and Smith, 1999).

Satisfaction of condition (5) also ensures that $CSDIF=2DIF$. In other words, randomization implies that focusing exclusively on post-program comparisons between treatment and controls yields unbiased conclusions about the impact of the program.

The extent to which the selection of localities into treatment and control groups can be considered as random is investigated in detail in one of the early reports of the evaluation project (see Behrman and Todd, 1999a). Randomized assignment to treatment implies that the distribution of all the variables for treatments and controls should be equal prior to the administration of the program. To check whether randomization has been successfully implemented, the treatment and control samples were compared in two key dimensions. First, by comparing the means of key variables transformed into locality means in control and treatment localities. Second, by comparing the means of the same variables with household level data.

When these comparisons and tests were performed at the locality level (i.e., comparing locality means of age, education, income, access to health care, etc) the hypothesis that the means are equal between treatment and control localities is not rejected. Performing the same comparison using household level data, it was found that the null hypothesis was rejected more frequently than would be expected by chance given standard significance levels. While this rejection of random assignment into control and treatment is somewhat alarming, the researchers interpreted it as being due to the fact that the samples are large which means that even minor differences could lead to rejection.

In practice which of these two estimators is feasible depends on whether data on an outcome indicator is available not only after but also before the start of the program. For most of the key outcome indicators of interest such as school enrollment and attendance, child nutrition, incidence of illness, and labor force participation, data are available before and after the start of the program that permit implementation of the 2DIF estimator. For some indicators, however, such as household consumption, caloric availability and individual time allocation, observations are only available for one or more rounds after the start of the program. For these outcome indicators, the CSDIF estimator provides the best available option for evaluating PROGRESA.

Program Evaluation Within the Regression Framework

The discussion so far focused on evaluating PROGRESA without making any adjustments for the role of observed characteristics of the individual, the household and the locality on the variation in the observed value of the outcome indicator of interest. Without any adjustment for the role of such confounding factors all the differences in the mean value of the outcome indicator are attributed to the program. As a matter of principle it is preferable to have an estimate of the impact of the program net of the influence of these observed characteristics on the difference in the mean value between treatment and control households.

This can be accomplished through linear regression methods. In my discussion below, I will focus on the regression methods that one can use to estimate the impact of eligibility in the PROGRESA program on a generic outcome indicator. It should be kept in mind that the proper econometric method applied (OLS, tobit, or probit) depends on whether the outcome indicator is a continuous variable, such as household consumption, whether the continuous variables is censored at some value (such as zero) or whether it is a binary variable, e.g., is a child is enrolled in school or not.

I also assume that the objective of the regression analysis is to obtain a consistent and unbiased estimate of the effect of the program on households or individuals eligible for the program. I do not address the issue of take up, although to the extent that take up differs a lot from eligibility biases from selectivity may be at work.

I begin with the case where there are data available for treatment and control households before and after the start of the program.²⁹ Restricting the sample to eligible households only ($E=1$), the various estimators for program evaluation discussed above that control for individual, household and locality observed characteristics can be obtained by estimating a regressions equation of the form³⁰

$$Y(i, t) = \mathbf{a} + \mathbf{b}_T T(i) + \mathbf{b}_R R2 + \mathbf{b}_{TR} (T(i) * R2) + \sum_j \mathbf{q}_j X_j + \mathbf{h}(i, v, t), \quad (3.6)$$

where $Y(i, t)$ denotes the value of the outcome indicator in household (or individual) i in period t , \mathbf{a} , \mathbf{b} , \mathbf{g} and \mathbf{q} are fixed parameters to be estimated, $T(i)$ is a binary variable taking the value of 1 if the household belongs in a treatment community and 0 otherwise (i.e., for control communities), $R2$ is a binary variable equal to 1 for the second round of the panel (or the round after the initiation of the program) and equal to 0 for the first round (the round before the initiation of the program), X is a vector of household (and possibly village) characteristics and \mathbf{h} is an error term summarizing the influence random disturbances.

²⁹ I assume only one observation after the start of the program for expositional simplicity only. More than one round of observations after the start of the program can be easily accommodated by including an additional binary variable (say $R3$) along its interaction with the treatment dummy ($R3 * T$). Then the coefficient of the ($R3 * T$) term is an estimate of the 2DIF program impact estimate in the third round of the survey and the can yield information on whether the impact of the program is strengthened or weakened over time (e.g., Schultz 2000, Parker and Skoufias, 2000).

³⁰ It should be noted that a slightly more restrictive specification is to pool all eligible and non eligible households and include an additional variable denoting eligibility (E) along with a full set of its interactions with the binary variables T and $R2$. This alternative specification, in addition to estimates of CSDIF and 2DIF, yields the triple difference (3DIF) or difference-in-difference-in differences estimator which compares changes in the inequality of the outcome indicator between eligible and non-eligible households (e.g., see Schultz, 1999).

To better understand the preceding specification it is best to divide the parameters into two groups: one group summarizing differences in the conditional mean of the outcome indicator before the start of the program (i.e., \mathbf{a} , \mathbf{b}_T), and another group summarizing differences after the start of the program (i.e., \mathbf{b}_R , and \mathbf{b}_{TR}). Specifically, the coefficient \mathbf{b}_T allows the conditional mean of the outcome indicator to differ between eligible households in treatment and control localities before the initiation of the program whereas the rest of the parameters allow the passage of time to have a different effect on households in treatment and control localities. For example, the combination of parameters \mathbf{b}_R and \mathbf{b}_{TR} allow the differences between eligible households in treatment and control localities to be different after the start of the program.

One advantage of this specification is that the t-values associated with some of these parameters provide direct tests of a number of interesting hypotheses. For example, the t-value associated with the estimated value \mathbf{b}_T provides a direct test of the equality in the conditional mean of Y between treatment and control before the initiation of the program and serves the role of a test of the randomness in selection of localities. For if there were a truly random selection of localities into control and treatment, then the conditional mean of the outcome indicator should be the identical across treatment and control households/individuals.

Specifically, given the preceding specification, the conditional mean values of the outcome indicator for treatment and control groups before and after the start of the program are as follows:

$$[E(Y | T = 1, R2 = 1, \mathbf{X})] = \mathbf{a} + \mathbf{b}_T + \mathbf{b}_R + \mathbf{b}_{TR} + \sum_j \mathbf{q}_j X_j \quad (3.7a)$$

$$[E(Y | T = 1, R2 = 0, \mathbf{X})] = \mathbf{a} + \mathbf{b}_T + \sum_j \mathbf{q}_j X_j \quad (3.7b)$$

$$[E(Y | T = 0, R2 = 1, \mathbf{X})] = \mathbf{a} + \mathbf{b}_R + \sum_j \mathbf{q}_j X_j \quad (3.7c)$$

$$[E(Y | T = 0, R2 = 0, \mathbf{X})] = \mathbf{a} + \sum_j \mathbf{q}_j X_j \quad (3.7d)$$

According to the preceding specification, the cross-sectional difference estimator is given by the expression:

$$\begin{aligned} CSDIF &= (3.7a - 3.7c) = \\ [E(Y | T = 1, R2 = 1, \mathbf{X}) - E(Y | T = 0, R2 = 1, \mathbf{X})] &= \mathbf{b}_T + \mathbf{b}_{TR} . \end{aligned} \quad (3.8)$$

while the before-and-after difference estimator is given by

$$BADIF = (3.7a - 3.7b) =$$

$$[E(Y | T = 1, R2 = 1, \mathbf{X}) - E(Y | T = 1, R2 = 0, \mathbf{X})] = \mathbf{b}_R + \mathbf{b}_{TR} . \quad (3.9)$$

Expression (3.8) describing the CSDIF estimator highlights the fact that the estimated impact of the program is inclusive of any pre-program differences between treatment and control groups (summarized by the presence of the \mathbf{b}_T term). Along similar lines, expression (3.9) indicates that the BADIF estimator is inclusive of any trend or aggregate effects in the changes of the outcome indicator Y (summarized by the presence of the \mathbf{b}_R term).

The advantage offered by the difference in differences (2DIF) estimator is that it provides an estimate of the impact of the program that is net of any pre-program differences between treatment and control households and/or any time trends or aggregate effects in changes of the values of the outcome indicator.³¹ By comparing before and after differences between treatment and control households (or differences between treatment and control households after and before the program) one is able to get an estimate of the impact of the program (summarized by the single parameter \mathbf{b}_{TR}).

$$\begin{aligned} 2DIF &= (3.7a - 3.7b) - (3.7c - 3.7d) = \\ &= (3.7a - 3.7c) - (3.7b - 3.7d) = \mathbf{b}_{TR} \end{aligned} \quad (3.10)$$

Using the terminology of Heckman, La Londe, and Smith (1999), the parameter \mathbf{b}_{TR} provides an estimate of the “mean direct effect of treatment on those who take the treatment.” It should also be noted the program effect summarized by the parameter \mathbf{b}_{TR} is inclusive of the role that the operational efficiency or inefficiency with which the program operates. It is likely that persistent delays in the processing of forms in some states or municipalities and other administrative bottlenecks may lead to weaker impacts of the program on households residing in these states relative to that in states where the program is operating more efficiently.³² This question was dealt with as part of the operations evaluation of PROGRESA rather than as part of the impact evaluation of the program.

In the majority of the reports, the vector \mathbf{X} typically consists of variables characterizing the age and gender composition of the household, household size, and the age and education level of the household head and his/her spouse. Given that the vector \mathbf{X} does not contain any supply-related variables, \mathbf{b}_{TR} is an estimate of the impact of the conditional cash transfers (demand-side

³¹ It is important to take note, however, that these advantages of the 2DIF estimator are based on some implicit assumptions. For example, the 2DIF estimator assumes that the time trend present among control households is an adequate representation of the trend that would have prevailed among treated households in the absence of the program.

³² For example, such regional inefficiencies in the operation of the program could be captured empirically by allowing the coefficient of treatment dummy variable T in expression 3.6 to vary by region or state.

effects) and the improvements in the quantity and quality (or supply-side effects) of educational and health services and facilities associated with the PROGRESA program. Efforts to distinguish between the demand and supply effects of the program require the inclusion of supply-related variables as additional regressors in equation (3.6).³³ However, the extent to which one is able to isolate sufficiently the demand effect from the supply effect depends on whether the observed supply-related variables observed capture sufficiently all the supply effects of the program

The availability of repeated observations before and after the start of the program on non-eligible households in treatment areas also offers the opportunity to examine the potential effects of the program on the non-eligible households residing in the treatment communities. For example, improvements in the quantity and quality of supply of health and educational services may also benefit the non-eligible households in the treatment communities. Non-eligible households may also benefit by attending voluntarily the monthly *platicas* offered in the villages covered by PROGRESA. In addition, non-eligible households in treatment localities may alter their behavior (such as work less or withdraw their children from school) in anticipation that such actions may qualify them for the program.

To assess the extent to which the program has some indirect effects on the outcome indicator among non-eligible households in treatment areas, a similar regression could be estimated for the sample of non-eligible households ($E=0$) (denoted here by the superscript NE) as follows:

$$Y(i, t) = \mathbf{a}^{NE} + \mathbf{b}_T^{NE} T(i) + \mathbf{b}_R^{NE} R2 + \mathbf{b}_{TR}^{NE} (T(i) * R2) + \sum_j \mathbf{q}_j^{NE} X_j + \mathbf{h}^{NE}(i, v, t). \quad (3.11)$$

As before, the difference-in-differences estimators (2DIF) described by the parameter \mathbf{b}_{TR}^{NE} yields a direct estimate of the indirect effects of the program on non-eligible households in treatment localities.

When data for the outcome variable of interest are available for one round (or more rounds) after the start of the program, then the evaluation of the impact of the program reduces to whether the coefficient of the $T(i)$ binary variable identifying the households residing in treatment localities, is positive and significantly different from zero. Using the sample of eligible households only ($E=1$), then a specification that could be estimated is of the form:

$$Y(i) = \mathbf{a} + \mathbf{g}_T T(i) + \sum_j \mathbf{q}_j X_j + \mathbf{h}(i, v) \quad (3.12)$$

In this case an estimate of the cross-sectional difference estimator (CSDIF) is provided by

³³ For example, see Schultz (2000a) and Coady (2000).

$$CSDIF = E(Y | T = 1, \mathbf{X}) - E(Y | T = 0, \mathbf{X}) = \mathbf{g}_T \quad (3.13)$$

The availability of observations for more than one round after the start of the program allows one to examine whether the impact of the program is strengthened or weakened by the passage of time. For example, denoting observations from the third round of the evaluation survey by R3 (that is the second round after the start of the program) a regression of the form

$$Y(i) = \mathbf{a} + \mathbf{g}_T T(i) + \mathbf{d}_R R3 + \mathbf{d}_{RT} (R3 * T(i)) + \sum_j \mathbf{q}_j X_j + \mathbf{h}(i, v) \quad (3.14)$$

With this specification, a statistical comparison of the relative sizes of the coefficients \mathbf{d}_{RT} and \mathbf{g}_T (using one-tailed tests) can reveal whether the impact of the program in the third round is significantly greater or smaller than the impact of the program in the second round (e.g., see Hoddinott, Skoufias, and Washburn, 2000, Skoufias and Parker, 2001).

Unobserved Heterogeneity Across Localities, Households, and Individuals

The discussion so far did not address the role of unobserved heterogeneity summarized by the error term $\mathbf{h}(i, v, t)$ in the preceding regressions. One primary implication of the clustering of the households with villages is that the household-specific error terms $\mathbf{h}(i, v, t)$ are likely to be correlated within each village (as well as across time). Failure to account for such a correlation may lead to a considerable bias in the estimated standard error of the program impact (e.g., see Murray, 1998). For this reason all of the impact evaluation reports account for the clustered nature of the sample and report robust standard error estimates for the impact of the program.³⁴

A more structural approach to the specification of the error term is possible as a result of the panel nature of the PROGRESA data. With repeated observations per household (or per individual), one useful decomposition of the error term is as follows:

$$\mathbf{h}(i, v, t) = \mathbf{m}(i) + \mathbf{m}(v) + \mathbf{e}(i, v, t). \quad (3.15)$$

This additive decomposition implies that the error components are likely to be correlated across time and across units within any given point in time. For example, across individuals residing in the same household, or across households residing in the same village. Variation arising from regional differences that are common for all households in the same community is denoted by $\mathbf{m}(v)$. Variation arising from unobserved household characteristics is denoted by $\mathbf{m}(i)$, while variation arising from other random shocks is denoted by $\mathbf{e}(i, v, t)$.³⁵

³⁴ Robust standard error estimates were obtained using the “robust” option in STATA v7.0.

³⁵ It should be noted that I could also have included a time effect $\mathbf{t}(t)$ common to all units in the sample, as an additional component of the individual error term. This effect is

Assuming that $e(i, v, t)$ is independently and identically distributed across households and communities and time with mean 0, and variance σ_e^2 , the appropriate estimator for equation (1) is determined by the treatment of the household-specific components $\mu(i)$. This is because the $\mu(v)$ term is perfectly collinear with the $\mu(i)$ term and thus not possible to distinguish from the $\mu(i)$.

There are two specifications of heterogeneity. The first treats the $\mu(i)$ as the realization of a random variable that is uncorrelated with e and the included regressors and distributed with mean 0 and variance σ_m^2 . With this random effects (or variance components) specification the efficient estimator is the generalized least squares (GLS) estimator. Hausman and Taylor (1981) show that the GLS estimator of this model can be obtained by running ordinary least squares on suitably transformed data.

The alternative specification treats $\mu(i)$ as an individual specific omitted variable (fixed effect) that may be correlated with the included regressors. To the extent that these municipality-specific omitted variables such as prices are correlated with the included regressors the parameter estimates obtained by either OLS or GLS methods may be biased and inconsistent.

As a more rigorous test of the potential correlation of individual specific effects with the included regressors, a Hausman (1978) statistic is also constructed. Under the null hypothesis of exogeneity, the random effects estimator will be consistent and efficient. Under the alternative hypothesis that $\mu(i)$ is correlated with the regressors, the random effects estimator is not consistent while the fixed effects estimator is consistent.

Evaluation Tools/Information Sources

To evaluate impact, researchers conducted formal surveys and structured and semi-structured observations and interviews, focus groups and workshops with a series of stakeholders, including beneficiaries, local leaders, local PROGRESA officials, central PROGRESA officials, health clinic doctors, nurses and assistants, and school teachers.

As discussed earlier the sample used in the evaluation of PROGRESA consists of repeated observations (panel data) collected for 24,000 households from 506 localities. Of the 506 communities, 320 were designated as treatment and 186 as control communities. The data used in the evaluation was carried out between November 1997 and November 1999. The communities were located in the seven states that were among the first states to receive PROGRESA, including Guerrero, Hidalgo, Michoacán, Puebla, Querétaro, San Luis Potosi,

explicitly omitted since it is accounted by the binary dummy variable signifying the round of the survey (R2).

and Veracruz. More details on the geographic distribution of the evaluation sample of localities and their characteristics are provided in Appendix C.

In November 1997 PROGRESA conducted a survey of the socio-economic conditions of rural Mexican households (*Encuesta de Características Socioeconómicas de los Hogares* or ENCASEH) in the evaluation communities to determine which households would be eligible for benefits. Then based on PROGRESA's beneficiary selection methods, households were classified as eligible and non-eligible for participation in the program in both treatment and control communities. On average in the evaluation sample, 78% of the households were classified as eligible for program benefits. The first evaluation survey (*Encuesta Evaluación de los Hogares* or ENCEL) took place in March 1998 before the initiation of benefits distribution in May 1998.³⁶ In combination these two surveys provide the baseline observations available for all households before the initiation of the distribution of cash benefits in the treatment villages.

The rest of the evaluation surveys were conducted after beneficiary households started receiving benefits from PROGRESA.³⁷ One round of surveys took place in November 1998, which was well after most households received some benefits as part of their participation in the program. The next two waves took place in June 1999 and November 1999.³⁸ A number of core questions about the demographic composition of households and their socio-economic status were applied in each round of the survey. These core questions were accompanied by specific questionnaires, focused on collecting information critical to a thorough evaluation of the impact of the program. The topics of these modules included collecting information about family background, assets brought to marriage, schooling indicators, health status and utilization, parental attitudes and aspirations towards children's schooling, consumption of food and non-food items, the allocation of time of household members in various activities, and self-employment activities. Table 3.2 below presents the number of households and individual members covered in each survey round.

