PROGRESA and Its Impacts on the Welfare of Rural Households in Mexico

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Acronyms and Abbreviations

CIMO	Programa Calidad Integral y Modernizacion
CONAFE	Consejo Nacional de Fomento Educativo
CONASUPO	Compania Nacional de Subsistencias Populares
COPUSI	Programa de Cocinas Polulares y Unidades de Servicios Integrales
DICONSA	Distribuidora Comercial CONASUPO
ENCASEH	Encuesta de Caracteristicas Socioeconomicas de los Hogares
ENCEL	Encuesta de Evaluacion de los Hogares
ENIGH	Encuesta Nacional de Ingreso-Gasto de los Hogares
FISM	Fondo para la Infraestructura Social Municipal
FONAES	Fondo Nacional de Apoyo a Empresas Sociales
IFPRI	International Food Policy Research Institute
IMSS	Instituto Mexicano del Seguro Social
INI	Instituto Nacional Indigenista
LICONSA	Leche Industrial CONASUPO
PASAF	Programa de Asistencia Social Alimentaria a Familias
PET	Programa de Empleo Temporal
PROBECAT	Programa de Becas de Capacitacion para Desempleados
PROCAMPO	Programa de Apoyos Directos al Campo
PROGRESA	Programa Educación, Salud Alimentacion
PRONASOL	Programa Nacional de Solidaridad
SEDESOL	Secretaria de Desarrollo Social
SEP	Secretaria de Educación
TORTIBONO	Subsidio a la Tortilla

Foreword

In the second half of the twentieth century, many developing countries adopted broad social assistance programs, like food subsidies, ostensibly designed to help poor people. Their effectiveness was mixed and, unfortunately, many of these expensive programs did not make much difference in the lives of poor people, much less help them climb permanently out of poverty. In the 1990s Mexico took a completely new approach. It launched a social program—PROGRESA—that was revolutionary in two ways. First, PROGRESA aimed to integrate interventions in health, education, and nutrition simultaneously, based on an understanding that these dimensions of human welfare are interdependent and that poor health, education, and nutrition are both causes and consequences of poverty. Second, PROGRESA was designed from the beginning to be continually evaluated and improved, so that it would become ever more effective at improving the well-being of Mexico's poorest people.

From 1998 to 2000 the International Food Policy Research Institute (IFPRI) assisted the PROGRESA administration in evaluating the program. This research resulted in a series of IFPRI reports, synthesized here, on aspects of PROGRESA's performance. The evaluation not only highlighted areas of success, but also suggested needed improvements in the program. On the one hand, for example, the research showed that PROGRESA has helped keep poor children in school longer, improved the health of young children and adults, increased women's use of prenatal care, and improved child nutrition. On the other hand, the evaluation revealed that PROGRESA could have a greater impact on school enrollment by focusing on attendance in secondary schools—the stage at which many poor children drop out.

In the election of 2000, the people of Mexico voted a new party into power. Yet, faced with evidence of PROGRESA's effectiveness, the new government decided to keep the program (renamed Oportunidades) and to make needed improvements in its operation.

IFPRI's research on PROGRESA has advanced our knowledge about policy steps that governments can take to improve the capacities of poor people, who may require interventions in several areas to make real headway in overcoming poverty. In the meantime comparable programs have been tested or implemented in other countries, including Brazil, Honduras, and Nicaragua, and it would be promising to explore their adaptation in African and Asian countries as well. It is our hope that research of this kind will encourage replications, adaptations to country circumstances, and rigorous evaluation of social programs in many developing countries.

Joachim von Braun
Director General, IFPRI

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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." 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 original IFPRI reports, which are provided in English and in Spanish on the CD enclosed with this publication.

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, PROGRESA aims to alleviate current and future poverty levels through cash transfers to mothers in households. The cash transfers provided are conditioned on regular school attendance and visits to health care centers. At the end of 1999, PROGRESA covered approximately 2.6 million families, representing one ninth of all families in Mexico; the beneficiaries comprised about 40 percent of all rural families. 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 US$777 million in 1999 was equivalent to 0.2 percent of Mexico's gross domestic product (GDP).

For Mexico, the design of PROGRESA represents a significant change in the provision of social programs. First, in contrast to previous poverty alleviation programs in Mexico, PROGRESA applies targeting at the household level to ensure that the resources of the program are directed and delivered to households in extreme poverty, that is, the households that can most benefit from the program. General food subsidies, such as the tortilla price subsidy [Subsidio a la Tortilla (TORTIBONO)], are widely acknowledged to have had a high cost in 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 programs such as the earlier anti-poverty program PRONASOL, in place during 1988 and 1994, were thought to be susceptible to local political influences and not very effective at reaching those in extreme poverty.[1] Under PROGRESA, communities are first selected using a marginality index based on census data. Then, within the selected communities, households are chosen using socioeconomic data collected for all households in the community.

Second, unlike earlier social programs in Mexico, PROGRESA contains a multisectoral 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 not only are desirable in themselves, but also 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,

[1]See Yaschine (1999) and Levy (1994) for a description of the program.

PROGRESA differs in the mechanism of delivering its resources. Recognizing the potential of mothers to use resources effectively and efficiently in a manner that reflects the immediate needs of the family, PROGRESA gives benefits exclusively to mothers.

Specifically, the education component of PROGRESA is designed to increase school enrollment among youth in Mexico's poor rural communities by making education grants available to pupils' mothers, who then are required to have their children attend school regularly. In localities where PROGRESA currently operates, households that have been characterized as poor, and have children enrolled in grades 3–9, are eligible to receive these educational grants every two months. The levels of these grants were determined taking into account, among other factors, what a child would earn in the labor force or contribute to family production. The educational grants are slightly higher at the secondary level for girls, given their propensity to drop out at earlier ages. Every two months, confirmation of whether children of beneficiary families attend school more than 85 percent of the time is submitted to PROGRESA by schoolteachers and directors, and this triggers the receipt of bimonthly cash transfers for school attendance.

In the area of health and nutrition, PROGRESA brings basic attention to health issues and promotes health care through free preventive interventions, such as distribution of nutritional supplements, and education on hygiene and nutrition as well as monetary transfers for the purchase of food. Receipt of monetary transfers and nutritional supplements is tied to mandatory health care visits to public clinics. This aspect of the program emphasizes targeting benefits to children under five, and pregnant and lactating women, and is administered by the Ministry of Health and by IMSS-Solidaridad, a branch of the Mexican Social Security Institute, which provides benefits to uninsured individuals in rural areas.

Nutritional supplements are given to children between the ages of four months and two years, and to pregnant and breastfeeding women. If signs of malnutrition are detected in children between two and five years of age, nutritional supplements will also be administered. The nutritional status of beneficiaries is monitored by mandatory visits to the clinic and is more frequently monitored for children five years of age and under and pregnant and lactating women. At each visit, young children and lactating women are measured for wasting (weight-for-height), stunting (height-for-age), and weight-for-age. An appointment monitoring system is set up and a nurse or doctor verifies adherence. Every two months the health care professionals submit certification of beneficiary visits to PROGRESA, which triggers the receipt of the cash transfer for food support.

The average monthly payment (received every two months) by a beneficiary family amounts to 20 percent of the value of monthly consumption expenditures prior to the initiation of the program. One additional requirement of the PROGRESA program is that households benefiting from PROGRESA were to stop receiving benefits from other programs in effect, 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.

Poverty alleviation programs such as PROGRESA are an important component of the set of instruments that government has at its disposal for redistributing income and assets among households. Program evaluation can improve the design and implementation of programs so that they can have a greater effect on household welfare. In addition, program evaluation, when applied consistently across a wide spectrum of programs, allows governments to have a stronger effect on social welfare with the same budget by reallocating resources from less to

more effective programs. In addition to these economic considerations, there are also social and political reasons for justifying program evaluations. Primary among these is that program evaluation can serve as a means of increasing the accountability of governments toward their citizens by providing a template for comparing sensibly whether public funds are used effectively toward poverty alleviation.

In the case of PROGRESA the national elections that were forthcoming in the year 2000 and the increasing public support toward the opposition parties contributed to an unprecedented willingness by the Zedillo administration to support a rigorous and politically neutral evaluation of the program. It is hard to dismiss the interpretation that the design of the program, with its careful targeting of the benefits to poor rural households, along with the decision to evaluate PROGRESA, also served political purposes. For example, the targeting of the program to households in extreme poverty and the provision of the cash transfers directly to the beneficiary households signaled a break from the wasteful practices of the past. At the same time, the decision to evaluate the program established a precedent that any future administration could hardly afford not to imitate.