The preceding surveys were supplemented by school and clinic surveys, community questionnaires, data on student achievement test scores, and other school and clinic administrative data. The evaluation surveys (ENCEL) collected by PROGRESA did not allow for an evaluation of the nutritional component of the program. For the purposes of evaluating the nutritional component of PROGRESA separate surveys of the same families were carried out

³⁶ In principle, the first payments in May 1998 were for the two-month period elapsed since incorporating families into PROGRESA (i.e., in March 1998). Note, however, there is no record kept for the exact date of incorporating families into the program.

³⁷ IFPRI researchers and academic collaborators had a significant contribution in the design of the evaluation questionnaires applied in November 1998, and later. IFPRI researchers were not allowed to contribute in the training of the interviewers, the household survey process, and in the data inputting and cleaning process.

³⁸ An additional survey took place in June 2000. From that survey only the fertility module has been utilized for the evaluation of PROGRESA.

by the National Institute of Public Health (INSP) in Cuernavaca. These surveys included collection of data on anthropometric measures (weight and height) data of children, collection of blood samples for tests for anemia and other deficiencies. Note, however, that IFPRI researchers were able to merge the child-specific anthropometric data collected and made available by the INSP with the evaluation data collected by PROGRESA in order to conduct an early evaluation of the impact of PROGRESA on the height of pre-school (Behrman and Hoddinott, 2000).

Table 3.2—The number of households and individual members covered in each survey round

		Non-Eligible (E=0)		Eligible (E=1)		All
Survey round	Coverage	Control (T=0)	Treatment (T=1)	Control (T=0)	Treatment (T=1)	
PRE-PROGRAM/BASELINE CENSUS/SURVEY						
ENCASEH Nov97	Households	2,048	3,233	7,173	11,623	24,077
	Individuals	5,791	8,765	17,114	27,366	59,036
ENCEL-Mar98	Households	1,925	3,048	6,567	10,549	22,059
	Individuals	n.a.	n.a	n.a	n.a.	n.a.
POST-PROGRAM SURVEYS						
ENCEL-Nov98	Households	2,058	3,272	7,158	11,585	24,073
	Individuals	6,147	9,290	17,793	28,258	61,488
ENCEL-Jun99	Households	1,837	2,932	6,655	10,682	22,106
	Individuals	5,361	8,090	16,406	25,775	55,632
ENCEL-Nov99	Households	1,921	2,902	6,818	10,475	22,116
	Individuals	5,804	8,421	17,219	26,000	57,444

Notes:

1. The terms eligible (E=1) or Non-Eligible (E=0) are based on the final list of eligible households constructed by the PROGRESA administration (see chapter 5 for more details).
2. The March 1998 ENCEL survey collected information at the individual level only for children between 0-6 years of age. No information was collected at the individual level for adult members

In measuring the impact of a large and administratively complex program such as PROGRESA it is very important to take into consideration the role that operational factors can play. Delays in the delivery, completion and/or processing of the various forms required to prove compliance with the program requirements can lead to delays in the delivery of the cash benefits associated with the program. To the extent that such delays are not accompanied by serious efforts by the PROGRESA administration to solve the problems involved, can then result in loss of confidence by households complying with the requirements of the program. Such factors could result in weaker program impacts with the passage of time. In contrast, initial delays in the processing of forms and delivery of benefits that are improved upon over time could lead to stronger program impacts with the passage of time. It is thus crucial that a thorough evaluation of PROGRESA must also examine the operational process of the program identify potential bottlenecks in the process and constructive suggestions of improving the operation and overall effectiveness of the program.

The evaluation of PROGRESA by IFPRI has also included an evaluation of the operational aspects of the program. The evaluation used both quantitative and qualitative surveys. The quantitative surveys included repeated surveys of beneficiary households, schools and health clinics. The qualitative surveys conducted in 1999 and in early 2000 included semi-structured interviews with stakeholders in PROGRESA including secondary school and health clinic directors and nurses from 18 communities, and focus group discussions with PROGRESA liaisons (*promotoras*), beneficiaries and non-beneficiaries. In total, 23 focus groups were held involving 230 participants: 80 beneficiaries from 8 communities, 80 non-beneficiaries from 8 communities, and 70 *promotoras* from 70 communities.

Although the information collected as part of the qualitative surveys is not intended to be statistically representative or true for the majority of the population, the research produces information that broadens the field of inquiry to include questions, issues and factors that may have been previously missed, and additional levels of explanatory and interpretive power.

Chapter 4

The Selection of Beneficiary Households and an Evaluation of PROGRESA's Targeting

The implementation of PROGRESA has involved in three distinct stages (for more details see Skoufias, Davis, and Behrman 1999 and Skoufias, Davis, and de la Vega 2001). The first stage involved the identification of the most marginal rural localities where the extreme poor are likely to be found. The identification of the marginal rural localities used a specially constructed “marginality index” based mainly on data from the national census. Additional considerations included geographical location, locality size (localities with less than 50 and more than 2,500 inhabitants were excluded), distance between localities, and access to some supporting infrastructure such as the presence of a primary school within the locality and access to a secondary school and a health clinic within a certain distance from the locality. The second stage involved the selection of households within eligible localities. Using detailed socioeconomic data collected by the program from all the households in the eligible localities, households were classified as “poor” or “non-poor” using a discriminant analysis of household income and other characteristics.

Methodology

The evaluation of PROGRESA's targeting is based on a framework consisting of three key elements: (i) a social objective, (ii) a set of economic, political and social constraints under which policy has to operate, and (iii) a range of instruments available to attain these objectives. Although PROGRESA has a number of interlinked objectives with respect to health, education and nutrition, the benefits of PROGRESA's targeting are measured solely in terms of its potential impact on poverty alleviation. The economic, social and political constraints under which policy has to operate are partly reflected in the amount of budget available for PROGRESA. The budget is assumed to be fixed and limited in the sense that it is not sufficient to eliminate poverty completely.

Policy instruments for poverty alleviation range from uniform transfers that apply no selection criteria to other schemes involving more strict selection criteria. Each of these instruments has different costs and benefits associated with it. The primary benefit derived from targeting at the household level, is that classifying households into those eligible and ineligible for receiving benefits from PROGRESA and giving benefits to those who are eligible, is a more effective way of using the limited funds towards the achievement of the social objective. This, however, is done at a cost. As discussed in the report, the PROGRESA targeting mechanism involves the collection of a household survey within all the localities selected as marginal (or as more likely to contain poor households). Such costs are taken into account by appropriately reducing the fixed budget available for poverty alleviation.

Within this framework the evaluation of PROGRESA's targeting can be formulated as providing an answer to the following question: How well does PROGRESA's targeting perform in terms of its objective after taking into account the costs and the constraints (financial and political) of achieving these objectives?

This question is answered in two steps. First, PROGRESA's accuracy in targeting is evaluated both at the community level, and at the household level by comparing PROGRESA's selection to an alternative selection of households based on consumption. Secondly, PROGRESA's targeting performance is evaluated in terms of its impact on poverty alleviation relative to other feasible targeting and transfer schemes assuming the same total budget.

The evaluation adopts an indicator that is considered sensible for classifying households into poor and nonpoor, while being careful to point out that this is necessarily the perfect poverty indicator. The indicator used to examine PROGRESA's targeting is predicted household consumption. Consumption for households contained in PROGRESA's sample (beneficiaries and non-beneficiaries) is estimated using the 1996 ENIGH. Based on this indicator the accuracy of PROGRESA's targeting is assessed using the concepts of undercoverage (exclusion error) and leakage (inclusion error) used frequently in the targeting evaluation literature.

Evaluation of Targeting Accuracy

The conclusion regarding the accuracy of PROGRESA's targeting is that overall it is an effective method of selecting households into the program. The evaluation analysis shows that the accuracy of PROGRESA's targeting, both in terms of selecting localities where poor households are more likely to be found and in terms of selecting poorest households within these localities, is good (Skoufias, Davis, and Behrman, 1999; Skoufias, Davis, and de la Vega 2001). However, this accuracy fades when it comes to distinguishing between localities in the moderate level of marginality. A similar conclusion is derived from the evaluation of the targeting of households within localities. PROGRESA's targeting is not perfect, but relatively more effective at identifying the extremely poor households within localities and less so when it comes to selecting households that are moderately poor.

Household Targeting versus Other Feasible Alternatives

Based on simulations using quantitative data which take into account the costs of targeting, PROGRESA's targeting as practiced during the second phase of the program is found to be the most effective among the set of feasible targeting and transfer schemes in reducing the depth of poverty and the severity of poverty in Mexico (Skoufias, Davis and de la Vega, 2001).

In short, PROGRESA performed closer to the ideal of "perfect" targeting than any of the alternative feasible transfer and targeting schemes examined such as uniform transfers (i.e. no targeting at all), targeting based on consumption or "perfect" targeting, and targeting at the locality level rather than at the household level. The research finds that PROGRESA's method

of selecting households outperforms alternative methods in terms of reducing poverty measures weighting extremely poor households more heavily (Skoufias, Davis, and Behrman 1999). A similar conclusion is drawn when examining the impact of PROGRESA's targeting on social welfare instead of the standard poverty measures (Coady, 2000).

The research also finds that the non-economic costs associated with targeting deserve serious consideration in the overall decision to pursue a household level targeting strategy. The targeting evaluation study finds that PROGRESA's method of targeting households outperforms alternative methods in terms of reducing the poverty gap and severity of poverty indices, even after taking into account the economic costs of targeting. However, the reduction in the higher order measures of poverty accomplished by household targeting over and above those accomplished by simply including all the households in the locality are relatively small (only 3.05 percentage points higher than the reduction in poverty achieved by including all households in the locality). Whether these marginal successes of targeting at the household level is a worthwhile effort depends on the size of the non-economic, or political and social costs of targeting, all of which are very difficult to quantify. As the qualitative surveys from PROGRESA's evaluation discussed below indicate these costs of targeting in rural, often indigenous, communities may not negligible.

PROGRESA and Its Impact on Poverty

In assessing the impact of the PROGRESA cash transfers on short-run poverty indicators two approaches were adopted. The first approach relies on simulations based on the predicted consumption of each household in the evaluation sample in November 1997 and adding the maximum amount of PROGRESA cash transfers an eligible household could receive assuming full compliance with the program's requirements (Skoufias et al, 1999). The second approach relies on reported household income and household consumption using the information collected by the household socio-economic census (ENCASEH) and the evaluation surveys (ENCEL) and the amount of cash benefits received by beneficiary households in treatment areas (Appendix E). Although each one of these approaches has a number of shortcomings associated with it, in combination they offer one the opportunity to check on the robustness of the measured impact of PROGRESA.

The results obtained from the simulated impact of PROGRESA's cash transfers, show that the headcount ratio, which simply measures the percentage of the population with income levels below the poverty level in a community, is reduced by about 10% through the supports of PROGRESA. The poverty gap and severity of poverty measures that place greater weight on the poorest households within the population in poverty show that the level of poverty according to the poverty gap is reduced by 30% whereas the severity of the poverty index is reduced by 45%. For comparison, an untargeted or uniform transfer is found to reduce the poverty gap by 28% and the severity of poverty by 36%. Given that these indicators put greater weight on the poorest of the poor, the simulation results suggest that the largest reductions in poverty of PROGRESA are being achieved in the poorest of the poor population.

One potential shortcoming of using simulations to measure the impact of PROGRESA on poverty is the fact that the income households receive from other government programs and children working in the labor market are both assumed to be constant. As discussed earlier, households receiving PROGRESA benefits should not, in principle, be receiving other similar benefits from program like *Abasto Social de Leche, de Tortilla* and the National Institute of Indigenous people (INI). In addition, the school attendance requirements of PROGRESA may force children to withdraw from paid activities and devoted more of their time in school. Both of these factors may work to negate the positive effect of the PROGRESA cash transfers on total household income.

Appendix E demonstrates in more detail that among PROGRESA beneficiary households in treatment localities the percentage of households receiving government transfers from other programs besides PROGRESA appears to decrease dramatically after the start of the PROGRESA program. In addition, among PROGRESA beneficiary households with children between ages 8-17 the total income received from children in this age group decreased.

Relying on reported household income allows one to obtain the difference-in differences (2DIF) estimate of the impact of the program on poverty which compares the change in a poverty measure in treatment villages to the changes in the corresponding poverty measure in control villages. In addition to controlling for macroeconomic shocks common to both treatment and control localities, this estimate allows one to account for any pre-existing differences in poverty between control and treatment localities and thus yield “cleaner” estimate of the impact of the program on poverty.

Irrespective of the measure of welfare used (per capita income or per capita consumption) and irrespective of the poverty line used (value of basic food basket or median of the value of household consumption) the 2DIF estimates imply that PROGRESA had a significant impact in reducing poverty between November 1997 and November 1999. For example, using income per capita as a measure of welfare and the 50th percentile of the value of consumption per capita as a poverty line, suggests that the headcount poverty rate declined by 17% in treatment areas between November 1997 and November 1999. Over the same period, the poverty gap and the severity of poverty measures declined by 36% and 46% (see Appendix E). These estimates are very much in line with the estimates obtained using simulations, and provide further confirmation that the impact of PROGRESA is concentrated at improving the welfare of the poorest of the poor households in marginal rural areas.

Perceptions of Stakeholders Regarding the Selection of Beneficiary Households

Quantitative and qualitative data indicate that there are perceived problems with the selection process: mainly, that there are poor people who need the benefits and do not receive them and, less frequently mentioned, that there are people receiving benefits who do not need them (Adato, Coady, and Ruel, 2000). Although not statistically representative, the qualitative data

collected from focus groups indicate some problems with the original socio-economic survey (i.e., the ENCASEH survey). For example, in some cases people were not home when the enumerator came to call and the enumerators did not return, or people overstated their resources because they were ashamed to admit their poverty. Most respondents in the qualitative research did not disagree with targeting in the sense that they did not believe that professionals, shop-owners or other relatively rich people should receive benefits; rather they believe that the mistakes should be corrected. Also, focus groups indicated that aside from these more obviously richer people, in these rural communities people perceive themselves as 'all poor' and all in need, and thus did not agree with the finer distinctions made in the selection process. However, they did indicate that the selection did not appear to be politically motivated.

At the community level, focus groups and interviews with doctors and school directors indicated that there has not been an opportunity to have an input into the selection process. In addition, these stakeholders indicated that PROGRESA's household targeting strategy has in some communities been associated with social divisions, most often manifested in non-beneficiaries not wanting to participate with beneficiaries in community work (Adato, Coady, and Ruel, 2000; Adato, 2000). Responses from these stakeholders suggest that these problems could be reduced through a more systematic implementation of PROGRESA's policy proposal to provide an opportunity for communities to review and improve the selection so that they are in agreement with its fairness.

Chapter 5

Summary of Impact Evaluation Results and Cost Analysis of PROGRESA

All of the reports evaluating the impact of PROGRESA do so by estimating regressions of the form (3.6) or (3.14). As discussed in detail in chapter 3, a specific parameter in either one of these regression equations is an estimate of the mean program impact or “mean direct of treatment on the treated”. For example, when data on an outcome indicator Y are available before and after the start of the program one can estimate a regression equation of the form (3.6). In this regression the coefficient b_{TR} is the difference-in differences (2DIF) estimator of the program impact. In the case where data on an outcome indicator are only available after the start of the program then one can estimate a regression equation (3.14). In this regression the coefficient g_T is the cross-sectional differences (CSDIF) estimator of the program impact.

Before continuing with the presentation of the impact evaluation results it is necessary to state upfront some of the caveats associated with the evaluation of the impact of the PROGRESA program³⁹ Firstly, and perhaps more importantly, a key assumption is that the indirect effects or spillover effects of the PROGRESA program from treatment localities to control localities are negligible. This assumption is necessary in order for the “no treatment state” to approximate the “no program” state. Certainly in the early rounds of the program when the census and the first or second evaluation surveys were conducted it would be safe to say that such spillover effects were likely to be insignificant. However, the extent to which the spillover effects were still insignificant during the later rounds of the evaluation is a matter of debate. In fact, in most of the states covered by the evaluation sample, the control localities are surrounded by localities covered by PROGRESA. In addition, control localities were eventually incorporated in PROGRESA and started receiving cash benefits in December 1999.⁴⁰ Although neither of these two facts necessarily invalidates the evaluation of PROGRESA, one should be aware of the possibility that PROGRESA has had indirect or spillover or anticipation effects on households in control localities.

Secondly, the variable used to identify household eligible for PROGRESA benefits varies across some of the reports. Since this is a potential source of misunderstanding among readers of the individual evaluation reports this point deserves more detailed elaboration. In the early stages of the program the PROGRESA beneficiary selection method led to approximately 52% of the households in the evaluation sample to be classified as eligible for the program benefits

³⁹ More detailed discussion of these and related issues can be found in Heckman and Smith (1995), Heckman(1992), and Heckman, LaLonde and Smith (1999).

⁴⁰ IFPRI researchers were unable to determine whether households in control villages were given any specific reasons as to why PROGRESA did not cover their locality. It is not unlikely, however, that promises were made by local PROGRESA officials about possible inclusion of the control localities into the program in the future.

(identified by the variable E1)⁴¹. By July 1999, PROGRESA had added new households to the list of beneficiaries since it was felt that the original selection method was biased against the elderly poor who no longer lived with their children.⁴² As a result of the revised selection process the fraction of households classified as eligible for program benefits increased from 52% of the evaluation sample to 78% of the sample. Accordingly a new variable identifying the new and “final” list of eligible households was provided for both treatment and control areas (denoted by E2).⁴³ Use of the variable E2 to identify the eligible households for PROGRESA benefits allows program evaluators to estimate the effect of “treatment on the treated” whereby the term treatment is used to represent the offer to treat” or the “intent to treat” effect of PROGRESA (Heckman, La Londe, and Smith 1999).

Given the differences across reports in the variable used to identify the eligibility status of a household table 5.1 below provides a guide of the key outcome indicators used in the quantitative evaluation of PROGRESA, as well as the econometric estimator used to measure the impact of PROGRESA. The majority of the evaluation reports by IFPRI rely on the variable E2 to identify the households eligible receive PROGRESA benefits. The two evaluation reports that rely exclusively on the variable E1 to identify household eligibility status are Schultz (2000) and Behrman, Sengupta, and Todd (2000).

To the extent that there is significant drop-out or attrition from the program among beneficiary households or administrative inefficiencies/delays in including all eligible households to the final list of households that actually receive program benefits, the “treatment of the treated” effect provides an underestimate of the mean effect of the program on *those who actually received the benefits of the program* (e.g., see Heckman, La Londe, and Smith 1999). Data on the records of payments made out by the PROGRESA administration could not be obtained until late into the evaluation process. After the release of these payment records in late August 2000, it was found that in the evaluation sample, many of the households that were supposed to be added to the updated list of beneficiaries had never received any cash benefits since the start of the distribution of program benefits in these localities. Specifically, of the 12,291 households in treatment localities eligible to receive PROGRESA benefits, 3,350 or 27% of the total eligible population had not received any benefits by March 2000. After crosschecking this finding with the PROGRESA administration it was confirmed that the explanation for this discrepancy is that 2,872 households (or 85.7% of the eligible households not receiving any benefits) had not been incorporated into the program. All of these “forgotten” households were households with a revised eligibility status from non-beneficiary to eligible beneficiary as a result of the revision of the selection process (densification). The remaining 478 households not receiving any benefits (or 14.3% of the forgotten eligible households and 3.9% of the total eligible population in

⁴¹ E1 denotes the variable named “pobre_1” provided with the original data sets.

⁴² The Spanish term used to describe this revised selection process is *densification*.

⁴³ E2 denotes the variable named “pobreden” provided with the original data sets.

treatment areas) were households that were incorporated during the early months of 1998, and chose either not to participate or move out of the locality covered by PROGRESA.⁴⁴

Table 5.1— Key Outcome Indicators and Impact Estimators used in the Quantitative Evaluation of PROGRESA

INDICATOR USED TO EVALUATE PROGRAM IMPACT	ESTIMATOR USED TO MEASURE PROGRAM IMPACT	VARIABLE USED TO IDENTIFY ELIGIBILITY STATUS	USED OTHER CONTROL VARIABLES?	DATA SOURCES	AUTHORS
EDUCATION					
Enrollment in School	2DIF	E1	Yes	ENCASEH-Nov97 ENCEL-Mar98 ENCEL-Nov98 ENCEL-Jun99 ENCEL-Nov99	Schultz (2000b)
Proportion of School Days Attended	2DIF	E1	Yes	ENCASEH-Nov97 ENCEL-Mar98 ENCEL-Nov98 ENCEL-Jun99 ENCEL-Nov99	Schultz (2000c)
Child school achievement test scores	2DIF	E1	Yes	ENCASEH-Nov97 ENCEL-Nov98 ENCEL-Nov99 Ministry of Public Education (SEP) test scores 1997,98,99	Behrman, Sengupta, Todd (2000)
HEALTH					
Daily Consultations per Clinic	2DIF	n.a.	Yes	IMMS Solidaridad Administrative records 1996,97,98	Gertler (2000)
Visits by Provider type (public vs. private)	CSDIF	E2	Yes	ENCEL-Jun99 ENCEL-Nov99	Gertler (2000)
Nutrition monitoring visits (0-5 yr old children)	2DIF	E2	Yes	ENCASEH-Nov97 ENCEL-Mar98 ENCEL-Nov98 ENCEL-Jun99 ENCEL-Nov99	Gertler (2000)
Child illness (0-5 yr old children)	2DIF	E2	Yes	ENCASEH-Nov97 ENCEL-Mar98 ENCEL-Nov98 ENCEL-Jun99 ENCEL-Nov99	Gertler (2000)
Adolescent and Adult Health Status	CSDIF	E2	Yes	ENCEL-Jun99 ENCEL-Nov99	Gertler (2000)

⁴⁴ There is no official record as to whether these households formally declined the opportunity to participate in the program

INDICATOR USED TO EVALUATE PROGRAM IMPACT	ESTIMATOR USED TO MEASURE PROGRAM IMPACT	VARIABLE USED TO IDENTIFY ELIGIBILITY STATUS	USED OTHER CONTROL VARIABLES?	DATA SOURCES	AUTHORS
NUTRITION					
Child height (12-36 month old children)	2DIF	E1/E2	Yes	INSP Evaluation data	Behrman and Hoddinott (2000)
CONSUMPTION					
Total Value of Consumption (Food and Non-Food) and Total Caloric Availability	CSDIF	E2	Yes	ENCEL-Nov98 ENCEL-Jun99 ENCEL-Nov99	Hoddinott, Skoufias, Washburn (2000)
INTRAFAMILY ALLOCATION OF TIME					
Participation in Paid and Unpaid Work Activities (measure excludes domestic activities)	2DIF	E2	Yes	ENCASEH-Nov97 ENCEL-Nov98 ENCEL-Jun99 ENCEL-Nov99	Parker and Skoufias (2000)
Time Spent in a Wide Range of Activities (including Domestic Activities) During Previous Day	CSDIF	E2	Yes	ENCEL-Jun99	Parker and Skoufias (2000)
WOMEN'S STATUS AND INTRAHOUSEHOLD RELATIONS					
Decisions Regarding Children (such as when to take child to the doctor, telling child to go to school, giving child permission to go out, and expenses on children's clothing)	CSDIF	E2	Yes	ENCEL-Nov98 ENCEL-Jun99	dela Briere, and Quisumbing in Adato et al. (2000)
Household Expenditure Decisions (such as food, durables, and house repairs)	CSDIF	E2	Yes	ENCEL-Nov98 ENCEL-Jun99	dela Briere, and Quisumbing in Adato et al. (2000)
Decisions on how to spend Women's Extra Income	CSDIF	E2	Yes	ENCEL-Nov98 ENCEL-Jun99	dela Briere, and Quisumbing in Adato et al. (2000)

INTERHOUSEHOLD TRANSFERS AND OTHER PROGRAM EFFECTS					
Incidence and amount of private transfers (monetary and in kind) among households	CSDIF	E1/E2	Yes	ENCEL-Nov98 ENCEL-Nov99	Teruel and Davis (2000)
Poverty, Inequality, School Continuation Nutrition Surveillance and Inflation Rates at the Locality level	DIF2	n.a.	Yes	ENCASEH-Nov97 ENCEL-Nov98	Handa et al. (2000)
Social Welfare (at the National Level)	Computable General Equilibrium model	n.a	Yes	ENIGH 1996	Coady and Harris (2000)

Impact of PROGRESA on School Enrollment

Studies have shown that the economic returns to children from continuing to enroll in secondary school are relatively large and provide children with opportunities to escape from poverty. Mexico's children typically maintain a high enrollment rate in primary school of about 93%. For the rural poor, however, education often stops there.

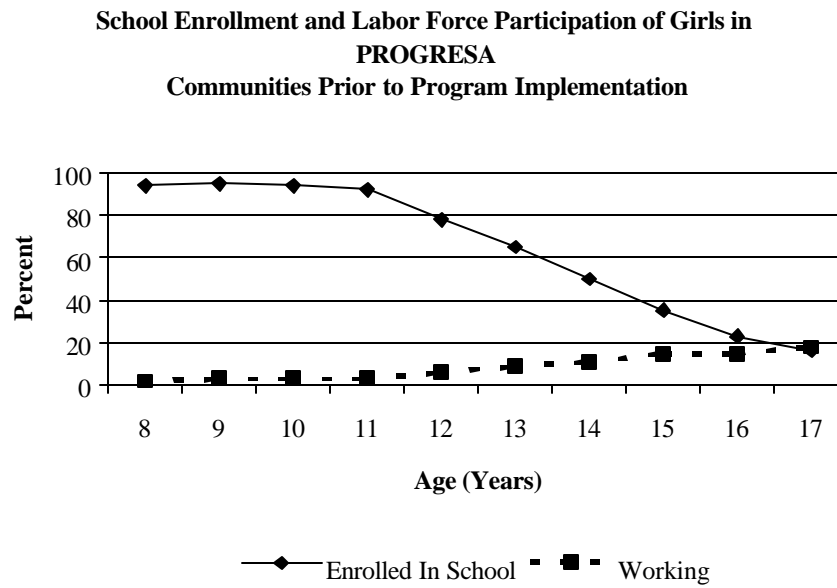
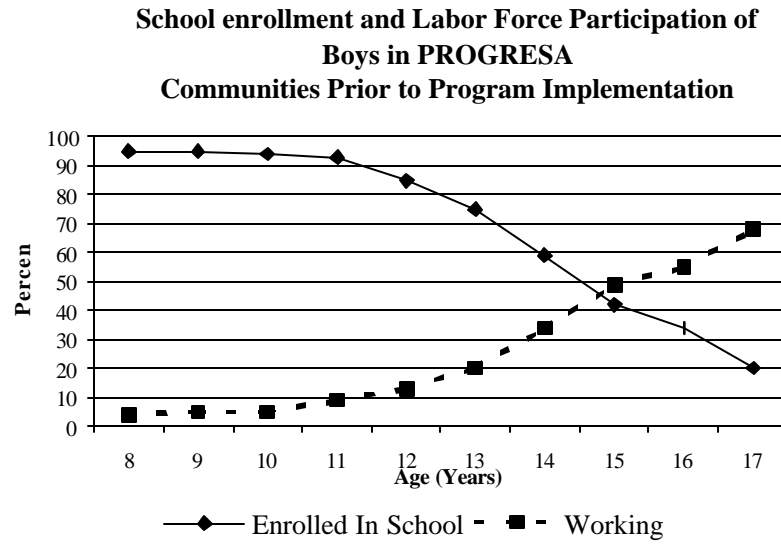
There appear to be two critical dips in enrollment rates among rural children in Mexico. Children generally begin dropping out of school after completing the sixth grade when enrollment rates decline to 55%. But the trend in enrollment once again witnesses a steep decline during the transition to senior secondary school or tenth grade, where enrollment once again falls to 58% for those qualified to enter.

The most critical objective of PROGRESA's education program is to increase the transition of poor rural youth into junior secondary school (7th to 9th grade). By design, educational grants for enrolling in the first year of junior secondary school increase by 50 percent with a small advantage to girls over boys in the first three years of secondary school.

Methodology

PROGRESA's effect on school enrollment is evaluated at two levels: first, by comparing for each grade completed simple differences in average enrollment rates of children in treatment (i.e., PROGRESA) and control localities; and second, by comparing differences in enrollment outcomes at the level of the individual child between those who are program-eligible and those who are not receiving benefits. Family and community factors are controlled for in this later analysis. To ensure confidence in the results, the robustness of the estimated impact of PROGRESA is also examined by comparing the impact of PROGRESA using two different samples of children. One sample consists of the children who are present in all five rounds of the surveys; the other consists of all observations on all children for which data are available.

Figure 5.1



Source: Parker and Skoufias (2000)

Impact on Enrollment Rates

After an exhaustive series of statistical tests, it was concluded that in all cases PROGRESA had a positive enrollment effect for both boys and girls, primary and secondary levels and irrespective of the sample used.

At the primary school level, where enrollment rates before PROGRESA were between 90 and 94 percent, statistical methods that control for the age and family background of children as well as community characteristics revealed that PROGRESA succeeds at increasing the enrollment rate of boys by 0.74 to 1.07 percentage points and of girls by 0.96 to 1.45 percentage points (Schultz, 2000a).

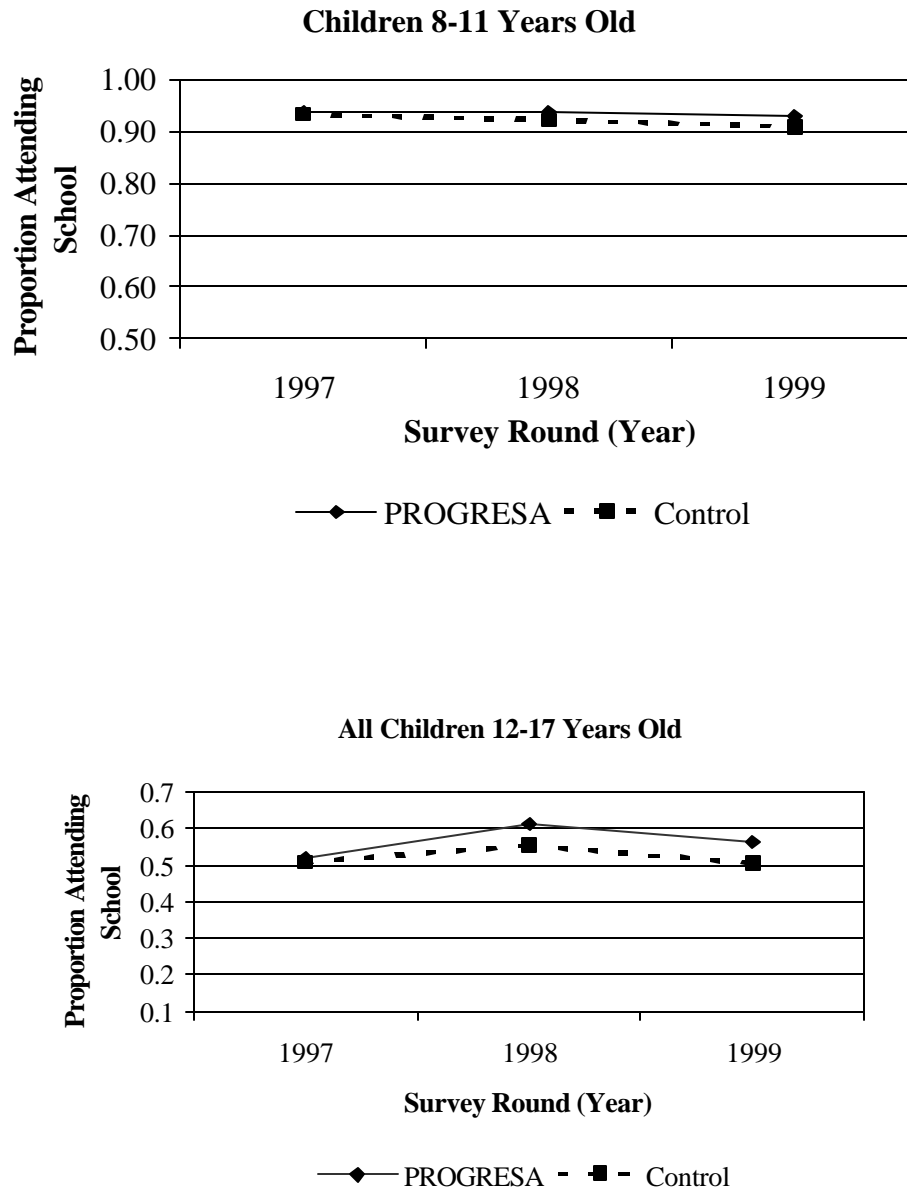
At the secondary school level, where the initial enrollment rates before PROGRESA were 67% for girls and 73% for boys, the increase in enrollment effects for girls ranged from 7.2 to 9.3 percentage points and for boys from 3.5 to 5.8 percentage points. This represents a proportional increase of boys from 5 to 8 percent and for girls 11 to 14 percent (Schultz, 2000a).

If these program effects could be sustained over the period in which a child is of school age, the accumulated effect on educational attainment for the average child from a poor household would be the sum of the estimated change for each grade level. Summing these values for grades 1 to 9 suggests that the program can be expected to increase educational attainment of the poor of both sexes by 0.66 years of additional schooling. Girls in particular are gaining 0.72 years of additional schooling by the ninth grade while boys gain 0.64 years of additional schooling (Schultz, 2000a). Given that the average youth aged 18 achieved about 6.2 years of completed schooling prior to the program, these data are suggestive of an overall increase in educational attainment of about 10%.

Potential Impact of PROGRESA on the Adult Earnings of Children

If current urban wages approximate what PROGRESA's beneficiaries can expect to earn from their schooling in terms of future percentage increases in their wages, the internal rate of return, taking into account the costs of the grants, to PROGRESA's educational benefits is roughly 8% per year (Schultz, 2000a). Children, when they reach adulthood, will have permanently higher earnings of 8% as a result of the increased years of schooling. Thus, in addition to improving beneficiaries current livelihood by reducing current poverty and raising consumption, PROGRESA is having a significant impact on raising overall human capital into the future.

Figure 5.2



Source: Author's calculation

Comparing the Effect of PROGRESA to Increased Access to Schools

It should be emphasized that PROGRESA might have additional impacts on increasing education beyond the level of secondary school if children are more likely to go on to higher levels of schooling, implying the estimates here are lower bounds of the impacts of PROGRESA

on schooling. Note that there are higher returns to education in Mexico for high school education than for junior high school. These possible impacts would increase the overall impact of PROGRESA on schooling and should be evaluated in the future.

Increased access to schooling may be considered as an alternative to providing educational grants to poor families. For example, 12% of the children in the PROGRESA evaluation sample currently have to travel more than 4 kilometers to a junior secondary school. The evaluation research shows that when access to secondary schooling is measured in terms of distance, if additional schools were to be built and staffed so that all children reside only 4 kilometers from their junior secondary school, secondary school enrollments would increase by 0.46 percentage points for girls and by 0.34 for boys, impacts less than one-tenth the size of those from PROGRESA. In comparison to the impact of PROGRESA's targeted educational grants to poor families, the effect of increased access to schooling appears to be a relatively less effective means of increasing school enrollments.⁴⁵

Furthermore, a more detailed investigation taking into consideration the costs associated with the options of building schools against the alternative of providing cash transfers conditional on enrollment as in PROGRESA revealed that in terms of the objective of getting more children into school a demand-side intervention like PROGRESA is more cost effective than a supply-side one (Coady, 2000). In other words, the cost incurred in generating one extra year of schooling is lower in PROGRESA than the alternative of building new schools.

Impact on the Transition from Primary to Secondary Schooling Level

The impact of PROGRESA on enrollment rates is largest for children who have completed the sixth grade and are thus qualified to enroll in junior secondary school, increasing 11.1 percentage points for both sexes combined or 14.8 percentage points for girls and 6.5 percentage points for boys, representing percentage increases of over 20% for girls and about 10% for boys (Schultz, 2000a). These results imply that, whereas many children before PROGRESA would leave school after completing the primary level, an important fraction, particularly girls, are now going on to secondary school.