Until the implementation of PROGRESA in Mexico, as in most developing countries, national poverty alleviation programs were not customarily subjected to rigorous evaluations. In the rare instances in which programs were evaluated, the decision to do so was usually taken years after the implementation of the program. In such situations, it is typically too late to evaluate the program because the program has already achieved wide coverage and it is practically impossible to construct a reliable comparison group that is essential for the credible evaluation of the program's impact.

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. The strategy adopted for the evaluation of PROGRESA consisted of the following two critical elements:

1. The adoption of an *experimental design* in the early stage of the implementation of the program, which allows the measurement of program impact by comparing the mean values of key outcome indicators among beneficiary households (treatment group) with similar households that were not yet covered by the program (comparison/control group). The experimental evaluation design of PROGRESA offers the opportunity to evaluate the impact of the program on beneficiary households by systematically removing the influence of other factors that might have contributed to the observed changes.
2. The collection of information from these two groups of households (treatment group and comparison groups) *before* and *after* the implementation of the program.

Specifically, the full 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. Of the 506 localities, 320 localities assigned to the treatment group (where PROGRESA was in operation) and 186 localities were assigned as controls. As originally planned, the localities serving the role of a control group started receiving PROGRESA benefits by December 1999. 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 IFPRI's evaluation of the impact of PROGRESA on its target group, Mexico's rural poor:

- 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 percent but generally begin dropping out of school after completing the sixth grade. Enrollment rates in general witness another steep decline as children transition to senior high school. Research reveals that PROGRESA has had the largest impact on children who enter secondary school and represents a percentage increase of enrollment of more than 20 percent for girls and 10 percent for boys. The research revealed that much of the positive impact on enrollment is attributable 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 0.66 years of additional schooling by grade 9 (0.72 years of additional schooling for girls, 0.64 years for boys). Given that the average 18-year-old youth typically achieved 6.2 years of completed schooling, PROGRESA effectively can be expected to increase educational attainment of poor Mexican rural children by 10 percent.
- 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 preventive health care in PROGRESA areas have made younger children more robust against illness. Specifically, PROGRESA children one to five years of age have a 12 percent lower incidence of illness than non-PROGRESA children.
- Adult PROGRESA beneficiaries on average have 19 percent fewer days of difficulty with daily activities, 17 percent fewer days incapacitated by illness, 22 percent fewer days in bed, and are able to walk about 7 percent longer than nonbeneficiaries.
- 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 faster than in non-PROGRESA areas.
- PROGRESA increased the number of first visits in the first trimester of pregnancy by about 8 percent. This shift to early prenatal care significantly reduced the number of first visits in the second and third trimesters of pregnancy. This positive change in behavior is documented to have a significant improvement in the health of infants and pregnant mothers.
- In 1999, median food expenditures were 13 percent 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 percent. Beneficiaries felt that since the initiation of 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 a 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 percent of 12- to 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 percent in mean growth rate per year (corresponding to 1 cm) for children who received treatment in the critical 12- to 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 a 2.9 percent 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 cost 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 costs 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.

One of the most important contributions of IFPRI's evaluation of PROGRESA has been the continuation of the program in spite of the historic change in the government of Mexico in the 2000 elections. The overwhelming (and unprecedented) evidence that a poverty alleviation program shows strong signs of having a significant impact on the welfare and human capital investment of poor rural families in Mexico has contributed to the decision of the Fox administration to continue with the program and to expand its coverage in the poor urban areas of the country after some improvements in the design of the program.

The majority of the improvements in the design of PROGRESA (renamed Oportunidades by the Fox administration) were based on findings of the evaluation of PROGRESA that revealed areas of needed improvements in some of the structural components and the operation of the program. For example, the evaluation revealed a larger program impact only on the schooling attendance of children of secondary school age. This suggests that it would be preferable to reorient the funds from primary school to families with children of secondary school age. Oportunidades did exactly that by extending the benefits of the program to children attending high school (*preparatoria*) rather than just junior high school, as it was in the earlier PROGRESA. Also, initially the award of PROGRESA's educational benefits was conditional on regular school attendance but not performance. Oportunidades improved on this design feature by linking benefits to performance, such as granting bonuses to encourage successful completion of a grade, or linking benefits with participation in other programs. For example, the creation of a related program, Jovenes con Oportunidades, aims to create income-generating opportunities for poor households through preferential access to microcredit, housing improvements, adult education, and social insurance.

Yet in spite of these improvements in the program, the evaluation findings suggest that some issues remain to be resolved. 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 implies 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. Finally, it is also important to find ways to maintain and improve the quality of the information provided in the *pláticas.*

The opportunity to conduct a rigorous evaluation of a program such as 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 policymakers now have a better sense of the basic elements of a program that can be effective toward alleviating poverty in the short run and, perhaps, in the long run, the list of questions and concerns about program choices and design cannot help but grow

larger. For example, is it possible for unconditional cash transfers without any "strings" attached to have similar or higher impacts 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 complementary 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? What if the benefits were given to the fathers rather than the mothers in the household? Are programs aimed toward younger children to be preferred over programs aimed toward older children?

The nature of the program and the scope of the evaluation of the program's impact 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 of these features as part of their structure. Hopefully, early involvement of researchers in the design and evaluation of programs implemented in other countries, such as Brazil (Bolsa Familia), Colombia (Familias en Accion), Honduras (PRAF), Jamaica (PATH), Nicaragua (RPS), and Turkey, can shed more light on these critical questions for policy.

Finally, the critical question of whether the vicious cycle of poverty and its intergenerational transmission are indeed broken can be determined only by following the cohorts of children currently in the program. At least in Mexico, the evaluation of PROGRESA's impact in the short term has provided a solid foundation for determining whether the program had a significant difference in the welfare and earnings of these children as adults.

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, aimed primarily at improving the educational, health, and nutritional status of poor families, 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 for 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 11 phases.[2] In phase 1, which began in August 1997, 140,544 households in 3,369 localities were incorporated. Phase 2 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. This constitutes around 40 percent 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 percent of the federal poverty alleviation budget or 0.2 percent of gross domestic product (GDP).

As part of an overall strategy for poverty alleviation in Mexico, PROGRESA works in conjunction with other programs that are aimed toward developing employment and income opportunities (such as Programa de Empleo Temporal [PET]) and facilitating the formation of physical capital, such as the Fondo para la Infraestructura Social Municipal (FISM) (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. First, in contrast to previous poverty alleviation programs in Mexico, PROGRESA applies targeting at the household level to ensure that the resources of the program are directed and delivered to households in extreme poverty, that is, the households that can most benefit from the program. General food subsidies, such as the tortilla price subsidy (Sub-

[2]For more details see Section 4 and Table 1 in Coady (2000).

sidio a la Tortilla [TORTIBONO]), 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 programs such as the earlier anti-poverty program Programa Nacional de Solidaridad (PRONASOL), in place during 1988 and 1994, were thought to be susceptible to local political influences and not very effective at reaching the extreme poor.[3] Under PROGRESA, communities are first selected using a marginality index based on census data. Then, within the selected communities, households are chosen using socioeconomic data collected for all households in the community.

Second, unlike earlier social programs in Mexico, PROGRESA contains a multisectoral 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 desirable not only in themselves, but also 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 use resources effectively and efficiently 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 an 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 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.[4]

This document synthesizes 24 months of extensive research by International Food Policy Research Institute (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, intrahousehold transfers, and work incentives are also examined. The synthesis presented here builds on a series of reports

[3]See Yaschine (1999) and Levy (1994) for a description of the program.

[4]For a more detailed discussion of the variety of quasi-experimental designs available in the evaluation literature, see Valadez and Bamberger (1994) and Ravallion (1999).

presented by IFPRI to PROGRESA from November 1998 through November 2000. A more detailed description of the research, rationale, and methods appears in the original IFPRI reports, which are provided in English and in Spanish in a CD enclosed with this publication.

This 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 (Rawlings and Rubio 2002).

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 in this report 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 cycle of poverty. Investments in education are therefore viewed as a way of facilitating growth while simultaneously reducing inequality and poverty.

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

1. A system of educational grants
2. Monetary support for the acquisition of school material
3. Strengthening the supply and quality of education services
4. Cultivation of parental responsibility for, and appreciation of the advantages stemming from, their children's education.

These are obviously interrelated 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 (see Table 1.1). First, the size of the grant increases through grade levels. Second, 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 internalize education externalities that accrue to other families after the marriage of women. 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, for example, how many and which eligible children to enroll. 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 third-year primary students) are eligible for education grants.[5]

[5]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.

Table 1.1 PROGRESA monthly cash transfer schedule (nominal pesos)

Grant	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				
Third grade	65	70	75	80
Fourth grade	75	80	90	95
Fifth grade	95	100	115	125
Sixth grade	130	135	150	165
Secondary				
First—male	190	200	220	240
Second—male	200	210	235	250
Third—male	210	220	245	265
First—female	200	210	235	250
Second—female	220	235	260	280
Third—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: Hernandez, Gomez de Leon, and Vasquez (1999).