The available evidence also shows that much of the positive impact on enrollment is due to increasing continuation rates rather than on getting children who were out of the school system to return to school. For instance, for girls (boys) who were attending school prior to the program, the impact of PROGRESA is to increase enrollment rates by 11 (7-8.5) percentage points. For boys who were out of school, this impact was only 5.4 percentage points. Furthermore, those kids who do return to school tend to only return for a year, whereupon they drop out again, suggesting that the program's impact is primarily to increase continuation rates

⁴⁵ It is interesting to note, however, that in the case of Indonesia, Duflo (1999) finds that a primary school construction program had a significant impact on increasing school enrollments and earnings.

rather than return rates. It is perhaps not surprising that many children do not return, given that most of these children had been out of school several years already at the time PROGRESA was implemented. With new generations of children, it is likely that PROGRESA will reduce dropout rates, and thus reinforce the effect of PROGRESA to increase continuation rates. (Coady, 2000).

Impact on drop-out rates, progression through grades, grade repetition rates and school re-entry rates

These questions are explicitly addressed in a study by Behrman, Sengupta, and Todd (2001). Their findings show that the participation in the program is associated with earlier ages of school entry, less grade repetition and better grade progression, lower dropout rates, and higher school reentry rates among dropouts. The program is especially effective in reducing dropout rates during the transition from primary to secondary school. In addition, at the secondary level the program appears to be more effective in inducing boys to enroll in the second and third years of secondary school, despite the fact that the benefit levels are slightly higher for girls. The study also finds the program to be effective in inducing children who dropped out prior to the initiation of the program to reenter school. However, it should be noted that a related analysis by Coady and Parker in Coady (2000) find that the impacts of the program on children who were previously out of school are not sustainable over time. This suggests that those kids who do return to school, tend to do so for only a year and then drop out again.

PROGRESA and Child Labor

The results show very clear negative impacts of PROGRESA on children's labor market participation. Estimates based on double difference models of labor force participation before and after the implementation of PROGRESA show important reductions in children's labor force participation for both boys and girls, in both salaried and non-salaried activities. Labor force participation for boys shows reductions as large as 15 to 25% relative to the probability of participating prior to the program. For girls, in spite of their overall lower participation level prior to the program, there are also significant reductions associated with PROGRESA. Also the lower incidence of child work due to the PROGRESA program is found to account for 65 percent (in November 1999) to 82 (in November 1998) of the increase in the enrollment of boys in school. In other similar programs, such as the Food for Education program in Bangladesh, the lower incidence of child labor was found to account for 25 percent of the increase in the enrollment of boys in school. (Parker and Skoufias, 2000). These estimates suggest that a PROGRESA-like program has the potential of combating the problem of child labor.

Impact on Time Spent Doing School Homework

Whereas PROGRESA has a significant impact on the number of children who enroll in school, it thus far does not show a significant impact on the time children spend in school or on the time

they spend after school on assigned homework. This suggests that the impacts of PROGRESA are primarily to increase the number of children in school and to reduce the number of children who are working, but not necessarily, for instance, to reduce the hours worked of children who attend school. A substantial number of children continue to combine both work and school under the program. (Parker and Skoufias, 2000). Additionally, analysis of school-standardized tests did not show any significant impact of PROGRESA in improving student scores on achievement tests (Behrman, Sengupta, and Todd, 2000). Whereas additional years of data are needed to provide more conclusive evidence, the possibility of including bonuses or prizes to provide incentives for achieving high grades could be explored.

Impact on School Attendance

A panel sample of data using children ages 6 to 16, some who benefit from PROGRESA scholarships and some who do not, indicates that for the school year of 1998/99, attendance rates in schools are higher in localities that are further removed from major urban areas but the evaluation research clearly shows that PROGRESA has a more pronounced effect on school enrollment rates than on attendance rates. Because enrollment does not guarantee attendance, this question deserves fuller investigation (Schultz, 2000b).

Impact of Fertility

By design the educational benefits of PROGRESA are targeted to children between 8 and 17 years of age. For these benefits to have a significant effect on the fertility decisions of rural men and women it is necessary for households to have confidence that these benefits will be continued for at least 8 years into the future. As of November 1999 there is no statistical evidence that PROGRESA female beneficiaries had higher fertility than poor females in control localities.

Perceptions of Stakeholders Regarding the Operation of the Educational Component of the Program

Analysis of the quantitative and qualitative data revealed that delays in the receipt of educational grants were common in the early stages of the program in part due to the cumbersome nature of the form design used to register school attendance (Adato, Coady, and Ruel, 2000). The collection, filling out, and returning of forms involved substantial time costs often incurred personally by school directors. The simplification of the forms appears to have reduced the time it takes to fill them out and teachers and school directors seem to be in agreement with the objectives of the program and the conditioning of transfers on attendance. Beneficiaries may have experienced a lag in the receipt of educational grants and indeed PROGRESA's own records reveal that significant delays took place at the early stages of the program primarily due to delays in the verification of school attendance.

Analysis of the beneficiary surveys suggests that, on the supply side, the increased demands generated by the program has at least not led to a degeneration in the quality of education services suggesting that resources have been increased. In many cases, there seems to have been an improvement. This view is also consistent with evidence from the quantitative survey of directors, with most schools reporting some improvements in infrastructure and other resources, albeit from a poor initial position. It is clear from the qualitative interviews that the process of acquiring extra resources is time and resource intensive for teachers and school directors. But some teachers still complain that they lack such basic resources as televisions for telesecondary schools. It will be interesting to compare this picture of the supply side with other data sources. Although most directors in the qualitative interviews report improvements in education outcomes, they attribute most of this to improved attendance, student interest and nutrition, rather than improvements in the supply side.

Both the quantitative analysis of the school directors' survey and the qualitative analysis of the focus group interviews support the general perception that PROGRESA has led to improvements in the attitude of beneficiary students and their families towards education. The program is viewed as allowing those parents and children who were always motivated to acquire education, but who faced severe economic hardship thus being unable to incur travel and other educational expenses and needing any income that children could contribute, to continue to send their children to school. The fact that lack of resources (or poverty) seems to be a major factor in explaining non-attendance at school, especially for older children, is consistent with the program design and initial estimates of program impact (Schultz, 2000) since the education subsidy (or scholarship) seems to have been effective in increasing demand.

Particularly from the focus-group analysis, there is evidence that families place a strong emphasis on school attendance and homework and that, where possible, parents attempt to adjust to these demands if children attend school. This was seen to be an acceptable trade-off, with others in the family willingly substituting for school-going children's time especially during the week. But children, in general, appear to have to continue to contribute to household chores, especially at the weekend and during the peak agricultural season. For some children, possibly those from the poorest families or those who have long distances to travel to secondary school, the balancing of the demands of school and work are very demanding.

But children's lack of interest in school is also an important factor in explaining non-attendance at school, especially for older children, although this appears to be at least in part indirectly motivated by poverty and the desire of older children to contribute to the family, and the lure of migration which is seen as "progress." In the case of older female children, concern for their safety when they have to travel long distances is also an issue.

One of the common complaints in the qualitative interviews with school directors was that teachers were never consulted about the objectives and design of the program nor informed how it would function. In particular, many could not understand why some "deserving" students were excluded, why some who need it do not receive it, and why they could not have had a role

in the selection of beneficiaries. Also, parents often blame teachers for their children not being included, for delays in transfers or for their child not receiving transfers due to poor attendance. Non-beneficiaries in some communities are reluctant to contribute towards school resources arguing that beneficiary families should be relied upon more. They also argue that the demands on them for school supplies should be less than for non-beneficiaries. Finally in some cases the school directors point out that the increase in demand has brought in some students from remote areas who were given poor quality education and thus require more input from teachers.

In the qualitative interviews with teachers we asked them for their overall view of the program. Their answers suggested that, on the whole, teachers saw the program as being beneficial for the communities and were in favour of greater participation. They invariably agreed with the objectives of the program as well as the conditioning of transfers. Some even suggested attaching extra conditions such as linking scholarships to academic performance. Most were in favour of money transfers, although concern for how households spent their money were behind some suggestions that food or education coupons be introduced. The general perception was that the supply side was not sufficient to deal with the increase in demand, although better attendance and attitudes to schooling made teaching easier and more rewarding. Also some schools that would have shut down due to insufficient demand could now remain open. While in some cases the *promotoras* were viewed as an asset to the school, in others there seemed to be some friction possibly because of her perceived “interference” in educational matters.

The impact of PROGRESA on health, nutrition, and health-care use

The use of health-care in rural Mexico is extremely low compared to other Latin American countries. On average, rural Mexicans make less than one visit to a medical provider per year. The non-poor make about .8 visits and the poor make about .65 visits per year.

The nutrition of preschool children is of considerable importance not only because of concern over their immediate welfare, but also because their nutrition in the formative stage of life is widely perceived to have substantial and persistent impact on their physical and mental development and on their health status as adults. Stunting — defined as having a z-score of height-for-age less than -2— is a major form of protein-energy malnutrition. In 1998 survey results indicate that 44% of 12-36 month old children in PROGRESA regions were stunted.

Methodologies

The effect of PROGRESA on health is evaluated at two levels: first, at the level of health clinics based on the administrative records of public clinics; second, at the individual level using data from the PROGRESA evaluation surveys. The analysis of the impact of PROGRESA on health care centers investigates whether the service and incentive provided by the program led to improved health-care and maintenance by exploring the impact on the use of facilities in terms of

number of visits, and on the purpose of these visits, such as the monitoring of the nutritional status of children and the use of prenatal care.

The facility-level data were obtained from surveys of 3,541 clinics operated by IMSS-Solidaridad from January 1996 to December 1998. This information, complimented from the records of PROGRESA, pertains to the number of beneficiary families incorporated to the program every month in each clinic. About two-thirds of these clinics are in PROGRESA areas, while the remaining one-third operates in control areas.

As is the case for the PROGRESA evaluation survey, the availability of repeated observations on the same clinic over time, before and after the start of the program, permitted analysis of the changes over time within treatment and control clinics.

The individual level data from the PROGRESA evaluation surveys included information on the utilization of public clinics, public hospitals, private providers, the incidence and type of illness, children's visits to clinics for nutritional monitoring, and whether children have received different types of immunization. Analysis of blood tests for anemia and other deficiencies did not form part of this evaluation, although the National Institute of Public Health in Cuernavaca has carried out analysis in this area. In the last two rounds of the survey, adolescent and adult health status was measured by collecting information for the last 4 weeks on the days of difficulty with daily activities due to illness, days incapacitated due to illness, days in bed due to illness and the number of kilometers they were able to walk without getting tired.

Impact of Children's Health

Improving livelihood security for the poor depends on improving early childhood health care. Frequency and duration of illness have profound effects on the development and productivity of populations. The analysis indicates that improved nutrition and preventative care in PROGRESA areas have made younger children more robust against illness. Specifically PROGRESA children 0-5 have a 12% lower incidence of illness than non-PROGRESA children do (Gertler, 2000).

Impact on Adult Health

The analysis also finds that adult members in beneficiary households are significantly healthier (Gertler, 2000). On average, PROGRESA beneficiaries have 19% fewer days of difficulty with daily activities, 17% fewer days incapacitated, 22% fewer days in bed, and are able to walk about 7% more than non-beneficiaries. Prime age PROGRESA adults (ages 18-50) had a significant reduction in the number of days of difficulty with daily activities due to illness and a significant increase in the number of kilometers able to walk without getting tired. Specifically, PROGRESA beneficiaries have 19% fewer days of difficulty due to illness than non-PROGRESA individuals, and are able to walk about 7.5% more without getting tired. For those over 50, PROGRESA beneficiaries have significantly fewer days of difficulty with daily

activities, days incapacitated, and days in bed due to illness than non-beneficiaries. As with younger adults, they are able to walk more kilometers without getting tired.

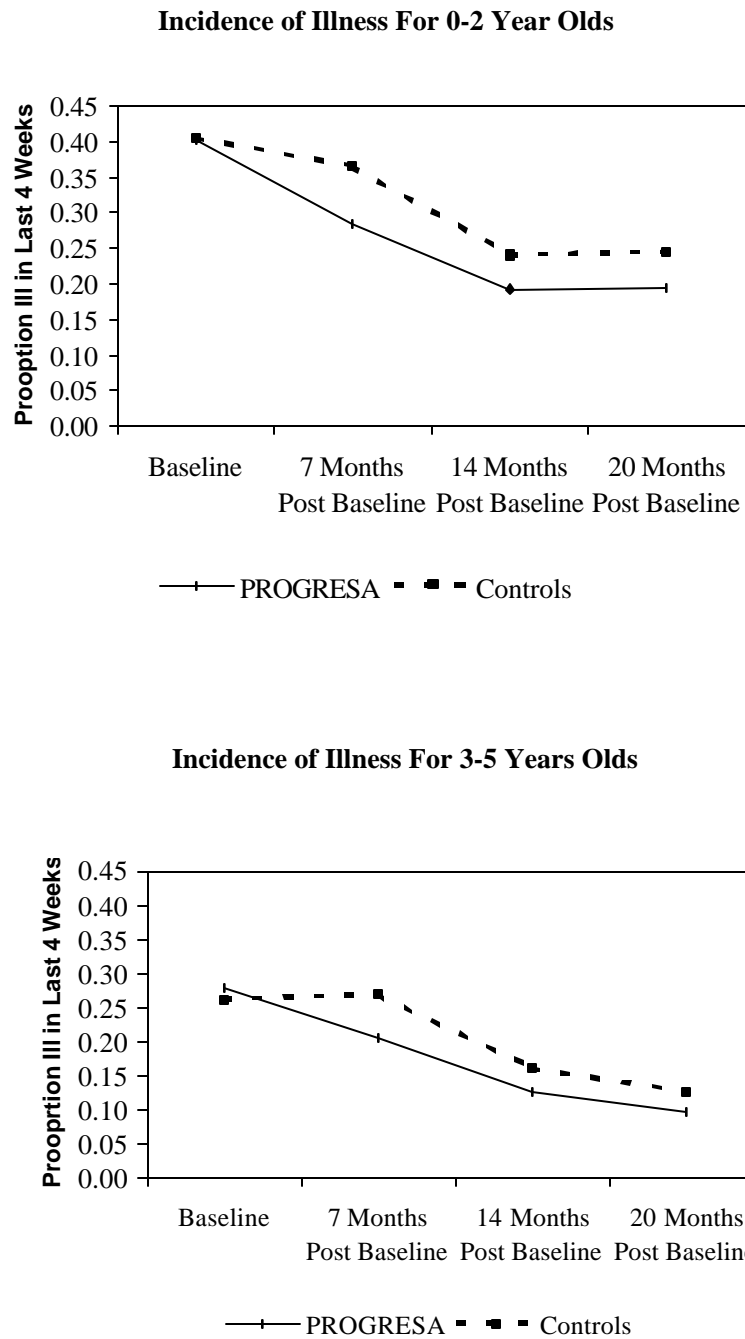
Impact on Utilization of Health Facilities

In January 1996, more than a year before PROGRESA began, average visits to clinics were identical in control and treatment localities. In 1998, the first full year in which PROGRESA was operational in all treatment localities, visit rates in PROGRESA communities were shown to grow faster in PROGRESA villages than in control areas (Gertler, 2000). In addition, there was a significant increase in nutrition monitoring visits, immunization rates and prenatal care.

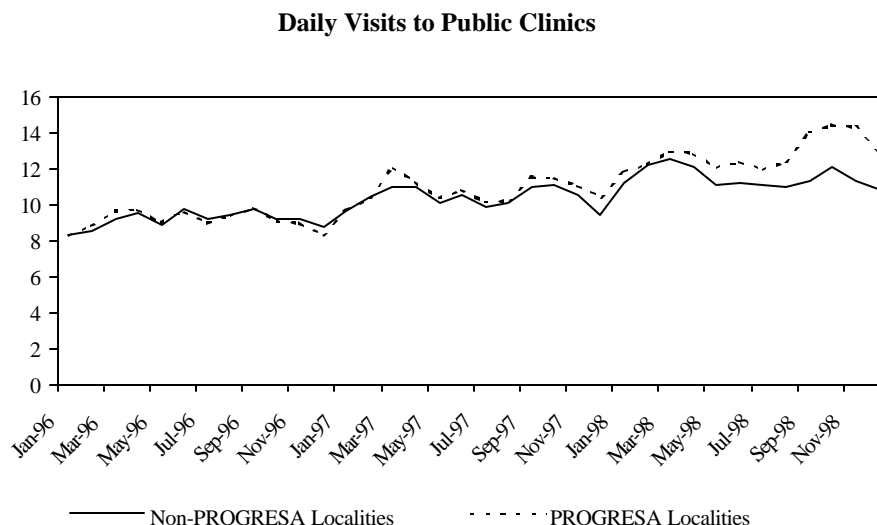
Regarding pre-natal care, the evaluation analysis indicates that PROGRESA increased the number of first visits in the first trimester of pregnancy by about 8%. This shift to early pre-natal care significantly reduced the number of first visits in the second and third trimester of pregnancy. Thus as a result of PROGRESA, pregnant women make their first visit to the clinic much earlier than before, a positive change in behavior that is documented to have a significant improvement in the health of babies and pregnant mothers.

The analysis of the individual-level data on health care use by type of provider confirms that for 18-50 year olds and for those over 50, there was no impact on visits to private providers (Gertler, 2000). This suggests that the increase in the use of public clinics was not from substitution out of the private sector, but rather new participation for preventive purposes, from households previously not using public services.

Figure 5.3



Source: Gertler, P. 2000.

Figure 5.4

Source: Gertler, P. 2000.

Nutritional Supplements and Child Growth

The data suggest that PROGRESA has had a significant impact on increasing child growth and in reducing the probability of child stunting for children in the critical age range of 12 to 36 months (Behrman and Hoddinott, 2000). These estimates imply an increase of about a sixth (16%) in mean growth per year, corresponding to about 1 centimeter for these children per year. The effects may be somewhat larger for children from poorer households and poorer communities but who come from households with more educated household heads. Overall, the effects suggest that PROGRESA had an important impact on growth for the children who received treatment in the critical 12-36 month age range.

There is evidence that a significant fraction of children in PROGRESA are not regularly receiving the supplements (Behrman and Hoddinott, 2000). Furthermore, in some cases, supplements were not fully consumed and in several households the supplement was shared among other family members, suggesting that its effects may have been diluted. Increased and more accurate distribution of the supplement may increase the impact of PROGRESA on nutrition indicators, such as height.

The analysis of the data suggests that PROGRESA may be having a fairly substantial effect on lifetime productivity and potential earning of currently small children in poor households. IFPRI estimates that the impact from the nutrition supplements alone could account for a 2.9% increase in lifetime earnings (Behrman and Hoddinott, 2000). In addition there are likely to be

other effects through increased cognitive development, increased schooling, and lowered age of completing given levels of schooling through starting when younger and passing successfully grades at a higher rate. Since the nutrition supplement (*papilla*) constitutes only a small fraction of the program costs given full compliance, the benefit to cost ratio of the nutrition supplement is likely to be high.

Perceptions of Stakeholders Regarding the Operation of the Health and Nutritional Component of the Program

Analysis of the quantitative and qualitative data revealed that the administration of the health and nutrition component of the program has improved considerably (Adato, Coady, and Ruel, 2000). In 1999 registration of beneficiaries was reported to have reached 97% and health care professionals report little problems with filling out forms. Appointment books have proven to be an effective mechanism for insuring compliance to scheduled visits despite the reported lack of time, transportation and awareness of the benefits of preventative health care. The health education seminars (*pláticas*) were found to be widely available, effective and very popular among beneficiaries, *promotoras* and health professionals. Problems reported with *pláticas* in some cases were that male doctors giving talks to women about family planning and the pap smear test is culturally problematic, and that the participation of non-beneficiaries varies widely.

Nutritional supplements for the mother and child are very popular among beneficiaries, yet some receive only a fraction of the daily ration they are supposed to receive from the program. Surveys reveal that families either run out of supplements, share the supplements with other household members, or the supplements are diluted thus diminishing their effectiveness. It also appears that the supplements are being distributed to non-beneficiaries, regardless of their nutritional status.

Impact of PROGRESA's Monetary Transfers on Household Consumption and Work Incentives

Expenditure-based or consumption-based standard of living measures are preferable to income-based measures because estimates of current consumption are likely to provide a more reliable estimate of household's permanent income than estimates of current income that is subject to peaks and troughs. Consumption measures what people actually consume and thus provide a better measurement of a household's standard-of-living.

Measuring consumption is not straightforward. Households rarely know how much they have spent over a given reference period, and experiments in survey design indicate that questions about broad categories of expenditures tend to lead to underestimates of consumption. Thus, the questions the evaluation exercise posed to households related to consumption were narrowed and then the results were aggregated up.

In each of the evaluation surveys, households were asked a set of questions on expenditures for food and non-food goods. The “most knowledgeable individual” in the household was asked, “In the last seven days, how much did you spend on the following foods?” Thirty-six different foods were queried.

Non-food expenditures are reported based on weekly expenditures, monthly expenditures, and expenditures made over the previous six months. These were all converted to monthly expenditures and then converted into November 1997 prices for comparable analysis.

The connection between PROGRESA’s subsidy and both monetary and non-monetary private transfers from individuals outside the household was investigated using two methods of empirical analysis. Descriptive statistics compared the frequency and level of inter-household transfers between non-beneficiaries and beneficiary groups at two points in time for which the data were available. Other characteristics of the households that received and did not receive were also compared. Second, selection into PROGRESA was analyzed econometrically to determine whether the selection itself had a significant impact on the incidence and levels of existing private transfers, such as remittances from individuals working abroad.

Lastly, it is worth noting that the large increase in cash that these communities receive as a result of having PROGRESA beneficiaries is likely to have an effect on local economies and the development of new markets. Whereas this was not an aspect that was evaluated, it is an important topic that deserved further examination in future evaluations of PROGRESA and other conditional cash transfer programs.

Impact on Household Consumption and Diet

Using data from the three surveys after the start of PROGRESA, the average level of consumption (including purchases and consumption out of own production) increases by approximately 14.53%. (Hoddinott, Skoufias and Washburn, 2000). The rest of the transfers were likely used for saving or other purchases such as durable goods.

In November 1998, median food expenditures were only 2% higher. However, in November 1999 median food expenditures were 10.6% higher in PROGRESA households when compared with comparable control households (Hoddinott, Skoufias and Washburn, 2000).

Not only are PROGRESA households increasing overall acquisition of food, they are choosing to improve dietary quality over caloric intake. The increase in household consumption is driven largely by higher expenditures on fruits, vegetables, meats, and animal products. By November 1999, median caloric acquisition has risen by 7.1%. There is also clear evidence that dietary quality has improved in PROGRESA households (Hoddinott, Skoufias and Washburn, 2000). The impact is greatest on the acquisition of calories from vegetable and animal products. These quantitative findings from the 7-day recall surveys reinforce the views of beneficiaries that access to PROGRESA has meant that they “eat better.”

Participation in PROGRESA is found to have a significant impact on the acquisition of calories from fruits, vegetables, and animal products even after controlling for the effect of increased household income from monetary transfers (Hoddinott, Skoufias and Washburn, 2000). There is also some evidence that information conveyed during the *platicas* spills over, and alters, in a positive fashion, the behavior of non-beneficiaries in treatment localities.

A possible concern is that the provision of the *papilla* may cause households to divert expenditures on food to other items, thus undermining efforts to increase caloric availability in these households. If the *papilla* is truly “crowding out” household acquisition of calories, we would expect to see lower measures of impact for beneficiary households, especially among those with pre-school children. Statistical analysis of the caloric acquisition in households containing at least one child below the age of 5 revealed that such concerns are unfounded (Hoddinott, Skoufias and Washburn, 2000). The impact of participation in PROGRESA on caloric acquisition is, if anything, slightly higher for these households.

PROGRESA, Work Incentives for Adults and the Allocation of Resources within Households

PROGRESA also does not appear to create negative incentives for work (Parker and Skoufias, 2000). Analysis of before and after program data shows no reduction in labor force participation rates either for men or for women. These results may in part reflect the design of PROGRESA, where benefits are provided to families for three years, irrespective of family income, so that there is no disincentive effect on work, as opposed to transfer programs in other countries which often reduce benefits with work income. The conventional wisdom is that there are tradeoffs between providing benefits to a population in need and stimulating work, the analysis here shows that, thus far, there is not necessarily any such tradeoff in PROGRESA.

There are no significant differences between treatment and control groups by year and over time with regards to the receipt of monetary transfers from individuals or friends not living in the household, including transfers from relatives working abroad, such as in the United States. After 19 months of receiving benefits, the analysis finds that the selection into the PROGRESA program has no influence over the incidence or level of either monetary or non-monetary private transfers within households (Teruel and Davis, 2000).

Impact of PROGRESA on Women’s Status, Household Relations and Community Social Relationships

Methodology

Measuring the impact of PROGRESA on women’s status and household relations is challenging. In general, household surveys are blunt instruments in this regard because gender-based decision-making is often understated; without adequate understanding of the sociocultural context, probing questions can easily be misinterpreted. Thus, this section of the evaluation

takes a two-pronged approach using quantitative and qualitative surveys to ascertain the position of women within the household (Adato, et al. 2000). The analysis seeks to ascertain (1) whether PROGRESA has influenced household relationships and the impact of women's status and, (2) the extent to which PROGRESA has influenced the attitudes towards the education of girls and women.

Several rounds of qualitative surveys conducted over a two-year period asked a series of questions related to women's status and intra-household relationships. In addition, related questions were explored through focus groups and interviews conducted by IFPRI's researchers. An additional qualitative research effort took place in 1999 to further investigate questions raised during the previous surveys. Focus groups rather than semi-structured interviews were chosen in order to enrich responses.

Impact on Decision Making within Households

PROGRESA's monetary transfers are a crucial aspect of the program with respect to bringing about changes in patterns of decision-making within households. While *residing in a* PROGRESA locality is shown to not have an effect on patterns of decision-making, *being in* PROGRESA decreases the probability that the husband is the sole decision-maker in five out of the eight decision-making outcomes. In PROGRESA families, over time husbands have shown they are less likely to make decisions by themselves, particularly as they affect the children. The surveys also indicate that through time, the probability that women solely decide on the use of their extra income increases.

Impact on Men's Attitudes Towards Women

Research has shown that by giving money to women, PROGRESA forces recognition among men, and within the community as a whole, of women's importance and of the government's recognition of women's level of responsibility in caring for the family. The survey shows that most men do not have problems with their wives participation in PROGRESA. Men see the benefits as good for the entire family since salaries, in general, are very low.

In focus group discussions, when asked, respondents indicated that, with a few exceptions, men do not take women's PROGRESA income. In general, men are said to work as hard and still give the same amount of money as they did before the family received PROGRESA.

Impact on Women's Time

Statistical analysis of time use of women shows that participation in the program yielded some evidence that the time demands on women associated with satisfying program obligations are significant (Parker and Skoufias, 2000). Women in PROGRESA are more likely to report spending time in both taking household members to schools, clinics etc. as well as having a greater participation in community work and *faenas*. Overall, however, there is no significant

impact of PROGRESA on the leisure time of both male and female adults. This again provides reinforcing evidence that adult beneficiaries do not use the benefits to work less and increase their leisure, as may be predicted by some economic models. These results would also seem to support the hypothesis that PROGRESA does not create dependency on its benefits, in the sense that it does not appear to reduce the work incentives of adults.

In general accordance with the results of the quantitative analysis, focus groups discussions revealed that women were evenly divided as to whether PROGRESA was too demanding on their time. Those who said it was demanding referred to the time demands of meetings. Women also discussed how they and sometimes their husbands had to do additional work that used to be done by their children. However, they were quick to point out that this was worthwhile in order for their children to study.

Impact on Women's Empowerment and Bargaining Power

The vast majority of responses indicated that women have benefited in ways that can be seen as “empowerment” — defined as increased self confidence, awareness and control over their movements and household resources. Women report that they leave the house more often; have the opportunity to speak to each other about concerns, problems and solutions related to the household; are more comfortable speaking out in groups; are becoming more educated through the health *platicas*; and have more control over household expenditures.

Impact on Attitudes Towards Girls' Education

PROGRESA's educational incentives for girls are based on the belief that the increased education of girls is fundamental to improving their living standards and social participation. In an exploration of attitudes towards girls' education, the survey found overwhelming support among women for girls' education.

Yet when faced with the hypothetical dilemma of sending a boy or a girl to school, most respondents chose the boy. It is thought that boys are favored because of men's responsibility as breadwinners and heads of households and the fact that girls get married. That said, the main reason to encourage girls' enrollment in school was to enable girls to get employment, or better employment. In general, women in the program do not understand the concept of PROGRESA's incentive to keep girls in school. Most think that the benefit for girls is higher than for boys because girls have higher expenses.

Because responses about girls' education were far stronger than statements about PROGRESA's effect on women's position within the household, it is thought that PROGRESA will have a far stronger secondary effect on household relationships through the next generation more than the program is having on this one.

Impact on Community Social Relations

The overall conclusion of this research is that PROGRESA's system of household targeting involves social costs that should be taken into account in evaluations of this system and consideration of alternative targeting systems. Communities exhibit social solidarity in terms of the common ways in which beneficiaries and non-beneficiaries evaluate the beneficiary selection process, outcomes and impacts. At the same time, there is evidence of problems that the targeting has introduced into community social relationships. Although it is not known from a statistical point of view the percentage of communities in Mexico that have experienced these problems, the frequent and similar statements of beneficiaries, non-beneficiaries, *promotoras* and doctors in the majority of focus groups and interviews conducted across six states provide strong evidence that there is a problem that should be addressed.

PROGRESA has also strengthened social relationships between beneficiary women, potentially building new forms of social capital. This is a valuable second-round effect of the program, and suggests that these types of approaches to PROGRESA activities that promote social capital could be encouraged. At the same time, the creation of a group of 'PROGRESA women' who participate in separate activities can reinforce social divisions, so these problems related to household targeting need to simultaneously be addressed.

Cost Analysis of PROGRESA

Methodology

In conducting an economic analysis of PROGRESA it is necessary to highlight two of the complicating factors involved. Firstly, in the absence of being able to attach monetary valuations to the human-capital impacts generated by the program, one is unable to aggregate across the range of impacts in order to undertake unified cost-benefit analysis of the program. Secondly, on the cost side one faces the conceptually difficult problem of allocating joint costs to the various program components.

For these reasons and in order to apply cost-benefit (or cost effectiveness) analysis to the evaluation of the program, IFPRI's evaluation can be characterized as making two types of comparisons:

- comparisons across different programs, and
- comparisons across different policy questions.

In making comparisons across different programs, one can think of a number of different program designs. Each component of PROGRESA (i.e., current poverty, education and health) may be considered as a *stand-alone* program. Then one can deal with each of the impacts separately and identify the costs that would have to be incurred in order to generate these impacts in isolation. For example, one can focus on the cost of transferring income to households through the program, or the cost of generating the observed human-capital impacts.

All of these hypothetical programs will incur the joint costs but certain costs will be specific to individual components, e.g., the supply-side costs or the costs of monitoring attendance at schools and health centers. These can then be compared to the costs that would have to be incurred to generate the same impacts using an alternative instrument.

When comparing across different policy questions one can distinguish between the costs associated with implementing the program from scratch (i.e., the actual program), the costs associated with expanding the program to incorporate more localities (i.e., program expansion), and the costs associated with continuing the existing program unchanged (i.e., continuation of the program). The relevant costs are generally lower in moving from the actual program to program expansion to program continuation, reflecting the presence of sunk costs.

As explained in more detail in the report of Coady (2000) the *total costs* of a program of the nature of PROGRESA can be categorized as *program costs*, and *private costs*. *Program costs* capture all the costs associated with the delivery of cash transfers to households such as (i) targeting costs associated with the targeting of transfers to the most marginal localities as well as only to the poorest households within these localities; (ii) conditioning costs associated with ensuring that households meet their responsibilities by ensuring attendance of children at school and household members at scheduled regular preventative check ups; and (iii) operation costs associated with the actual operation of the program. *Private costs* are the costs that households incur in order to receive cash transfers. For example, private costs include the time and financial costs of traveling to schools and health clinics (i.e., due to the conditioning of the program) as well as to collect the transfers from distribution points.

Although information on *total* private costs is in general a useful input into policy analysis, for the purposes of evaluating PROGRESA it is only the *incremental* costs due to the introduction of the program are relevant. For example, in order to qualify for the food transfer, household members must make a series of visits to health clinics for check-ups and health lectures. One estimate of the private costs incurred by households is that households incur travel costs of 6.38 pesos per 100 pesos received through the food transfer (Coady 2000). Such an estimate, however, is substantially higher than the incremental private costs incurred by the household as a result of PROGRESA. The incremental private cost incurred by the household is the cost of the extra trips brought about by the program. According to Gertler (2000), PROGRESA brought about a 30%-50% increase in the number of trips. Using an estimate of a 40% increase, this implies that only 28.6% of total trips are additional. This in turn implies that the *incremental* private costs of receiving the food transfer are 1.82 pesos per 100 pesos received.

Approximately the same cost ratio is estimated for the incremental travel costs incurred by households sending their older children to secondary schools outside their locality (1.5 pesos per 100 pesos received) and the travel costs incurred for collecting the bi-monthly PROGRESA cash transfer (1.2 pesos per 100 pesos received).

The Program Costs and the Total Costs of PROGRESA

IFPRI's analysis of PROGRESA's program costs consisted of calculating cost benefit ratios that summarize the program cost incurred in transferring monies to beneficiaries. According to the program costs analysis for every 100 pesos allocated to the program, 8.2 pesos are administration or program costs. Given the complexity of the program, this level of program costs appears to be quite small. It is definitely relatively low compared to the numbers given by Grosh (1994) for the LICONSA and TORTIVALES programs, which imply program costs of 40 pesos and 14 pesos per 100 pesos transferred respectively.

By comparing the cost benefit ratios across the different hypothetical programs to that for the actual program, which is targeted and provides cash transfers conditionally, one can also identify the relative importance of the different activity costs (see table 13 in Coady, 2000). For example, the largest cost component is that associated with targeting at the household level. This activity accounts for nearly 30% of the program cost. This is followed by the costs associated with conditioning the program, which account for 26% of the program cost. Thus the costs associated with both the targeting and the conditioning of the program make up 56% of the program's costs. This also implies that it is important to ensure that there is a return to these activities.

When the incremental private costs discussed above are added to the program costs it is found that the total cost-benefit ratio increases by about 27% (from 0.089 to 0.113). So, for every 100 pesos transferred to households, 11.3 pesos are incurred in administrative and private costs. The cost analysis also reveals that private costs associated with participating in the program are as important as household targeting and conditioning costs.

Overall, the administrative costs employed in getting transfers to poor households appear to be small relative to the costs incurred in previous programs and for targeted programs in other countries. This is in spite of the program being quite a complex program, which involves both the targeting and conditioning of transfers and all the costs that such activities entail. Although this partly reflects operational efficiency, it is important to keep in mind that the size of the program also plays an important role in keeping these numbers low. In combination, the large number of households covered by the program and the size of the transfers tend to reduce the unit fixed costs of the program.

The Financing of PROGRESA and its Impact on Welfare

The cost analysis above and the evaluation of the impact of the program on poverty focus exclusively either on the costs of operating the program or on the direct effects of the program on beneficiaries. Such partial equilibrium analyses may provide only a limited view of the potential costs or effects of the program since they ignore the indirect effects arising from the need to finance the program domestically. As a matter of principle, in evaluating a program of the size and nature of PROGRESA it is also necessary to adopt a broader perspective. PROGRESA, for example, may be considered as being financed by the elimination of subsidies and various reforms in the structure of value-added taxes. The removal of food subsidies are

likely to have a negative impact on the welfare of poor households in urban areas where PROGRESA is not yet in operation; yet, their removal will also have efficiency gains

These potential indirect effects of the PROGRESA program are examined using a computable general equilibrium model of the Mexican economy (Coady and Harris, 2000). Their results show that financing the program through the elimination of distortionary food subsidies is associated with a substantial welfare gain. The simulation results suggest that there are clear welfare gains from introducing a new efficiently targeted program like PROGRESA; the benefits from more efficient targeting of households is substantial and they are reinforced by the welfare gains from being able to reform the existing system of subsidies and taxes. The results also clearly indicate substantial welfare gains from the expansion of the PROGRESA program to include the urban poor.