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 enroll their children in school and ensure regular attendance (i.e., students must have a minimum attendance rate of 85 percent, both monthly and annually). Failure to fulfill 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 schoolteacher/director to certify enrollment. 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.[6]

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 halfway through the

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

school year (i.e., in January/February 2000), for the replacement of materials, as long as children continue to attend school. For secondary school students, this support increases to 205 pesos and is delivered in a single payment, at the beginning of the school year, once pupils have enrolled. Children attending primary schools that are supplied by the state-run Consejo Nacional de Fomento Educativo (CONAFE) suppliers (under the Ministry of Education), that is, 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 interrelated subcomponents, namely:

1. A basic package of primary health care services
2. Nutrition and health education and training for families and communities
3. Improved supply of health services (including annual refresher courses for doctors and nurses)
4. Nutrition supplements for pregnant and lactating mothers and young children.

Although 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 preventive health care that 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 (see Table 1.2). The most important actions are related to maternal and child health (e.g., pre- and postnatal health care) and family planning services. A crucial ingredient in the program is the emphasis placed on regular visits to health centers and the setting up and monitoring of a schedule of appointments. This includes the setting of appropriate health-center timetables that minimize the inconvenience associated with the making and keeping of appointments. To facilitate this, on 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 Table 1.3. 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.

Table 1.2 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. Antiparasite 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 1.3 Annual frequency of health care visits required by PROGRESA

Age group	Frequency of check-ups
Children	
Younger than 4 months	Three check-ups: 7 and 28 days, and 2 months
4 months to 24 months	Eight check-ups: 4, 6, 9, 12, 15, 18, 21, and 24 months, with one additional monthly weight and height check-up
2–4 years	Three check-ups a year: one every 4 months
5–16 years	Two check-ups a year: one every 6 months
Women	
Pregnant	Five check-ups: prenatal period
During puerperium and lactation	Two check-ups: in immediate puerperium and one during lactation
Adults and youths	
17–60 years	One check-up per year
Over 60 years	One check-up per year

Beneficiaries are also asked to attend health and nutrition talks (referred to as *pláticas*) at the clinic. Each clinic[7] 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 center visits, another for attendance at *pláticas*) for registering compliance or noncompliance by the household, must be filled out by a nurse or a 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 bimonthly 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 asked to comply with only one visit per year, if the appointment date is changed in advance, the health center 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. 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 detection and prevention of chronic diseases. Because mothers are the primary caretakers, the *pláticas* are directed mainly 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: (1) ways to prevent and reduce

[7]Regarding mobile clinics (*unidad mobiles*) that already existed in some localities, PROGRESA reached agreement with another program (Programas de Ampliacion de Cobertura) on a new frequency of visits to beneficiary localities in order to facilitate the expected increase in demand.

health risks (e.g., through prenatal care, early detection of malnutrition, childhood immunizations, safe food and water treatment); (2) how to recognize signs or symptoms of sickness; and (3) how to follow appropriate primary-care procedures (e.g., treatment of diarrhea by means of oral rehydration). Participants are also trained in the use of the nutritional supplements 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.

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:

1. Ensuring adequate supply of equipment to units
2. Encouraging staff working in remote rural areas to remain there on a long-term basis
3. Ensuring that health care units have the necessary medicines and materials (including educational health materials to distribute to families)
4. 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 Supplements

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 of age 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 flavors and colors, 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-gram packages and are ready to eat after they are rehydrated. The child supplement produces a type of pap and is available in banana, vanilla, and chocolate flavors. A 40-gram 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 1.4). The supplement for women is intended to be consumed as a beverage after rehydration, and is available in banana, vanilla, or natural flavor. The daily ration is 52 grams and provides 250 kilocalories of energy, 12–15 grams of protein, and selected vitamins and minerals.[8]

[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).

Table 1.4 Micronutrients contained in the food supplements

Pregnant and lactating women	Children
Iron	Iron
Zinc	Zinc
Vitamin B_{12}	Vitamin A
Vitamin C	Vitamin C
Vitamin E	Vitamin E
Folic acid	Riboflavin
Iodine	Vitamin B_{12}
	Folic acid

The supplements are prepared at one production plant devoted solely to this task and then distributed to health centers through Distribuidora Comercial CONASUPO (Compania Nacional de Subsistencias Populares) (DICONSA), which is an operational arm of the Ministry of Social Development (Secretaria de Desarrollo Social [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

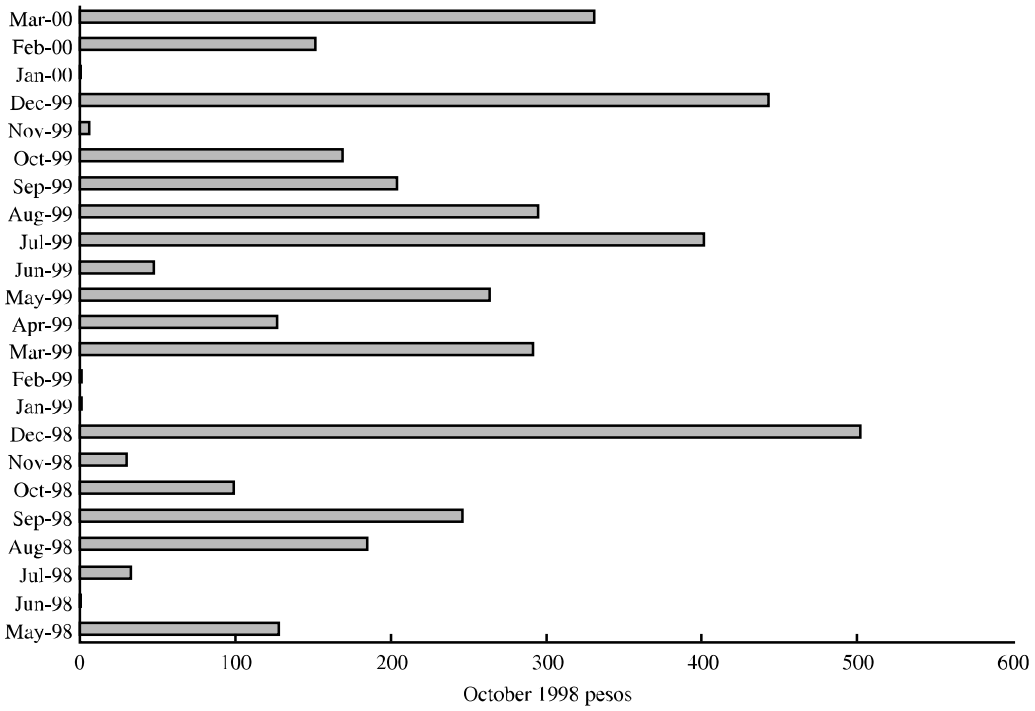
One additional requirement of the PROGRESA program is that households benefiting from PROGRESA are supposed to stop receiving benefits from other preexisting programs. For example, according to the operational guidelines of PROGRESA, households receiving PROGRESA benefits should not be receiving other similar benefits from programs such as Niños de Solidaridad, Abasto Social de Leche, de Tortilla, and the National Institute of Indigenous People (Insituto Nacional Indigenista [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

Figure 1.1, based on the administrative records of PROGRESA containing the payments sent out to beneficiary families, reveals that there is a substantial variation in the average cash transfer received per month by beneficiary families.[9] For example, the average cash transfer paid out to families in December 1998, July 1999, and December 1999 were between 400 and 500 pesos, amounts that are considerably higher than those paid out in most other months. In the initial months of program implementation, there were considerable delays in the

[9]The sample used is the sample of beneficiary households in the 506 localities used for the evaluation of PROGRESA.

Figure 1.1 Average cash transfer paid out by PROGRESA by month



processing of the forms necessary for payment authorization. The unusually high payments made during the months of December and July are a consequence of PROGRESA's efforts to catch up with the distribution of payments owed to the beneficiary families.

Figure 1.1 also reveals that the first monetary benefits associated with participation in PROGRESA started in May 1998, covering, in principle, the first two months of participation in the program (i.e., March and April 1998). However, the fact that the first payments that were sent out to some households in May 1998 exceeded the maximum bimonthly amount suggests that some households were incorporated before March 1998 (e.g., in January 1998).[10] Taking into consideration these factors, it was determined that it would be more appropriate to derive the estimate of the average cash transfer received based on the 12-month interval between November 1998 and October 1999.

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 1.5. The average monthly transfers 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 because of nonadherence 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 percent of the mean value of consumption of poor households in control localities. On average, households receive 99 pesos for

[10]There is no record of the specific date that a household was incorporated into the program.

Table 1.5 PROGRESA transfers to beneficiary households from November 1998 to October 1999 (pesos)

	Beneficiary households						Poor households residing in control localities		
Recipient	**Household size**	**Total value of consumption (food) [non-food]**	**Average monthly transfers received**	**Average monthly *alimento* transfer**	**Average monthly *beca* transfer**	**Average monthly school utilities transfer**	**Household size**	**Total expenditures (food) [non-food]**	**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-school-aged children	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-month period between November 1998 and October 1999 (deflated to November 1998 prices). Consumption and family size averaged across the three rounds of the ENCEL surveys in November 1998, June 1999, and November 1999.

food support (*alimento*), and 91 pesos for the educational grant (*beca*). The *alimento* accounts for 68 percent 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 pose some limitations on the 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.[11] Clearly, the main objectives of the program are long-run goals that can be evaluated only over the lifetimes 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 or 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 *pláticas* 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 analyses of the program in the future.

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 complementary efforts and resources directed at the supply and quality of the educational and health services. Thus

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

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 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 an economic framework that is useful in understanding the potential impacts of the program. Chapter 3 presents the experimental design and the information sources used in the evaluation of PROGRESA. Chapter 4 discusses the evaluation of PROGRESA's targeting and its impact on poverty. Chapter 5 summarizes the econometric methods used to evaluate the impact of the program, while Chapter 6 contains a summary of the quantitative and qualitative results of the evaluation of PROGRESA along with the cost analysis of the program. Chapter 7 contains a summary of the policy considerations derived from the evaluation of the program. Readers seeking a more detailed description of the research, rationale, and methods may consult the original IFPRI reports that are contained in the CD enclosed with this publication.

CHAPTER 2

PROGRESA Seen through an Economic Lens

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 preventive 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 carried out. A number of policy instruments 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 or 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 policymakers 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 summarizes some of the key determinants of household investment in human capital and the ways in which participation in PROGRESA may influence these decisions. 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 are discussed.

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 older than seven years of age suggests that the design of the program is also cognizant of the possible indirect effects of the program on fertility.

This section presents a 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 1974), 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, it is assumed that households have 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 also 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.

Cleary, most of these assumptions may be questioned on the grounds that they impose some strong or unrealistic restrictions on household behavior. For example, the collapsing of the life cycle of the household into one period may be less acceptable for poor rural economies characterized by imperfect credit markets, liquidity constraints, and limited possibilities of ensuring household consumption (Jacoby and Skoufias 1997, 1998). In addition, the assumption of a unitary household 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., Haddad, Hoddinott, and Alderman 1997).

Although it is important to acknowledge the limitations of this model, it is also quite instructive to present it as a means of obtaining a better understanding of the pathways through which PROGRESA might influence household behavior and its investments on the human capital of children.

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.[12] The function describing the effects of changes in household resources on the level of human capital invested in each child is given by

[12]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 later.

$$H = h(t_H^c, t_H^m, X; Z, \mu, K). \quad (1)$$

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 in children increases. Here, three important human capital inputs are 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, equation (1), also contains the terms Z, μ, and K. The term Z summarizes observable child characteristics such as gender or the birth order, which also directly but exogenously influence H. The term μ 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 μ can be observed by the parents of the child but is 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 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. 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 or she becomes an adult denoted by E are

$$E = \alpha\mu + \beta H = \alpha\mu + \beta h(t_H^c, t_H^m, X; Z, \mu, K), \quad (2)$$

where α is the market return to the genetic endowment of an individual and β 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 θ of the earnings of "grown" children. Specifically, the budget constraint of the households is

$$V + W^c(\Omega - T_H^c)N + W^m(\Omega - Nt_H^m) + \theta NE = Np_xX + Y, \quad (3)$$

where N denotes the number of children in the household, V is non-employment sources of income including the labor income of adult men in the household, W^c is wage rate of children, W^m is the wage rate of the mother, Ω is 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.[13]

Finally, parents are assumed to "care about" the number and adult earnings of their children, and the level of household consumption.[14] These parental preferences can be summarized by the parental welfare function,

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

$$U = U(E,Y), \tag{4}$$

which is assumed to possess the usual neoclassical properties.[15]

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]):

$$MRS_{EY} = \frac{U_E}{U_Y} = N\left\{\frac{W^c}{\beta h_1} - \theta\right\} = MC_{t_H^c}. \tag{5}$$

$$MRS_{EY} = \frac{U_E}{U_Y} = N\left\{\frac{W^m}{\beta h_2} - \theta\right\} = MC_{t_H^m}. \tag{6}$$

$$MRS_{EY} = \frac{U_E}{U_Y} = N\left\{\frac{P_x}{\beta h_3} - \theta\right\} = MC_x. \tag{7}$$

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 households 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, with 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.

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)–(7). Provided that E and Y are "normal" commodities, 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.[16]

[14]In 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).

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

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

The Conditionality of Cash Transfers

At the risk of oversimplifying, one of the key features of PROGRESA is that the cash transfers paid by the program are conditioned on school attendance and visits to health centers. Simple economic theory suggests that a household is generally better off receiving an unconditional cash transfer than a conditional cash transfer. The reason for this lies in the fact that conditionalities induce households to make choices that are different from those that they would make if they were given the cash transfer unconditionally and allowed to use it as they pleased. One possible justification for the imposition of these requirements may be that significant market failures in rural economies tend to make poor households invest less in education or in health than would be best in the society's point of view.[17] In the presence of market failures and other externalities, the conditionality of cash transfer schemes can be considered as an effective means of improving efficiency. Requiring that beneficiary households fulfill some minimum requirement in school attendance and visits to health centers may result in a gain in social welfare that is greater than that obtained from an unconditional cash transfer.

Based on the model outlined in the previous section, it is instructive to follow through some of the pathways in which this key characteristic of PROGRESA can 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 in which impact can be expected.

Consider, first, the cash transfers by themselves, 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 are likely to result in changes in the shadow price or marginal cost of investment in human capital.[18] For example, consider a household with a child enrolled in school and with an attendance rate less than the 85 percent 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 $\beta h_1(t_H^c, t_H^m, X; Z, \mu, K)$ 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 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

[17]See Das, Do, and Ozler (2004) for an interesting discussion of the equity and efficiency trade-offs involved in conditional cash transfer programs.

[18]In principle, an eligible household's decision of whether to participate in the program or not can be modeled as comparing its maximum utility level outside the program with the utility level associated with participating in the program, adhering to all the conditions of the program imposed on the time allocation of children and mothers and receiving the cash transfers provided by the program.

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 resulting from the increased time spent by the mother in producing child education and the larger number of textbooks available (i.e., $h_{12} > 0$, $h_{13} > 0$).[19]

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 to increase 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 2.1 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 of his or her time to schooling and not working. When a child divides his or 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 tradeoff in the market between the consumption of other goods and schooling (or work).[20] 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.

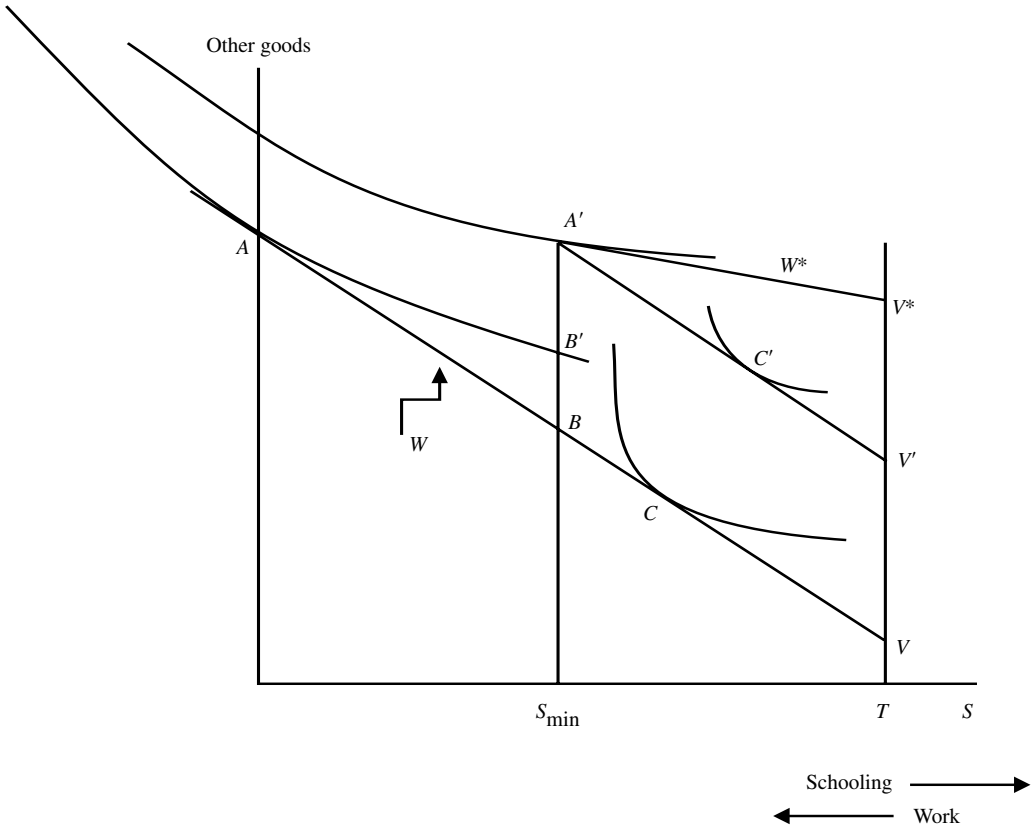
Let $S_{\min}$ denote the 85 percent attendance rate required by the PROGRESA program. Eligibility for the benefits of PROGRESA causes the budget line in the region between points T and $S_{\min}$ to shift up without changing its slope and increases the nonlabor component of income upward to the point 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 nonearned income and market opportunities may be one important reason 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 percent ($S > S_{\min}$) and