Chapter 6

Policy and Research Considerations

The majority of the evaluation findings suggest that PROGRESA's combination of education, health, and nutrition interventions into one integrated package has a significant impact on the welfare and human capital of poor rural families in Mexico. The initial analysis of PROGRESA's impact on education shows that the program has significantly increased the enrollment of boys and girls, particularly of girls and above all, at the secondary school level (Schultz, 2000). In addition, most of the increase in school attendance takes place by children and especially boys working less. The results imply that children will have on average, about 0.7 years of extra schooling because of PROGRESA, although this effect may increase if children are more likely to go on to senior high school as a result of PROGRESA. Taking into account that higher schooling is associated with higher levels of income, the estimations imply that children have lifetime earnings that are 8% higher due to the education benefits they have received through PROGRESA. As a result of PROGRESA, both children and adults are also experiencing improvements in health. Specifically, children receiving PROGRESA's benefits have a 12% lower incidence of illness as a result of the program's benefits and adults report a decrease in 19% of sick or disability days (Gertler, 2000). In the area of nutrition, PROGRESA has had a significant effect on reducing the probability of stunting for children aged 12 to 36 months (Behrman and Hoddinott, 2000). PROGRESA has also had important impacts on food consumption. Program beneficiaries report higher calorie consumption and are eating a more diverse diet, including more fruits, vegetables, and meat. The program is also found to have no apparent effects on the work incentives of adults, while the award of the cash benefits to mothers in beneficiary households appears to have led to the empowerment of women.

A detailed cost analysis of the program also provides strong evidence that the program is generally administered in a cost-effective manner. For example, for every 100 pesos allocated to the program 9 pesos are "absorbed" by administration costs (Coady, 2000). Given the complexity of the program, this level of program costs appears to be quite small and definitely relatively low compared to the numbers for roughly comparable programs.

The findings from IFPRI's evaluation also suggest that there is considerable room for improvement in some of the structural components and the operation of the program. For example, the program was found to have no measurable impact on the achievement test scores of children in beneficiary localities or on their regular school attendance. This suggests that if the program is to have a significant effect on the human capital of children more attention needs to be directed to the quality of education provided in schools. Enrolling in and attending school regularly are only necessary conditions for the improvement of children's human capital. Currently the award of PROGRESA's educational benefits is conditional on regular school attendance but not performance. There may be considerable improvements to be attained by linking benefits to performance, such as granting bonuses to encourage successful completion of a grade, or linking benefits with other programs. It is also important to find ways to maintain and improve the quality of the information provided in the *platicas*. Although the targeting of

households within poor marginal communities may be a source of more social tensions than social benefits, there is no doubt that if PROGRESA were to expand in urban areas, some form of targeting has to take place. Better alternatives to the current reliance of PROGRESA on reported income include the use of household consumption as a measure of poverty.

Whether the vicious cycle of poverty and its intergenerational transmission are indeed broken can only be determined by continuing with PROGRESA and continuing to evaluate in the medium and long run its impact on the livelihood of Mexico's poor.

The possibility of expanding the coverage of PROGRESA to poor households in marginal urban areas implies that there is opportunity to use program evaluation, such as the one presented herein, as a means to adapt some of the components of the program to suit the needs of households in different environments. Mexico's policy leaders are encouraged to capitalize on the innovative precedent established by PROGRESA and to consider program evaluation as an indispensable component of all social policies.

Undoubtedly, the opportunity to conduct a rigorous evaluation of the program like PROGRESA has set a higher set of standards for the design and conduct of social policy in Mexico and in Latin America in general. As policy makers now have a better sense of the basic elements of a program that can be effective towards alleviating poverty in the short run and in the long run, the list of questions and concerns about program choices and design cannot help but grow bigger. For example, is it possible for unconditional cash transfers without any "strings" attached to have similar or higher impact on human capital investments of poor rural families? Is the amount of the cash transfer given to families too high? Perhaps a lower cash transfer could achieve the same impact. Is the simultaneous intervention in the areas of education, health, and nutrition areas preferable to intervening in each of these sectors separately? PROGRESA has been accompanied by complimentary efforts and resources directed at strengthening the supply and quality of educational and health capacity constraints that might arise as a result of the more intensive use of existing facilities and resources. Perhaps this feature of the program plays a critical role for the success of PROGRESA and programs that do not pay sufficient attention to the capacity constraints that might arise as a result of the conditionality of cash transfers may be less effective. Is it not possible that similar or even higher effects on school attendance can be achieved through alternative programs, such as building new schools or improving the quality of educational services? Given that the evaluation finds only a larger program impact on the schooling attendance of children of secondary school age, would it not be preferable to re-orient the funds from primary school to families with children of secondary school age? What if the benefits were given to fathers rather than the mothers in the household? Are programs aimed towards on children at younger age to be preferred over programs aimed towards children of older ages?

The nature of the program and the scope of the program's impact evaluation can provide only a tentative answer to some of these questions. More definite answers can be obtained through the analysis and evaluation of programs that incorporate all or some these features as part of their structure. Hopefully, early involvement of researchers in the design and evaluation of programs

implemented in other Latin American countries, such as Brazil, Honduras, Nicaragua, Colombia, Jamaica, and Argentina, can shed some light on these critical questions for policy.

REFERENCES

- Adato, M. 2000. Final report: The impact of PROGRESA on community social relationships. September. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Adato, M., D. Coady, and M. Ruel. 2000. Final report: An operations evaluation of PROGRESA from the perspective of beneficiaries, *promotoras*, school directors, and health staff. August. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Adato, M., B. de la Brière, D. Mindek, and A. Quisumbing. 2000. Final report: The impact of PROGRESA on women's status and intrahousehold relations. August. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Becker, G.S. 1965. A theory of the allocation of time. *Economic Journal* 75: 493-517.
- Becker, G.S. 1981. A treatise on the family. Cambridge, MA: Harvard University Press.
- Behrman, J. R. 1997. Intrahousehold distribution and the family. In *Handbook of population and family economics*, ed. M. R. Rosenzweig and O. Stark. Amsterdam: North-Holland.
- Behrman, J. 2000. Literature review on interactions between health, education and nutrition and the potential benefits of intervening simultaneously in all three. September. International Food Policy Research Institute, Washington, D.C.
- Behrman, J., and J. Hoddinott. 2000. An evaluation of the impact of PROGRESA on pre-school child height. July. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Behrman, J., and J.C. Knowles. 1999. "Household Income and Child Schooling in Vietnam" *The World Bank Economic Review* vol 13, no.2: 211-56.
- Behrman, J., and P. E. Todd. 1999a. Randomness in the experimental samples of PROGRESA (education, health, and nutrition program). February. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Behrman, J., and P. E. Todd. 1999b. A preliminary evaluation of the sample sizes used for the evaluation of the education, health, and nutrition program (PROGRESA) of Mexico.

- January. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Behrman, J., P. Sengupta, and P. Todd. 2000. Final report: The impact of PROGRESA on achievement test scores in the first year. September. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Behrman, J., P. Sengupta, and P. Todd. 2001. Progressing through PROGRESA: An Impact Assessment of a School Subsidy Experiment" April. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Behrman, J., B. Davis, D. Levy, and E. Skoufias. 1998. A preliminary evaluation of the selection of beneficiary households in the education, health, and nutrition program (PROGRESA) of Mexico. November. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C.
- Bergstrom, T. 1997. A survey of theories of the family. In *Handbook of population and family economics*, ed. M. R. Rosenzweig and O. Stark. Amsterdam: North-Holland.
- Coady, D. 2000. Final report: The application of social cost-benefit analysis to the evaluation of PROGRESA. November. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Coady, D., and R. L. Harris. 2000. Final report: A general equilibrium analysis of the welfare impact of PROGRESA transfers. April. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Demombynes, G., 2001. Incentive Oriented Poverty Programs and Child Time Allocation: The Case of PROGRESA. Department of Economics, University of California at Berkeley Paper (presented at the Population Association Meetings, Washington DC.). Mimeo.
- Duflo, E., 1999. "Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment," Mimeo, MIT.
- Duflo, E., 2000. "Grandmothers and granddaughters: Old age pension and intra-household allocation in South Africa," Mimeo, MIT.
- Gertler, P. J. 2000. Final report: The impact of PROGRESA on health. November. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>

- Haddad, L., J. Hoddinott, and H. Alderman, eds. 1997. *Intrahousehold resource allocation in developing countries: Methods, models, and policy*. Baltimore, MD: Johns Hopkins University Press for the International Food Policy Research Institute.
- Handa, S., M-C. Huerta, R. Perez, and B. Straffon. 2000. Final report: Poverty, inequality, and “spill-over” in Mexico’s education, health, and nutrition program. April. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Hausman, J. A. 1978. Specification tests in econometrics. *Econometrica* 46: 1251-1271.
- Hausman, J., and W.E. Taylor. 1981. Panel data and unobservable individual effects, *Econometrica* 47: 455-473.
- Heckman, J. J. 1992. Randomization and social policy evaluation. In *Evaluating welfare and training programs*, ed. C. Manski and I. Garfinkel. Cambridge, MA: Harvard University Press.
- Heckman, J.J. and J. Smith. 1995. Assessing the case for social experiments. *Journal of Economic Perspectives* 9(2) Spring: 85-110.
- Heckman, J. J, R. La Londe, and J. Smith. 1999. The economics and econometrics of active labor market programs. In *Handbook of labor economics*, vol. 3A, ed. O. Ashenfelter and D. Card. Amsterdam, The Netherlands: North Holland.
- Heckman, J.J, J. Smith, and N. Clements. 1997. Making the most out of programme evaluations and social experiments: Accounting for heterogeneity in programme impacts. *Review of Economic Studies* 64 (4): 487-535.
- Hernandez, D., J. Gomez de Leon, and G. Vasquez. 1999. El Programa de Educacion, Salud y Alimentacion: orientaciones y componentes. Chapter 1 in *Mas Oportunidades para las Familias Pobres: Evaluacion de Resultados del Programa de Educacion, Salud y Alimentacion, Primeros Avances*, 1999. Secretaria de Desarrollo Social. Mexico City.
- Hoddinott, J., and L. Haddad. 1995. Does female income share influence household expenditures? Evidence from Cote D’Ivoire. *Oxford Bulletin of Economics and Statistics* 57(1): 77-95.
- Hoddinott, J., E. Skoufias, and R. Washburn. 2000. The impact of PROGRESA on consumption: A final report. September. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>

- Killingsworth, Mark R. 1983 *Labor Supply*, Cambridge Surveys of Economic Literature, Cambridge University Press.
- Levy, S. 1994. La pobreza en Mexico. In *Causas y políticas para combatirla*, ed. F. Vélez. La pobreza en Mexico. ITAM y FCE: Mexico City: 15-112.
- Murray, David M. 1998. Design and analysis of group-randomized trials. New York: Oxford University Press.
- Newman J., L. Rawlings, and P. Gertler 1994. Using Randomized Control Designs in Evaluating Social Sector Programs in Developing Countries. *The World Bank Research Observer*, 9 (2): 181-201.
- Parker, S., and E. Skoufias. 2000. The impact of PROGRESA on work, leisure and time allocation. October. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progresa.htm>>
- Rivera, J.A., G. Rodríguez, T. Shamah, J. L. Rosado, E. Casanueva, I. Maulén, G. Toussaint, and A. García-Aranda. 2000. Implementation, monitoring, and evaluation of the nutrition component of the Mexican Social Programme (PROGRESA). *Food and Nutrition Bulletin* 21 (1): 35-42.
- Rosado, J. L., J. Rivera, G. Lopez, and L. Solano. 2000. Development, production, and quality control of nutritional supplements for a national supplementation program in Mexico. *Food and Nutrition Bulletin* 21 (1): 30-34 .
- Rosenzweig, M. R. 1986. Program interventions, intrahousehold distribution and the welfare of individuals: Modeling household behavior. *World Development* 14 (2): 233-243.
- Rosenzweig, M.R., and R.E. Evenson. 1977. Fertility, schooling, and the economic contribution of children in rural India: An econometric analysis. *Econometrica* 45: 1065-1079.
- Rosenzweig, M.R., and T. P. Schultz. 1983. Estimating a household production function: Heterogeneity, the demand for health inputs, and their effects on birthweight. *Journal of Political Economy* 92 (October): 723-746.
- Rosenzweig, M.R., and K.I. Wolpin. 1982. Governmental interventions and household behavior in a developing country: Anticipating the unanticipated consequences of social programs. *Journal of Development Economics* 10: 209-225.
- Sahn, D. , and H. Alderman. 1995. Incentive effects on labor supply of Sri Lanka's rice subsidy. In *Public spending and the poor: Theory and evidence*, ed. D. van de

- Walle and K. Nead. Baltimore MD: The Johns Hopkins University Press published for the World Bank.
- Schultz, T. P. 1990. Testing the neoclassical model of family labor supply and fertility. *Journal of Human Resources* 25 (4): 599-634.
- Schultz, T. P. 1999. Preliminary evidence of the impact of PROGRESA on school enrollments from 1997 and 1998. June. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C.
- Schultz, T. P. 2000a. School subsidies for the poor: Evaluating a Mexican strategy for reducing poverty. June. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progres.htm>>
- Schultz, T. P. 2000b. Final report: The impact of PROGRESA on school enrollments. April. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C. <<http://www.ifpri.org/themes/progres.htm>>
- Schultz, T. P. 2000c. Impact of PROGRESA on school attendance rates in the sampled population. February. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C.
- Schultz, T. P. 2000d. Preliminary evidence of PROGRESA's impact on school enrollments from 1997/98 to 1998/99. February. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C.
- Skoufias, E. 1993. Labor market opportunities and intrafamily time allocation in rural households in South Asia. *Journal of Development Economics* 40 (April): 277-310.
- Skoufias, E. 1994a. Using shadow wages to estimate labor supply of agricultural households. *American Journal of Agricultural Economics* 76 (2) May: 215-227.
- Skoufias, E. 1994b. Market wages, family composition and the time allocation of children in agricultural households. *Journal of Development Studies* 30 (2) January: 335-60.
- Skoufias, E. and B. McClafferty. 2001. Is PROGRESA working? Summary of the results of an Evaluation by IFPRI. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute. <<http://www.ifpri.org/themes/progres.htm>>
- Skoufias, E, and S. W. Parker, 2001 Conditional cash Transfers and their Impact on Child Work and Schooling: Evidence from the PROGRESA program in Mexico, *Economia*, Vol.2, No. 1, Fall 2001, pp. 45-96.

- Skoufias, E., B. Davis, and J. Behrman. 1999. Final report: An evaluation of the selection of beneficiary households in the education, health, and nutrition program (PROGRESA) of Mexico. June. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C.
- Skoufias, E., B. Davis, and S. de la Vega. 2001. Targeting the poor in Mexico: evaluation of the selection of beneficiary households into PROGRESA. *World Development* Vol. 29, no. 10 (October) <<http://www.ifpri.org/themes/progres.htm>>
- Strauss, J. A., and D. Thomas. 1995. Human resources: Empirical modeling of household and family decisions. In *Handbook of development economics*, ed. T. N. Srinivasan and J. Behrman. Amsterdam: North Holland.
- Teruel, G., and B. Davis. 2000. Final report: An evaluation of the impact of PROGRESA cash payments on private inter-household transfers. August. Report submitted to PROGRESA. International Food Policy Research Institute, Washington, D.C.
- Thomas, D. 1990. Intrahousehold resource allocation: An inferential approach. *Journal of Human Resources* 25 (4): 635-664.
- Valadez, J., and M. Bamberger. 1994. Monitoring and evaluating social programs in developing countries: A handbook for policymakers, managers, and researchers. EDI Development Studies. Washington D.C.: The World Bank.
- Yaschine, Iliana. 1999. The changing anti-poverty agenda: What can the Mexican case tell us? *IDS Bulletin* 30 (2): 47-60.

APPENDIX A⁴⁶

Summary of Mexican Anti-Poverty Programs

It is important to note that the Mexican government distinguishes between 3 types of anti-poverty programs. These include programs aimed at 1) human capital development 2) income earning opportunities and 3) infrastructure development. The first two types of programs are benefits provided at the individual or household level whereas the third group is aimed at the community or regional level. This document covers principally programs in the first two groups. It is important to note that neither PROBECAT nor PROCAMPO is classified as an anti-poverty program by the Mexican government although we describe these programs below.

Anti-poverty programs during the past few years have undergone several important transitions. First, overall spending has increased in real terms by about 20% over the past 5 years (Poder Ejecutivo Federal, 2000). Second, there has been an increasing tendency towards giving states and municipalities greater control over resources and some consequent decentralization of programs. Third, there has been a gradual transition towards a relatively greater participation of rural areas in terms of spending. For instance, in food and nutrition subsidies, whereas in 1994, rural areas received only 31.4% of spending, by the year 2000, rural areas were receiving 76.4% of all spending on these programs. Overall spending on anti-poverty programs shows similar trends. By the year 2000, 76% of all anti-poverty spending was dedicated to rural areas whereas in 1994, only 48% of all anti-poverty spending was spent in rural areas (Poder Ejecutivo Federal, 2000). Finally, there has also been a gradual transition away from general subsidies and towards targeted programs. Again, referring to spending on food and nutrition subsidies, in 1994 targeted programs received only 39% of overall spending, whereas by the year 2000, 95.5% of all spending was on targeted programs (Subsecretaría de Egresos, 2000a and Poder Ejecutivo Federal, 2000).

Human Capital Development

Diconsa

An important social supply program (DICONSA) provides basic consumer goods, including milk, tortillas and other food items, at low prices in 23,200 stores in rural areas, benefiting 29.2 million individuals in the year 2000. DICONSA helps to guarantee that basic products are available in isolated areas at an affordable price. Its objective communities are those with high and very high margination with community size between 500 and 4,000 inhabitants.

Fidelist and Liconsa

⁴⁶ Prepared with the help of Susan W. Parker.

Two other important food subsidy programs include FIDELIST, which currently provides approximately 1.7 million poor families with one free kilogram of tortillas daily being supplied through producers affiliated with the Program, and LICONSA, which operates a milk subsidy program, supplying milk at a reduced price to, in 2000, 2.4 million poor households with children under 12 years of age, corresponding 4.2 million children. The average subsidy of Liconsa results in a savings of approximately 52% per liter of milk with respect to equivalent brands of milk. It is important to note that both Fidelist and Liconsa cannot operate in the communities where PROGRESA benefits are received. Nevertheless, both Fidelist and Liconsa are in the process of transition towards using the same selection mechanism as that of PROGRESA in terms of choosing households in eligible communities.

DIF

The DIF (National System for Integral Family Development) operates 3 different nutritional programs. The largest is its school breakfast program which gave during the year 2000 a total of 3 million free breakfasts daily to children in preschools and primaries. DIF has 2 other sub-programs which includes PASAF (Programa de Asistencia Social Alimentaria a Familias) and COPUSI (Programa de cocinas populares y unidades de servicios integrales). PASAF provides a monthly *despensa* (package of basic food products) to families in marginated urban and rural areas benefiting in the year 2000 1.7 million families. COPUSI also provides hot breakfasts, providing benefits to 571,000 individuals in 2000 (Poder Ejecutivo Nacional, 2000).