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

[20]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 1994a).

Figure 2.1 Effect of conditional cash transfers on children's school attendance and work



Note: *A,* Initially not attending; *C,* initially attending full time; *T,* maximum amount of time available excluding leisure; S_{min}, program's required school attendance.

works only a very small fraction of his or her time. The indifference curve that crosses the vertical axis at point *A* represents households with a child who does not attend school at all ($S = 0$) and devotes all of his or 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, implies 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 percent attendance requirement and keeping their child out of school. A conditional cash transfer less than $B' - B$ is insufficient to induce the household to enroll its child in 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 2.1, 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 percent attendance requirement. In con-

sequence, household *A* finds it to its advantage to enroll the child in school. As 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 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 2.1 by the parallel upward shift in the portion of the budget constraint between points *T* and $S_{\min}$.[21] 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.[22]

For a contrast, consider household *A*. With the cash transfer conditioned on an 85 percent attendance rate, and with the 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'. The same household, given the same cash transfer of $V' - V$, and without the minimum requirement of an 85 percent attendance rate, might choose an attendance rate that is lower than 85 percent and achieve a higher level of welfare (i.e., would be on a higher indifference curve) than at point A'. One plausible justification for introducing "distortions" on the choices of poor households is the role of significant market failures and externalities that create differences between individual and social welfare. As long as such market failures are prevalent, the social gains from making cash transfers conditional are likely to exceed the sum of the individual welfare losses from the imposition of these distortions.

Continuing with the discussion of household *A,* at first sight it would appear that for this household it is very hard to 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 *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 percent of his or her 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 in-

[21]In terms of the more detailed human capital model discussed earlier, the program will have negligible effects on the marginal product of the child's time at school. Insofar 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.

[22]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).

come $V^* - V'$ earned as a result of the lower price of schooling.[23]

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 implementation of the program. For households for which the program constraints are binding, the program is likely to result in income and substitution effects that tend to reinforce its impact. In contrast, for households for which the constraints of the program are nonbinding, 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 be determined only through empirical analysis.

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 a 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 or 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 or longer-run health and nutrition or on shorter-run nutrient intakes. Also, of course, given that individuals are followed over three years at most, effectively individuals cannot be followed across life-cycle stages. Therefore, although analysis of

[23]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 resulting from the longer time spent by the mother in production of child education, and the larger number 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).

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 cannot provide much insight into the importance of such synergies or 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. More important from the aspect of the human resource emphasis in PROGRESA, there also seem 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 earlier to allow for households to determine their fertility endogenously (i.e., the number of children N enters as a direct argument of the utility function of the household) as in

$$U = U\,(E, Y, N). \tag{8}$$

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

$$N = \phi + n(Z), \quad n' < 0, \tag{9}$$

where N = number of births (children), Z = resources used to control births, with $n' < 0$, and ϕ = fecundity, the number of births that would occur in the absence of control ($Z = 0$).[24] The household chooses its level of control Z, but fecundity is biologically determined.

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

$$V + W^c(\Omega - t_H^c)N + W^m(\Omega - Nt_H^m) + \theta NE = Np_N + Np_xX + p_zZ + Y, \tag{10}$$

[24]Other reproductive inputs, for example, age and breastfeeding, can readily be incorporated.

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 their welfare function (8) subject to (1)–(3) and (9) and (10) by choosing the levels of Z, X, and Y and by allocating parental and child time across activities.

In this revised maximization problem, the same MC expressions presented above, that is, expressions (6) and (7), still remain valid, whereas the marginal cost or shadow price of having an additional child is given by the expression

$$MC_N = \pi_N = P_N + W^m t_h^m + p_x X - \theta E - W^c(\Omega - t_H^c) + p_z/n' \quad (11)$$

Expression (11) 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 child'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 (9) with respect to Z.

Increases in the direct costs of children, 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 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 additional 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 they become adults tend to decrease the MC of having an additional child. Which of the two effects dominates can be determined only empirically by observing families over long periods of time. The empirical evidence available 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.

Intrahousehold Resource Allocation and 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 (e.g., Haddad et al. 1997).[25]

[25]Duflo (2000) 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 girls but little effect on that of boys. The pensions received my men had no effects on the anthropometric status of either boys or girls.

The allocation of resources within households is intricately related to the question of whether resources in the household are controlled by adult men or women. For example, both unitary (e.g., Becker and Tomes 1976) 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 earlier, 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 μ. As long as two children in a family are endowed with different amounts of μ, 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, that the availability of the nutritional supplements 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 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 as "general equilibrium" effects, meaning that the actual transfer of cash and the method used to finance these transfers may have secondary effects that could work to reinforce or weaken the effects of the program. A naive 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 suggest 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 households 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, or 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, 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 preceding discussion 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 con-

sumption may show little or no impact on poverty as long as households choose 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 in 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 *pláticas* 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 spreads 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 raises 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 in the preceding paragraphs 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 toward 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 such as 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 be determined only 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

The Experimental Design and Information Sources Used to Evaluate PROGRESA

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 be 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 $\Delta = (Y_1 - Y_0)$. At any given time, however, 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 not observed 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 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

$$E(\Delta \mid T = 1,X) = E(Y_1 - Y_0 \mid T = 1,X) = E(Y_1 \mid T = 1,X) - E(T_0 \mid T = 1,X). \quad (12)$$

The term $E(Y_1 \mid T = 1, X)$ can be reliably estimated from the experience of program participants. What is missing is the mean counterfactual term $E(Y_0 \mid T = 1, X)$ 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 $E(Y_0 \mid T = 1, X)$. For example, one approach used frequently to evaluate 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 program can be used to estimate $E(Y_0 \mid T = 1, X)$. 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 ex-

perienced had they not participated in the program, that is, the term $E(Y_0 \mid T = 1, X)$.[26]

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. First, it is an experimental design with randomization of localities, rather than households or individuals, into treatment and control groups.[27] Second, data are collected from all households in both treated and control localities before and after the start of the treatment. The combination of these two features permits 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 later in this chapter.

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.[28] In phase 1, which began in August 1997, 140,544 households in 3,369 localities were incorporated. Phase 2 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. 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. Of the 506 localities, 320 localities were assigned to the treatment group ($T = 1$) and 186 localities were assigned as controls ($T = 0$).[29] Specifically, according to Hernandez et al. (1999), the 320 treatment localities were randomly selected using probabilities proportional to size from a universe of 4,546 localities that were covered by phase 2 of the program in the seven states mentioned previously. Using the same method, the 186 control localities were selected from a universe of 1,850 localities in these seven states that

[26]For a more thorough discussion of the various solutions to the evaluation problem, see Heckman et al. (1999), Ravallion (1999), and Baker (2000).

[27]Valadez and Bamberger (1994) provide a detailed description of the elements of experimental and quasi-experimental approaches 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). In fact, the method used by PROGRESA to select the eligible households also offers the opportunity to evaluate the impact of the program using a quasi-experimental design such as the Regression Discontinuity Design (Hahn, Todd, and Van der Klaauw 2001). See Buddelmeyer and Skoufias (2004) for an evaluation of the impact of PROGRESA on child work and schooling using the RD design.

[28]For more details see Section 4 and Table 1 in Coady (2000).