Conafe (Consejo Nacional de Fomento Educativo-Nacional Council to Promote Education)

CONAFE is part of the Secretary of Public Education (SEP) and distributes school supplies to children in isolated and marginated areas as well as didactic materials, school equipment and resources to support parent teacher associations. It is important to note that the benefits of CONAFE have been largely concentrated in the same communities which are served by PROGRESA. The overall budget of CONAFE in the year 2000 was about 400 million dollars benefiting about 4.5 million children (Subsecretaría de Egresos, 2000b).

INI (Instituto Nacional Indigenista-National Indigenous Institute)

The general objective of INI is to design and implement public policies oriented towards indigenous communities. In practice, INI has a wide range of objectives ranging from cultural research, social and economic development and human rights. As part of its actions in promoting investment in human capital, INI provides *albergues escolares*, these are residences which provide lodging and food to indigenous students from communities where education services are not available or insufficient. They also provide education grants to promote students at the junior high and high school level. Its operation is supported by community

committees who supervise and participate in resource allocation. In 1999, the coverage of INI included 1,082 albergues with a total of 59,823 students. It also provided 12,000 education grants to students at junior and senior high school.

Niños de Solidaridad

Other grants received by children in isolated and highly marginalized regions derive from *Programa Estímulos a la Educación Básica* (Program incentives to Basic Education), financed *Fondo para la Infraestructura Social Municipal* (FISM) which consists of funds decentralized to municipalities under the spending areas- Ramo 33). Note that this program was formally called Niños de Solidaridad. These grants are given to children who are not receiving PROGRESA grants, nevertheless it is permitted that communities and even households with PROGRESA benefits have children receiving these grants. The only restriction is that the same child is not receiving both an education grant from PROGRESA and from Programa Estímulos at the same time (PROGRESA, 2000). About 560,000 children received these grants in the year 2000. (Subsecretaría de Egresos, 2000b)

Income-Generating Opportunities

Fonaes

FONAES (National Social Enterprise Fund) contributes to generating employment and income opportunities through the financing of productive projects with risk capital and other forms of credit (5,000 last year with a budget of about 80 million dollars). The most common activities which have been financed include commerce and fishing projects.

PET (Temporary Employment Program)

The Temporary Employment Program (PET), begun in 1995 is another important source of income for families which focuses resources in rural areas in Mexico. During 2000, through the Secretariat of Social Development, 518,996 temporary jobs were created in Mexico, with work involving improvements in basic infrastructure, roads and highways, irrigation, and reforestation projects. Through the Secretariat of Communications and Transportation, another 278 thousand temporary jobs were created. Finally, the Secretariat of Agriculture and Rural Development began operating within the Temporary Employment Program supporting 228 thousand producers. In all, over 1 million temporary jobs were created with PET in the year 2000. The objective of the program is to respond to possible lack of work in rural areas due to different farming seasons and in productive activity. About 90% of all jobs were created in rural zones.

Other Programs Potentially Received by PROGRESA Beneficiaries

Probecat

One of the most important training programs in Mexico is the Program of Training Scholarships for Unemployed Workers (PROBECAT). Here, unemployed individuals receive short training courses (generally lasting less than 3 months), in accordance with the economic activities common to their region and requirements of firms with vacancies in the area. During the period in which they receive the training, they are given a grant equivalent to one minimum salary. Coverage in this program grew significantly between 1995 and 1997, from 412,318 recipients in 1995 to 552,186 recipients in 1999, corresponding to about 25,000 training courses. It is important to emphasize that almost half of the courses and grants given correspond to the Project of Local Initiatives on Temporary Employment, a program that tries to incorporate productive projects to the population living in marginalized areas.

CIMO-Programa Calidad Integral y Modernización

The Modernization and Integral Quality Program gives training courses on systems to improve productivity, mainly in very small firms. During the year 1999, it benefited 760,000 workers in about 418,000 firms.

Procampo (Programa de Apoyos Directos al Campo)

This cash transfer program is provided by the Secretary of Agriculture to producer/farmers who produce any of the following crops: corn, beans, wheat, rice, soy, cotton. The farming area (# of hectares) determines the amount of the cash transfer, which currently ranges from 700 to 800 pesos per hectares depending on the season. In the year 2000, approximately 2.9 million producers were benefited, covering a square area of approximately 14 million hectares.

Sources

Secretary of Social Development. 2000. Internet Page. www.sedesol.gob.mx

Poder Ejecutivo Federal. 2000. Sexto Informe de Gobierno. Septiembre.

Subsecretaría de Egresos. 2000a. El Presupuesto de Egresos de la Federación 1995-2000. Septiembre.

Subsecretaría de Egresos. 2000b. Proyecto de Preupuesto de Egresos de la Federación para el Ejercicio Fiscal.

PROGRESA. 2000. Reglas Generales para la Operación del Programa de Educación, Salud y Alimentación. Documentos de Divulgación.

APPENDIX B

A Description of PROGRESA's Benefits and Requirements

Table B.1 — PROGRESA Monthly Cash Transfer Schedule (Nominal Pesos)

	January-June 1998	July-December 1998	January-June 1999	July-December 1999
EDUCATIONAL GRANT PER CHILD (conditioned on child school enrollment and regular attendance)				
Primary:				
3rd grade	65	70	75	80
4th grade	75	80	90	95
5th grade	95	100	115	125
6th grade	130	135	150	165
Secondary:				
1st – male	190	200	220	240
2nd – male	200	210	235	250
3rd – male	210	220	245	265
1st – female	200	210	235	250
2nd – female	220	235	260	280
3rd – female	240	255	285	305
GRANT FOR SCHOOL MATERIALS PER CHILD				
Primary - September	-	In-kind	-	110
Primary – January	40	-	45	-
Secondary - September	-	170	-	205
GRANT FOR CONSUMPTION OF FOOD PER HOUSEHOLD (conditioned on attending scheduled visits to health centers)				
Cash Transfer	95	100	115	125
MAXIMUM GRANT PER HOUSEHOLD				
	585	625	695	750

Source: D. Hernandez , J. Gomez de Leon, G Vasquez 1999.

Table B.2 — Composition of the Basic Health Services Package

1.	Basic sanitation at the family level
2.	Family planning
3.	Prenatal, childbirth and puerperal care
4.	Supervision of nutrition and children's growth
5.	Vaccinations
6.	Prevention and treatment of outbreaks of diarrhea in the home
7.	Anti-parasite treatment
8.	Prevention and treatment of respiratory infections
9.	Prevention and control of tuberculosis
10.	Prevention and control of high blood pressure and diabetes mellitus
11.	Accident prevention and first-aid for injuries
12.	Community training for health care self-help

Table B.3 — Annual Frequency of Health Care Visits Required by PROGRESA

Age Group	Frequency of Check-Ups
_ Children	
Less than 4 months	3 check-ups: 7 and 28 days, and at 2 months
4 months to 24 months	8 check-ups: 4, 6, 9, 12, 15, 18, 21 and 24 months with 1 additional monthly weight and height check-up
2 to 4 years old	3 check-ups a year: 1 every 4 months
5 to 16 years old	2 check-ups a year: 1 every 6 months
_ Women	
Pregnant	5 check-ups: prenatal period
During purpureum and lactation	2 check-ups: in immediate purpureum and 1 during lactation
_ Adults and youths	
17 to 60 years old	One check-up per year
Over 60 years old	One check-up per year

Table B.4 — Micronutrients Contained in the Food Supplements

Pregnant and Lactating Women	Children
Iron	Iron
Zinc	Zinc
Vitamin B12	Vitamin A
Vitamin C	Vitamin C
Vitamin E	Vitamin E
Folic acid	Riboflavin
Iodine	Vitamin B12
	Folic acid

APPENDIX C

Characteristics of the Localities in the Evaluation Sample

Characteristics of the 506 Localities in the PROGRESA Evaluation
Nov-97

COMMITTEES PRESENT IN THE LOCALITY	ALL	Control	Treatment
municipal president	0.04	0.02	0.05
municipal agent	0.40	0.42	0.38
municipal sub-delegado	0.35	0.37	0.34
ejidal Marshall	0.37	0.47	0.32
communal property Marshall	0.08	0.11	0.07
committee of municipal development	0.14	0.14	0.14
health committee	0.63	0.61	0.64
education committee	0.75	0.73	0.76
agriculture committee	0.14	0.12	0.15
cattle ranching committee	0.07	0.07	0.07
DICONSA clerk	0.20	0.20	0.21
indigenous language speaking inhabitants	0.42	0.32	0.48
LOCALITY INFRASTRUCTURE			
water from community well	1.00	1.00	0.99
flowing water	0.98	0.96	0.99
stagnant water	0.98	0.95	0.99
water truck	0.98	0.95	0.99
potable water	0.98	0.95	0.99
garbage is burned	0.99	0.99	0.99
garbage is buried	0.98	0.95	0.99
garbage is put in open fields	0.97	0.94	0.99
garbage is put in public facility	0.97	0.94	0.99
garbage is left for a truck to collect it	0.97	0.94	0.99
electricity	0.76	0.97	0.64
drainage system	0.16	0.23	0.12
public phone	0.25	0.33	0.21
private phone	0.02	0.02	0.02
movie theatre	0.00	0.00	0.00
post office	0.03	0.05	0.02
telegraph office	0.01	0.02	0.01
EDUCATIONAL FACILITIES IN THE LOCALITY			
Pre-school	0.82	0.83	0.82
Primary School	0.97	0.95	0.98
Tele-Secondary	0.17	0.25	0.13
Secondary school	0.01	0.01	0.01
high school	0.01	0.02	0.00
Higher education (CONALEP)	0.00	0.00	0.00
Higher education (CETA)	0.00	0.00	0.00
Higher education (CETIS)	0.00	0.00	0.00
Higher education (CEBTA)	0.00	0.00	0.00

Characteristics of the 506 Localities in the PROGRESA Evaluation

Nov-97

COMMITTEES PRESENT IN THE LOCALITY	ALL	Control	Treatment
			(continued)
Higher education (CEBTIS)	0.00	0.00	0.00
Higher education (OTHER)	0.00	0.00	0.00
HEALTH FACILITIES IN THE LOCALITY			
Health Ministry Clinic	0.10	0.13	0.08
IMSS-SOLIDARIDAD clinic	0.04	0.05	0.03
IMMS clinic	0.00	0.00	0.00
ISSSTE clinic	0.00	0.00	0.00
Private Doctors	0.00	0.00	0.00
Medical aids	0.60	0.62	0.58
Dispensary	0.07	0.09	0.06
Midwives	0.32	0.25	0.36
Witch doctors	0.12	0.12	0.13
Other Health	0.03	0.01	0.05
mobile health centers	0.75	0.76	0.74
visits of private doctor to locality	0.06	0.03	0.07
pregnancy supervision	0.28	0.26	0.29
delivery supervision available	0.25	0.24	0.25
babies checkup available	0.32	0.26	0.35
immunizations available	0.79	0.77	0.81
diarrhea supervision	0.50	0.42	0.55
family planning	0.44	0.39	0.47
Hospitalization	0.05	0.03	0.06
SALARIES			
Daily Official Minimum Salary of agricultural workers in locality	25.21	24.79	28.17
Actual daily salary	25.34	24.69	29.81
ECONOMIC ACTIVITIES			
main first activity is agriculture	0.97	0.99	0.97
main first activity is commerce	0.01	0.01	0.01
main first activity is cattle ranching	0.01	0.00	0.01
main first activity is art crafts production	0.00	0.00	0.00
main first activity is construction	0.00	0.00	0.00
main first activity industrial production	0.00	0.00	0.00
main first activity is services	0.00	0.01	0.00
main first activity is mining	0.00	0.00	0.00
main second activity is agriculture	0.02	0.01	0.03
main second activity is commerce	0.12	0.15	0.10
main second activity is cattle ranching	0.22	0.15	0.26
main second activity is art crafts production	0.02	0.01	0.03
main second activity is construction	0.03	0.02	0.03
main second activity industrial production	0.00	0.01	0.00
main second activity is services	0.01	0.01	0.00
main second activity is mining	0.00	0.00	0.00
main third activity is agriculture	0.00	0.00	0.00
main third activity is commerce	0.03	0.03	0.03
main third activity is cattle ranching	0.02	0.00	0.03

Characteristics of the 506 Localities in the PROGRESA Evaluation

Nov-97

COMMITTEES PRESENT IN THE LOCALITY	ALL	Control	Treatment
main third activity is art crafts production	0.01	0.00	0.02
			(continued)
main third activity is construction	0.02	0.01	0.03
main third activity industrial production	0.00	0.00	0.00
main third activity is services	0.01	0.00	0.01
main third activity is mining	0.00	0.00	0.00
MARKETS AND PRODUCT SUPPLIES			
Public market	0.00	0.00	0.00
DICONSA shop	0.19	0.19	0.19
supply warehouse	0.00	0.00	0.00
grocery shop	0.36	0.43	0.32
weekly market	0.01	0.01	0.02
regional market	0.00	0.00	0.01
traveling market (1)	0.01	0.01	0.01
traveling market (2)	0.03	0.03	0.02
household commerce	0.39	0.40	0.38
traveling vendor	0.18	0.24	0.14
pharmacy	0.00	0.00	0.01
DICONSA (filter)	0.19	0.19	0.19
can buy maize in locality?	0.39	0.40	0.38
can buy maize flour in locality?	0.47	0.46	0.47
can buy beans in locality?	0.56	0.57	0.55
can buy rice in locality?	0.64	0.68	0.62
can buy sugar in locality?	0.70	0.74	0.68
can buy milk in locality?	0.47	0.52	0.43
can buy eggs in locality?	0.62	0.68	0.58
can buy oil or lard in locality?	0.71	0.74	0.68
can buy meat in locality?	0.06	0.09	0.04
can buy chicken in locality?	0.12	0.13	0.11
can buy soap, tooth paste, etc... in locality?	0.67	0.73	0.64
can buy medicines in locality?	0.09	0.10	0.09
can buy school supplies in locality?	0.34	0.38	0.32
GOVERNMENT PROGRAMS in LOCALITY			
Community kitchens Program	0.04	0.04	0.04
Distribution of DICONSA milk	0.08	0.06	0.10
Provisions?	0.45	0.48	0.43
 TORTILLA DE SOLIDARIDAD Program	 0.00	 0.00	 0.01
Scholarships from SOLIDARIDAD	0.66	0.67	0.66
Scholarships from PROBECA	0.02	0.01	0.02
Temporal Employment Program (PET)	0.12	0.12	0.12

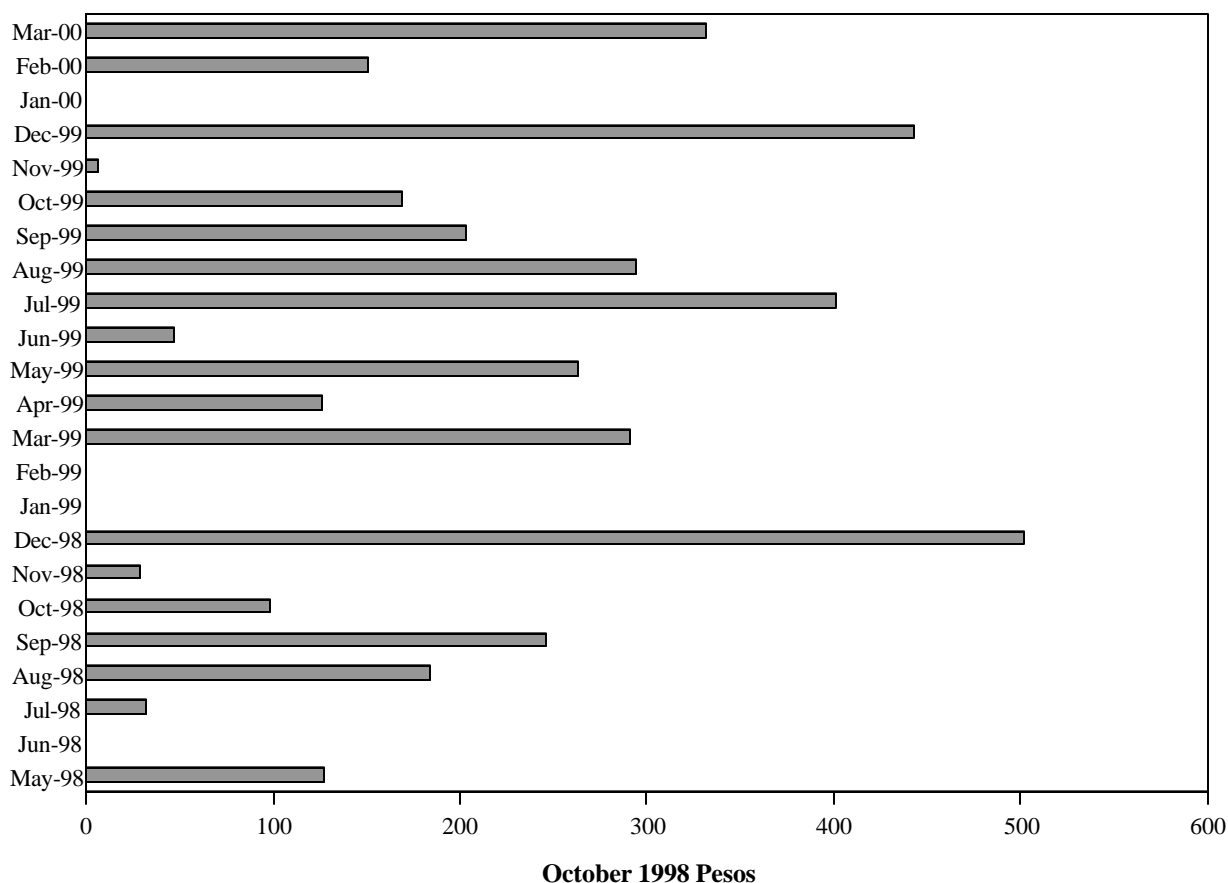
Source: Locality Socio-Economic Characteristics Survey (ENCASEL Nov-97).