[29]More details on the geographic distribution of the evaluation sample of localities and their characteristics are provided in Appendix B.

were to be covered by PROGRESA in later phases.[30] 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 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 such as PROGRESA in very small and remote rural communities typically do not permit the program to cover all of the 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 toward the achievement of the short-run and long-run objectives of the program.

As discussed in more detail later in this chapter, all households were initially surveyed in October/November 1997 and, based on this 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 or non-eligible for participation in the program. On average in our sample, 78 percent of the households were classified as eligible for program benefits.[31] 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 being distributed in the control communities.

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 in Table 3.1. Within any survey round before ($t = 0$) or after the start of the program ($t = 1, 2, 3, \ldots$), the average value of the outcome indicator Y within the total survey population, denoted by $[Y(t)]$, can be divided into four 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 $T = 0$). Given this decomposition of the sample one may then construct all of the estimators com-

[30]IFPRI's active involvement in the evaluation of PROGRESA started in July 1998, more than one year after the selection of the evaluation sample by PROGRESA authorities. The only way of verifying the integrity of the randomization process was by using an "ex-post" approach as in Behrman and Todd (1999a). The pool of localities used to select the evaluation sample did not include localities from the states of Campeche, Chiapas, Chihuahua, Coahuila, Guanajuato, and Oaxaca for a variety of socioeconomic reasons, including the potential safety problems for interviewers (e.g., in Chiapas).

[31]As is explained later, 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 errors.

Table 3.1 Decomposition of the sample of all households in treatment and control villages

Description	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 $E = 0, T = 0$

monly used in program evaluation. These are:

1. The cross-sectional difference estimator (CSDIF) 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., $t = 1, 2, 3, \ldots$):

$$CSDIF = E(Y(t)|T = 1, E = 1) - E(Y(t)|T = 0, E = 1) \quad \text{for } t = 1, 2, 3, \ldots. \tag{13}$$

2. 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, that is:

$$BADIF = E(Y(t = 1)|\, T = 1, E = 1) - E(Y(t = 0)|\, T = 1, E = 1). \tag{14}$$

3. The double differences or difference-in-differences estimator (2DIF) 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 means of the outcome between group A and B in the pre-program round. Formally,

$$2DIF = [E(Y(t = 1)|\, T = 1, E = 1) - E(Y(t = 1)|\, T = 0, E = 1)] - [E(Y(t = 0)|\, T = 1, E = 1) - E(Y(t = 0)|\, T = 1, E = 1)]. \tag{15}$$

Each of these estimators has some advantages and shortcomings associated with it. However, the 2DIF estimator, in comparison to either the BADIF or CSDIF estimator, 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 preexisting 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 preprogram 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, that is,

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

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.[32]

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 preprogram differences in the outcome variable of interest between treatment and control localities, that is,

$$[E(Y(t = 0)| T = 1, E =1)] = [E(Y(t = 0)| T = 0, E = 1)]. \quad (16)$$

Satisfaction of condition (16) 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; and 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. When the same comparison was performed 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. Although 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.

Which of these two estimators is feasible in practice depends on whether data on an outcome indicator are 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 available only 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.

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 schoolteachers.

[32]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 later and Heckman et al. 1999).

In November 1997 PROGRESA conducted a survey of the socioeconomic conditions of rural Mexican households (Encuesta de Caracteristicas Socioeconomicas de los Hogares [ENCASEH]) in the evaluation communities to determine which households would be eligible for benefits. Based on PROGRESA's beneficiary selection methods, households were then classified as eligible or non-eligible for participation in the program in both treatment and control communities. On average in the evaluation sample, 78 percent of the households were classified as eligible for program benefits. The first evaluation survey (Encuesta de Evaluation de los Hogares [ENCEL]) took place in March 1998 before the initiation of benefits distribution in May 1998.[33] 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.[34] 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.[35] A number of core questions about the demographic composition of households and their socioeconomic 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 toward children's schooling, consumption of food and nonfood items, the allocation of time of household members in various activities, and self-employment activities. Table 3.2 presents the number of households and individual members covered in each survey round. It is important to keep in mind that the March 1998 questionnaire did not contain a detailed household roster based on each household member interviewed in the November 1997 round. In the March 1998 round the mother of the child was simply asked to give her child's name followed by questions about the child's health and school attendance. Member codes were later assigned to children in the March 1998 round after the completion of the survey as long as a child's name in a family could be safely matched with a name in the same family in the November 1997 round. Given differences in the spelling, many children could not be matched across rounds. As a result, the March 1998 round contains a significant number of children with a new member code that did not exist in the previous round. This problem was corrected in the later rounds, when interviewers were given a household roster based on the November 1997 household roster. This problem with the member codes in March 1998 implies that panels of children constructed by including this survey round are likely to be problematic.

The preceding surveys were supplemented by school and clinic surveys, com-

[33]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.

[34]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 and in the household survey process.

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

Table 3.2 Number of households and individual members covered in each survey round

		Non-eligible ($E = 0$)		Eligible ($E = 1$)		
Survey round	**Coverage**	**Control ($T = 0$)**	**Treatment ($T = 1$)**	**Control ($T = 0$)**	**Treatment ($T = 1$)**	**All**
Pre-program/baseline census/survey						
ENCASEH Nov 97	Households	2,048	3,233	7,173	11,623	24,077
	Individuals	5,791	8,765	17,114	27,366	59,036
ENCEL-Mar 98	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-Nov 98	Households	2,058	3,272	7,158	11,585	24,073
	Individuals	6,147	9,290	17,793	28,258	61,488
ENCEL-Jun 99	Households	1,837	2,932	6,655	10,682	22,106
	Individuals	5,361	8,090	16,406	25,775	55,632
ENCEL-Nov 99	Households	1,921	2,902	6,818	10,475	22,116
	Individuals	5,804	8,421	17,219	26,000	57,444

Notes: 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).
The March 1998 ENCEL survey collected information at the individual level only for children between birth and six years of age. No information was collected at the individual level for adult members.

munity 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 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 and 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 preschool children (Behrman and Hoddinott 2000).

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, they can 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 on 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 offer constructive suggestions for 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

An Evaluation of PROGRESA's Targeting and Its Impact on Poverty

The implementation of PROGRESA has involved three distinct stages (for more details see Skoufias, Davis, and Behrman 1999a and Skoufias, Davis, and de la Vega 1999b, 2001). The first stage involved the identification of the most marginal rural localities where the extremely 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 fewer 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: (1) a social objective; (2) a set of economic, political, and social constraints under which policy has to operate; and (3) 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.[36] The economic, social, and political constraints under which policy has to operate are partly reflected in the size of the 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

[36]It is also possible to evaluate PROGRESA's targeting in terms of alternative objectives such as whether the program selects families with children who have a higher risk of dropping out of school (e.g., de Janvry and Sadoulet 2002).

for receiving benefits from PROGRESA and giving benefits to those who are eligible is a more effective way of using the limited funds toward 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. Second, 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 non-poor, while being careful to point out that this is not 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 Encuesta Nacional de Ingreso-Gasto de los Hogares (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, in terms of both selecting localities where poor households are more likely to be found and selecting poorest households within these localities, is good (Skoufias et al. 1999a,b, 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 that 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 et al. 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 et al. 1999a,b). A similar conclusion is drawn when one ex-

amines 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 noneconomic, or political and social costs of targeting, all of which are very difficult to quantify. As the qualitative surveys from PROGRESA's evaluation discussed in the following section indicate, these costs of targeting in rural, often indigenous, communities may not be negligible.

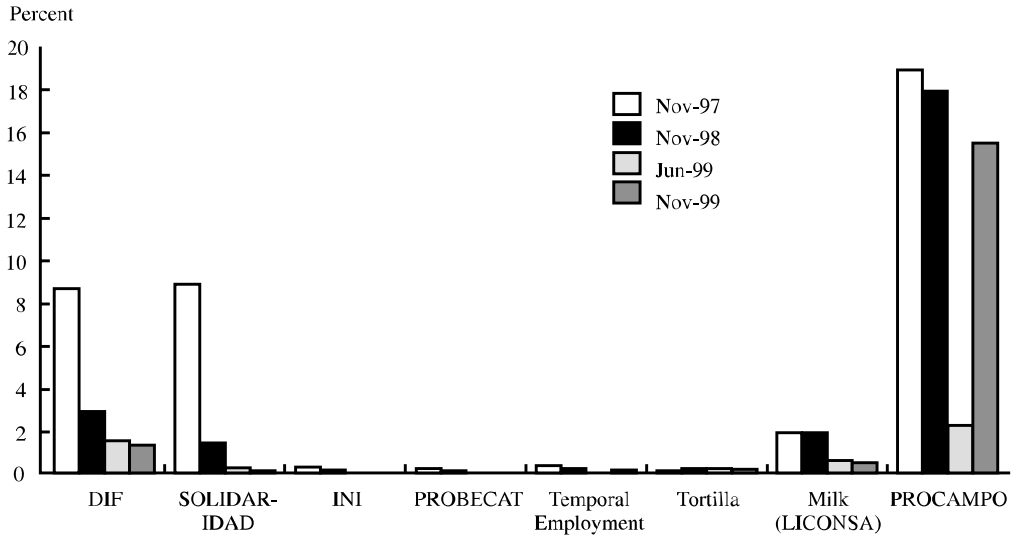
PROGRESA and Its Impact on Poverty

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. 1999a,b). The second approach relies on reported household income and household consumption using the information collected by the household socioeconomic census (ENCASEH) and the evaluation surveys (ENCEL) and the amount of cash benefits received by beneficiary households in treatment areas (Appendix C). Although each one of these approaches has a number of shortcomings associated with it, in combination they offer 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 percent 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 percent whereas the severity of the poverty index is reduced by 45 percent. For comparison, an untargeted or uniform transfer is found to reduce the poverty gap by 28 percent and the severity of poverty by 36 percent. 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 programs such as 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 devote more of their time to school. Both of these factors may work to negate the positive effect of the

Figure 4.1 Percentages of households in treatment localities that receive transfers from other programs and PROGRESA



PROGRESA cash transfers on total household income.

Figure 4.1 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 8 and 17 years of age the total income received from children in this age group decreased.[37]

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 preexisting differences in poverty between control and treatment localities and thus yields a "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 percent 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 percent and 46 percent (see Appendix C). 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.

[37]For more details see Appendix C.

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 2000a). Although not statistically representative, the qualitative data collected from focus groups indicate some problems with the original socioeconomic 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 2000; Adato et al. 2000a). 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.

Impact on Community Social Relationships

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 the percentage of communities in Mexico that have experienced these problems is not known from a statistical perspective, 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 be addressed simultaneously.

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, in which 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 trade-offs between providing benefits to a population in need and stimulating work; the analysis here shows that, thus far, there is not necessarily any such trade-off in PROGRESA.

There are no significant differences between treatment and control groups by year and over time with regard 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. The analysis finds that after 19 months of receipt of benefits, the selection into the PROGRESA program has no influence over the incidence or level of either monetary or nonmonetary private transfers within households (Teruel and Davis 2000).

CHAPTER 5

Summary of the Methods Used to Evaluate the Impact of PROGRESA

All of the reports evaluating the impact of PROGRESA did so using either the difference-in-differences (2DIF) estimator or the cross-sectional differences (CSDIF) estimator of the program impact (discussed in Chapter 3). However, rather than simply comparing unconditional means between treated and control groups, all of the reports used regression methods. The estimation of the 2DIF and CSDIF estimates of program impact through regression methods provides the advantage of controlling 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.

The discussion that follows provides a summary of 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 nature of the outcome indicator (i.e., whether it is a continuous variable, such as household consumption, or a binary variable, such as child school enrollment) necessitates an appropriate econometric method for the estimation of the program impact (such as ordinary least-squares [OLS], probit, or logit).[38]

To begin, consider the case where data are available for treatment and control households before and after the start of the program.[39] *Restricting the sample to eligible households only (*E = *1),* the various estimators for program evaluation discussed earlier that control for indi-

[38]However, it should be kept in mind that when nonlinear methods (such as probit or logit) are employed, the estimated parameters of the model must be transformed into marginal effects that depend on the values of the regressors used in the model. The common practice in these circumstances is to estimate marginal effects at the means of the regressors.

[39]It is assumed that there is only one observation after the start of the program for expositional simplicity. The availability of more than one round of observations after the start of the program can be easily accommodated by including an additional binary variable (say *R3*) together with 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 can yield information on whether the impact of the program is strengthened or weakened over time (e.g., Schultz 2000a; Parker and Skoufias 2000).

vidual, household, and locality observed characteristics can be obtained by estimating a regressions equation of the form[40]

$$Y(i,\ t) = \alpha + \beta_T T(i) + \beta_R R2 + \beta_{TR}(T(i)*R2) + \sum_j \theta_j \mathbf{X}_j + \eta\ (i,v,t), \quad (17)$$

where $Y(i,t)$ denotes the value of the outcome indicator in household (or individual) i in period t; α, β, γ, and θ are fixed parameters to be estimated; $T(i)$ is an 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); $\mathbf{X}$ is a vector of household (and possibly village) characteristics; and η is an error term summarizing the influence of random disturbances.

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., α, β_T) and another group summarizing differences after the start of the program (i.e., β_R, β_{TR}). Specifically, the coefficient β_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 β_R and β_{TR} allows 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 β_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 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:

$$[E(Y \mid T = 1, R2 = 1, \mathbf{X})] = \alpha + \beta_T + \beta_R + \beta_{TR} + \sum_j \theta_j X_j \quad (18a)$$

$$[E(Y \mid T = 1, R2 = 0, \mathbf{X})] = \alpha + \beta_T + \sum_j \theta_j X_j \quad (18b)$$

$$[E(Y \mid T = 0, R2 = 1, \mathbf{X})] = \alpha + \beta_R + \sum_j \theta_j X_j \quad (18c)$$

$$[E(Y \mid T = 0, R2 = 0, \mathbf{X})] = \alpha + \sum_j \theta_j X_j \quad (18d)$$

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

$$CSDIF = (18a - 18c) = [E(Y \mid T = 1, R2 = 1, \mathbf{X}) - E(Y \mid T = 0, R2 = 1, \mathbf{X})] = \beta_T + \beta_{TR}, \quad (19)$$

[40]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.

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

$$BADIF = (18a - 18b) = [E(Y \mid T = 1, R2 = 1, \mathbf{X}) - E(Y \mid T = 1, R2 = 0, \mathbf{X})] = \beta_R + \beta_{TR}. \quad (20)$$

Expression (19) 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 β_T term). Along similar lines, expression (20) 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 β_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.[41] 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 β_{TR}):

$$\begin{aligned} 2\,DIF &= (18a - 18b) - (18c - 18d) \\ &= (18a - 18c) - (18b - 18d) \\ &= \beta_{TR}. \end{aligned} \quad (21)$$

Using the terminology of Heckman et al. (1999), the parameter β_{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 β_{TR} is inclusive of the role of 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 those in states where the program is operating more efficiently.[42] 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 **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 or her spouse. Given that the vector **X** does not contain any supply-related variables, β_{TR} is an estimate of the impact of the conditional cash transfers (demand-side 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 equations (18).[43] 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 capture sufficiently all the supply effects of the program.

The availability of repeated observations before and after the start of the program on

[41]It is important to 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.

[42]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 (17) to vary by region or state.

[43]For example, see Schultz (2000a) and Coady (2000).

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 *pláticas* 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. An evaluation of the extent to which the program has had some indirect effects on the outcome indicator among non-eligible households in treatment areas can also be conducted by estimating a regression similar to equations (18) but restricted to the sample of non-eligible households ($E = 0$).

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

$$Y(i) = \alpha + \gamma_T T(i) + \sum_j \theta_j X_j + \eta\,(i,v). \quad (22)$$

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

$$CSDIF = E(Y \mid T = 1,\mathbf{X}) - E(Y \mid T = 0,\mathbf{X}) = \gamma_T. \quad (23)$$

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) is a regression of the form

$$Y(i) = \alpha + \gamma_T T(i) + \delta_R R3 + \delta_{RT}(R3*T(i)) + \sum_j \theta_j X_j + \eta\,(i,v). \quad (24)$$

With this specification, a statistical comparison of the relative sizes of the coefficients δ_{RT} and γ_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).

The discussion so far did not address the role of unobserved heterogeneity summarized by the error term $\eta(i, v, t)$ in the preceding regressions. One primary implication of the clustering of the households with villages is that the household-specific error terms $\eta(i, v, t)$ 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.[44]

Some Important Details

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

[44]Robust standard error estimates were obtained using the "robust" option in STATA v7.0.

PROGRESA program.[45] First, 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 within PROGRESA and started receiving cash benefits in December 1999.[46] 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.

Second, the variable used to identify households 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 percent of the households in the evaluation sample to be classified as eligible for the program benefits (identified by the variable E1).[47] 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.[48] As a result of the revised selection process, the fraction of households classified as eligible for program benefits increased from 52 percent of the evaluation sample to 78 percent 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*).[49] 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 et al. 1999).

Given the differences across reports in the variable used to identify the eligibility status of a household, Table 5.1 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 to receive PROGRESA benefits. The two evaluation reports that rely exclusively on the variable *E1* to identify household eligibility status are Schultz (2000a,b,c) and Behrman et al. (2000).