APPENDIX D

On the Size of the PROGRESA Cash Transfers

To provide readers with a better sense of the size of the PROGRESA benefits received by program beneficiaries, this appendix draws on the administrative databases of PROGRESA that contain a record of the receipts of payments by beneficiaries in the ENCEL surveys in the 506 evaluation localities. Figure D.1 shows that there is considerable variation in the average payment received per month. For example, a typical beneficiary received more than 500 pesos in December 1998, but nothing in January or February 1999.

Figure D.1— Average Cash Transfers from PROGRESA



Actual average payments, in total and by component, received over the 12-month period between November 1998 and October 1999, along with data on household consumption averaged across all three rounds are reported in Table D.1. The first monetary benefits associated with participation in PROGRESA start in May 1998, covering, in principle, the first two months of participation in the program (i.e. March and April 1998). However, since the first payments that were sent out to some households in May 1998 exceeded the maximum bi-monthly amount suggests that some households were incorporated before March 1998 (e.g. in January 1998). Given that there is no record of the date of incorporation of households into the program, and the initial lags in payments that took place because of delays in the processing of the forms necessary for payment authorization the calculation of the average monthly monetary benefits received by PROGRESA beneficiaries on the 12-month interval between November 1998 and October 1999.

Table D.1 — PROGRESA Transfers to Beneficiary Households from November 1998 to October 1999

	Beneficiary Households						Poor Households Residing in Control Localities		
	Household size	Total value of consumption (Food) [Nonfood]	Average monthly transfers received	Average monthly <i>alimento</i> transfer	Average monthly <i>beca</i> transfer	Average monthly school utilities transfer	Household size	Total expenditures (Food) [Nonfood]	Transfers as a percentage of non- beneficiaries expenditures
All poor households	5.81	1190 (947) [242]	197	99	91	8	5.47	1039 (806) [233]	19.54%
Households with pre- schoolers	6.58	1289	202	101	93	8	6.41	1092	18.7%
Households with school aged children	6.59	1311	239	101	128	11	6.40	1155	20.9%
Households with heads aged 60 or older	4.35	936	138	93	41	3	4.23	880	16.5%

Source: Calculations based on transfer data provided by PROGRESA averaged across the 12 months period between November 1998 and October 1999 (deflated to November 1998 prices). Consumption and family size averaged across the 3 rounds of the ENCEL surveys in November 1998, June 1999, and November 1999.

APPENDIX E⁴⁷

On The Impact of PROGRESA on Poverty

This appendix discusses in more detail the estimated impact of PROGRESA on poverty and provides some background discussion for the income per capita measure used as an indicator of poverty. The November 1997 ENCASEH survey as well as the November 1998, June 1999, and November 1999 ENCEL surveys collected detailed information on income earned or received from a variety of sources for each individual in the household. The survey instrument used to collect individual and household income for these various sources changed significantly beginning with the November 1998 survey. With this caveat in mind it should be noted that a serious effort was made to maintain comparability of income by source across the survey rounds. Then the various sources of income were transformed into monthly income and then aggregated into 4 main sources of income:

- a) labor income;
- b) income from self employment (such as income from sewing, food preparation, construction or carpentry, commerce, produce transportation, repairs and laundry or cooking);
- c) other income (such as pensions, interest income, rents and community profits); and
- d) government transfers (such as educational scholarships from Niños de Solidaridad, benefits from Instituto Nacional Indigenista (INI), PROBECAT, Empleo Temporal and Procampo).

For households in treatment villages receiving PROGRESA cash transfers, total income per month was adjusted upwards by the cash transfer per month received by the household. The actual amount of cash transfers received per month was obtained from the records of payments sent out each month since May 1998 by the PROGRESA administration headquarters in Mexico City. The monthly income measure calculated for each round of the survey was then expressed into November 1998 pesos by dividing by the corresponding adjustment ratio of the national consumer price index.

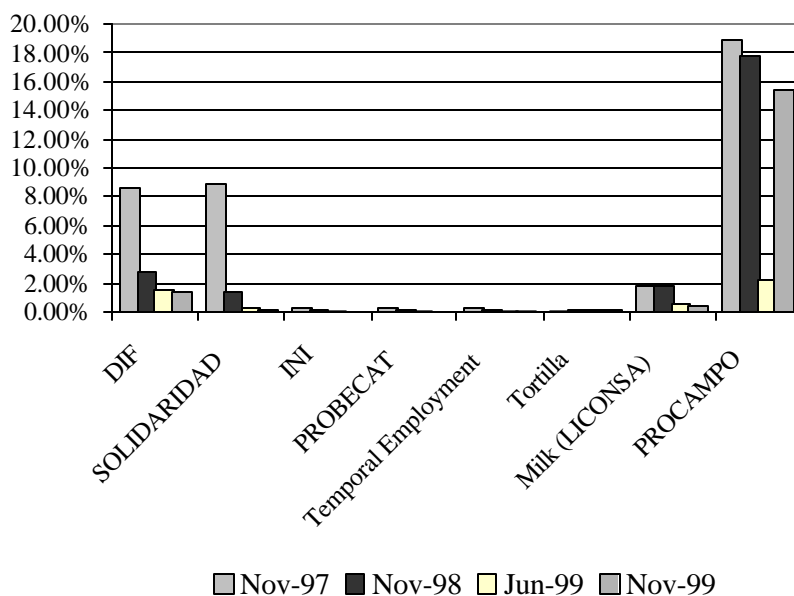
The first item examined concerned the incidence of receipt of benefits from other government programs. Households receiving PROGRESA benefits should not, in principle, be receiving other similar benefits from program like *Abasto Social de Leche, de Tortilla* and the National Institute of Indigenous people (INI). Figure E.1 below suggests that among beneficiary households (i.e. those that received any PROGRESA benefits between May 1998 and November 1999) the incidence of benefits received from DIF, Niños de Solidaridad and *Abasto Social de Leche* decreased dramatically. As it was discussed in the first part of Chapter 5, the set of beneficiary households is not identical to the set of eligible households. Beneficiary

⁴⁷ Prepared with the help of Claudia Aburto-Szekely.

households are defined to be the (eligible) households that actually received PROGRESA benefits. These households were identified based on the payment record data. Specifically, for households in treatment localities, a household is classified as a beneficiary (BEN=1) as long as the household received a positive amount of cash benefits since the start of PROGRESA in March 1998 and the November 1999 round of the evaluation survey (BEN=0 otherwise).

Figure E.1

Percentages of Households in Treatment Localities that Receive the Transfers from Other Programs and PROGRESA

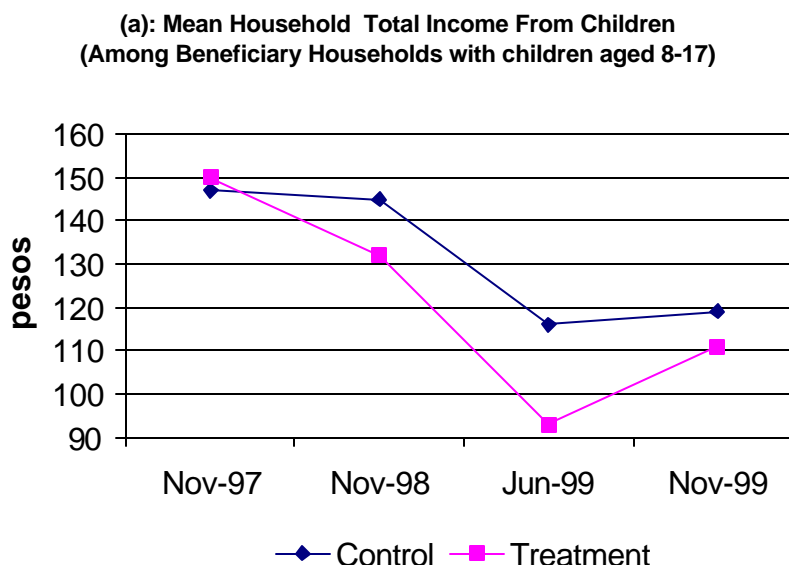


Secondly, we examined how the income contributed to beneficiary families by children between ages 8-17 evolved across different survey rounds. Children can contribute income to families by working for wages or by being recipients of cash transfers from other government transfer programs excluding PROGRESA. Panel (a) in Figure E.2 reveals that the total (labor + other) income beneficiary families received from children declined in both treatment and control localities since the initiation of PROGRESA in November 1998. Note that for comparison purposes we use the set of all eligible households in control localities (E2=1). The mean total income reported in November 1998 is slightly lower among treatment households compared to control households and the gap gets even bigger by the June 1999 round. By November 1999

this gap is completely eliminated as control households are already incorporated into PROGRESA.⁴⁸

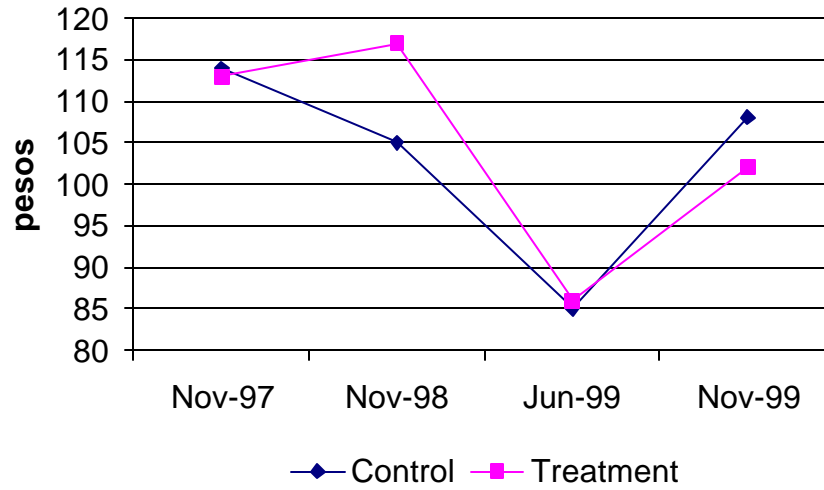
Panels (b) and (c) break down total income into its two components, i.e., income from labor and other income that consists mainly of government transfers. These graphs reveal that the differences in mean total income from children in beneficiary households and eligible households in control localities are primarily due to drops in the child-related income beneficiary families received from other government programs. It also appears that there are no significant differences in the labor income of children from beneficiary households in treatment localities and the labor income contribution of children in eligible households in control villages.

Figure E.2

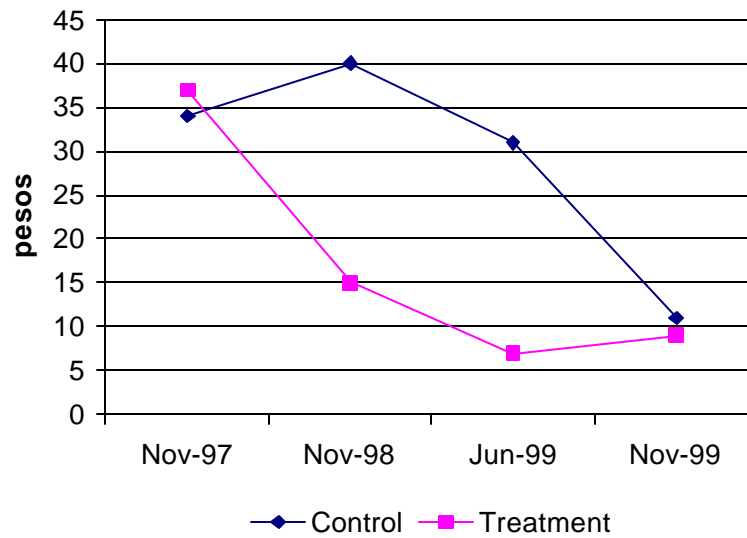


⁴⁸ Note that control households started receiving cash benefits in December 1999. Households are first incorporated into PROGRESA, meaning that they are given all the necessary forms and informed of all the program requirements. A few months later, the cash benefits are sent out by the PROGRESA administration headquarters.

(b): Mean Household Labor Income From Children
(Among Beneficiary Households with children aged 8-17)



(c): Mean Household Other Income From Children
(Among Beneficiary Households with children aged 8-17)



Next we estimated the impact of the PROGRESA cash transfers on poverty using the income per capita as reported in (and constructed form) the various household surveys.

For this purpose we used two different poverty lines. The first one is the value of the standard food basket (*canasta basica*) in November 1997 pesos. The second poverty line used is the median or 50th percentile of the value of consumption in November 1998 (expressed in November 1997 pesos).

The availability of poverty estimates in treatment and control localities before and after the start of the PROGRESA program, provides the opportunity to calculate a difference-in differences estimate of the impact of PROGRESA's cash transfers on the poverty rate in the sample. Such estimates allow for the possibility of pre-existing differences in poverty between treatment and control localities as well as for the role of aggregate or macroeconomic shocks that affected all localities during the time period between the first survey round in November 1997 and subsequent survey rounds.

Tables E.1 and E.2 below provide the estimated poverty rates in treatment and control localities in each survey round as well as a difference-in-differences (2DIF) estimate of the impact of PROGRESA's cash transfers. The standard errors reported for the Foster-Greer-Thorbecke (FGT) poverty indices are calculated using the method proposed by Kakwani (1993).

Specifically, the difference-in-difference estimate of the impact of PROGRESA on the poverty rate denoted by P between round R , where $R = 2, 3, 4$ and the first round of the survey ($R=1$) is calculated as

$$2DIF = (P_{TREAT}(R) - P_{TREAT}(1)) - (P_{CONTROL}(R) - P_{CONTROL}(1)).$$

Inspection of tables E.1 and E.2 reveals that irrespective of the poverty line used (i.e. the value of basic food basket or the median value of household consumption) the 2DIF estimates imply that PROGRESA had a significant impact in reducing poverty between November 1997 and November 1999. For example, using the 50th percentile of the value of consumption per capita as a poverty line, suggests that the headcount poverty rate declined by 17% in treatment areas between November 1997 and November 1999 (using as base the 67.4 percent poverty rate in treatment localities in November 1997). Over the same period, and using as base the corresponding value of the poverty gap and squared poverty gap indices in treatment areas in November 1997, the poverty gap measure declined by 36%, and the severity of poverty measure declined by 46%. These estimates are very much in line with the estimates obtained using simulations and provide further confirmation that the impact of PROGRESA is concentrated at improving the welfare of the poorest of the poor households in marginal rural areas.

References:

Kakwani N. (1993) “Statistical Inference in the measurement of Poverty,” *Review of Economics and Statistics* Vol. 75, no. 4, pp.632-39.

Table E.1

POVERTY MEASURES AND DIFFERENCE IN DIFFERENCE TESTS FOR TOTAL INCOME PER CAPITA USING "CANASTA BASICA" AS POVERTY LINE						
			POVERTY ESTIMATOR			
			MEAN	STANDAR ERROR	t	2DIF STANDAR ERROR t
Head Count Ratio						
	Oct-97	control	0.927	0.003	302.889	
	Oct-97	treatment	0.926	0.002	383.197	
	Oct-98	control	0.935	0.003	325.836	
	Oct-98	treatment	0.932	0.002	406.049	-0.002 0.005 -0.418
	Jun-99	control	0.946	0.003	356.493	
	Jun-99	treatment	0.937	0.002	416.080	-0.008 0.005 -1.602
	Nov-99	control	0.940	0.003	347.807	
	Nov-99	treatment	0.925	0.002	378.144	-0.014 0.005 -2.594
Poverty Gap						
	Oct-97	control	0.575	0.003	174.386	
	Oct-97	treatment	0.598	0.003	223.418	
	Oct-98	control	0.610	0.003	186.859	
	Oct-98	treatment	0.594	0.003	233.816	-0.038 0.006 -6.496
	Jun-99	control	0.658	0.003	191.019	
	Jun-99	treatment	0.624	0.003	232.768	-0.057 0.006 -9.280
	Nov-99	control	0.593	0.003	189.077	
	Nov-99	treatment	0.527	0.003	209.916	-0.089 0.006 -15.273
Squared Poverty Gap						
	Oct-97	control	0.409	0.003	118.037	
	Oct-97	treatment	0.441	0.003	153.006	
	Oct-98	control	0.450	0.004	125.878	
	Oct-98	treatment	0.430	0.003	158.585	-0.052 0.006 -8.129
	Jun-99	control	0.518	0.004	130.365	
	Jun-99	treatment	0.473	0.003	158.554	-0.077 0.007 -11.486
	Nov-99	control	0.428	0.003	126.858	
	Nov-99	treatment	0.350	0.003	138.566	-0.110 0.006 -17.789

Table E.2

POVERTY MEASURES AND DIFFERENCE IN DIFFERENCE TESTS FOR TOTAL INCOME PER CAPITA USING 50th PERCENTILE OF PER CAPITA VALUE OF CONSUMPTION AS POVERTY LINE						
			POVERTY ESTIMATOR			
			MEAN	STANDARD ERROR	t	
Head Count Ratio						2DIF STAND. t
						ERR.
Oct-97	control		0.652	0.006	116.437	
Oct-97	treatment		0.674	0.004	156.024	
Oct-98	control		0.698	0.005	130.130	
Oct-98	treatment		0.681	0.004	160.306	-0.039 0.010 -3.922
Jun-99	control		0.758	0.005	150.238	
Jun-99	treatment		0.712	0.004	170.030	-0.068 0.010 -7.011
Nov-99	control		0.694	0.005	132.232	
Nov-99	treatment		0.599	0.005	131.543	-0.117 0.010 -11.783
Poverty Gap						
Oct-97	control		0.319	0.004	82.296	
Oct-97	treatment		0.357	0.003	110.179	
Oct-98	control		0.364	0.004	89.969	
Oct-98	treatment		0.343	0.003	111.617	-0.060 0.007 -8.378
Jun-99	control		0.444	0.005	98.214	
Jun-99	treatment		0.392	0.003	115.398	-0.090 0.008 -11.921
Nov-99	control		0.339	0.004	89.219	
Nov-99	treatment		0.248	0.003	89.104	-0.129 0.007 -18.622
Squared Poverty Gap						
Oct-97	control		0.211	0.004	59.182	
Oct-97	treatment		0.252	0.003	81.895	
Oct-98	control		0.253	0.004	65.227	
Oct-98	treatment		0.231	0.003	82.093	-0.063 0.007 -9.439
Jun-99	control		0.344	0.005	74.477	
Jun-99	treatment		0.288	0.003	87.587	-0.097 0.007 -13.182
Nov-99	control		0.226	0.004	63.378	
Nov-99	treatment		0.152	0.002	62.201	-0.115 0.006 -18.065