To the extent that there is significant dropout or attrition from the program among beneficiary households or administrative

[45]More detailed discussion of these and related issues can be found in Heckman (1992), Heckman and Smith (1995), and Heckman et al. (1999).

[46]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.

[47]E1 denotes the variable named "pobre_1" provided with the original data sets.

[48]The Spanish term used to describe this revised selection process is *densification.*

[49]*E2* denotes the variable named *pobreden* provided with the original data sets.

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-Nov 97 ENCEL-Mar 98 ENCEL-Nov 98 ENCEL-Jun 99 ENCEL-Nov 99	Schultz (2000a,b)
Proportion of school days attended	2DIF	*E1*	Yes	ENCASEH-Nov 97 ENCEL-Mar 98 ENCEL-Nov 98 ENCEL-Jun 99 ENCEL-Nov 99	Schultz (2000c)
Child school achievement test scores	2DIF	*E1*	Yes	ENCASEH-Nov 97 ENCEL-Nov 98 ENCEL-Nov 99 Ministry of Public Education (Secretaria de Educación [SEP]) test scores 1997, 1998, 1999	Behrman, Sengupta, Todd (2000)
Health					
Daily consultations per clinic	2DIF	n.a.	Yes	IMMS Solidaridad administrative records 1996, 1997, 1998	Gertler (2000)
Visits by provider type (public versus private)	CSDIF	*E2*	Yes	ENCEL-Jun 99 ENCEL-Nov 99	Gertler (2000)
Nutrition monitoring visits (0- to 5-year-old children)	2DIF	*E2*	Yes	ENCASEH-Nov 97 ENCEL-Mar 98 ENCEL-Nov 98 ENCEL-Jun 99 ENCEL-Nov 99	Gertler (2000)
Child illness (0- to 5-year-old children)	2DIF	*E2*	Yes	ENCASEH-Nov 97 ENCEL-Mar 98 ENCEL-Nov 98 ENCEL-Jun 99 ENCEL-Nov 99	Gertler (2000)
Adolescent and adult health status	CSDIF	*E2*	Yes	ENCEL-Jun 99 ENCEL-Nov 99	Gertler (2000)

(*continued*)

Table 5.1 Continued

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- to 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-Nov 98 ENCEL-Jun 99 ENCEL-Nov 99	Hoddinott, Skoufias, Washburn (2000)
Intrafamily allocation of time					
Participation in paid and unpaid work activities (measure excludes domestic activities)	2DIF	*E2*	Yes	ENCASEH-Nov 97 ENCEL-Nov 98 ENCEL-Jun 99 ENCEL-Nov 99	Parker and Skoufias (2000)
Time spent in a wide range of activities (including domestic activities) during previous day	CSDIF	*E2*	Yes	ENCEL-Jun 99	Parker and Skoufias (2000)
Women's status and intrahousehold relationships					
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-Nov 98 ENCEL-Jun 99	de la Briere and Quisumbing in Adato et al. (2000b)
Household expenditure decisions (such as food, durables, and house repairs)	CSDIF	*E2*	Yes	ENCEL-Nov 98 ENCEL-Jun 99	de la Briere and Quisumbing in Adato et al. (2000b)
Decisions on how to spend women's extra income	CSDIF	*E2*	Yes	ENCEL-Nov 98 ENCEL-Jun 99	de la Briere and Quisumbing in Adato et al. (2000b)
Interhousehold transfers and other program effects					
Incidence and amount of private transfers (monetary and in kind) among households	CSDIF	*E1/E2*	Yes	ENCEL-Nov 98 ENCEL-Nov 99	Teruel and Davis (2000)
Poverty, inequality, school continuation, nutrition surveillance, and inflation rates at the locality level	DIF2	n.a.	Yes	ENCASEH-Nov 97 ENCEL-Nov 98	Handa et al. (2000)
Social welfare (at the national level)	Computable General Equilibrium model	n.a.	Yes	ENIGH 1996	Coady and Harris (2000)

inefficiencies/delays in including all eligible households on 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 et al. 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 percent of the total eligible population had not received any benefits by March 2000. After cross-checking this finding with the PROGRESA administration, it was confirmed that the explanation for this discrepancy is that 2,872 households (or 85.7 percent 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 percent of the forgotten eligible households and 3.9 percent of the total eligible population in treatment areas) were households that were incorporated during the early months of 1998, and chose either not to participate or to move out of the locality covered by PROGRESA.[50]

[50]There is no official record as to whether these households formally declined the opportunity to participate in the program.

CHAPTER 6

A Summary of the Findings of the Impact Evaluation and a Cost Analysis of the Program

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 percent. 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 percent (see Figure 6.1). 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 percent 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 (seventh to ninth 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.

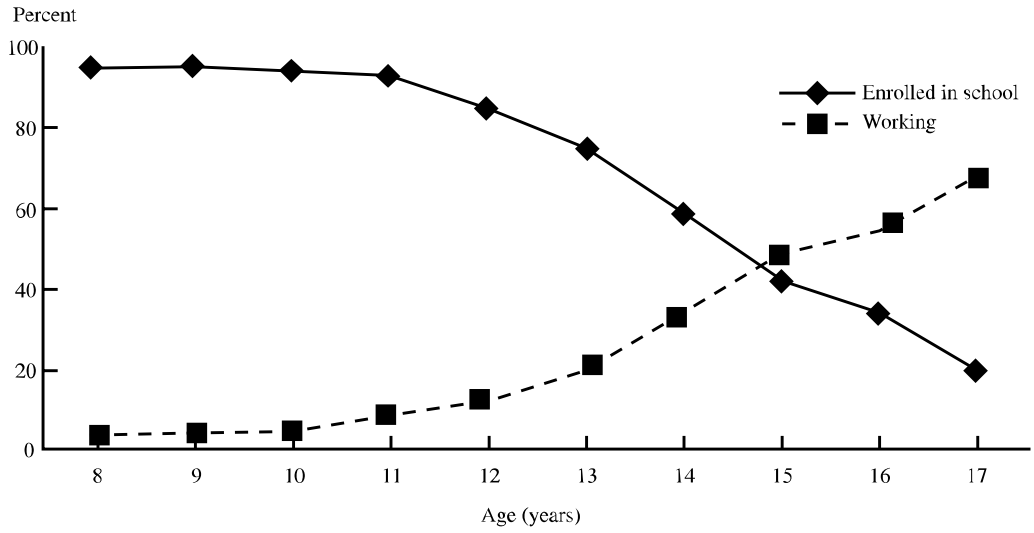
Methodology

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 whom data are available.

Impact on Enrollment Rates

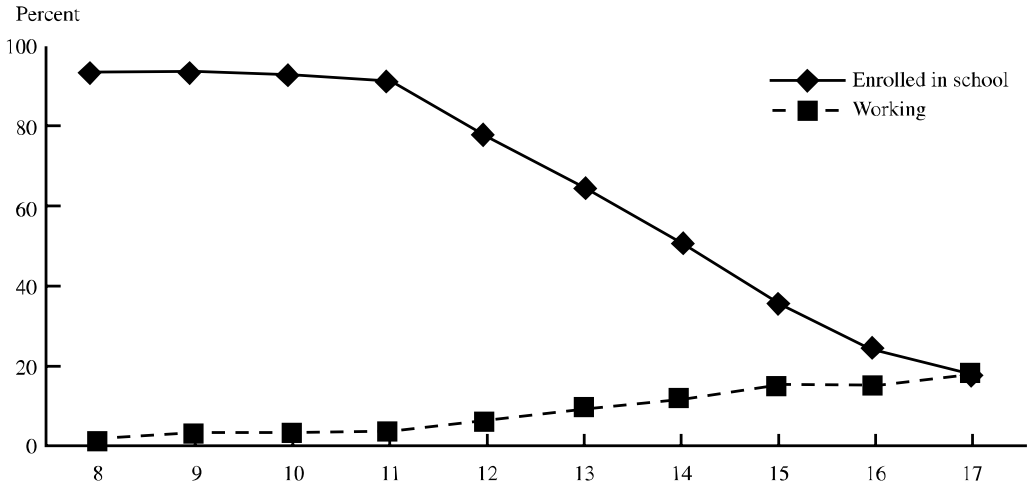
After an exhaustive series of statistical tests, it was concluded that in all cases PROGRESA had a positive enrollment effect for both boys and girls, primary and secondary levels, and irrespective of the sample used. Figure 6.2 displays the impact of the program on the mean school attendance of children.

Figure 6.1a School enrollment and labor force participation of boys in PROGRESA communities prior to program implementation



Source: Parker and Skoufias (2000).

Figure 6.1b School enrollment and labor force participation of girls in PROGRESA communities prior to program implementation

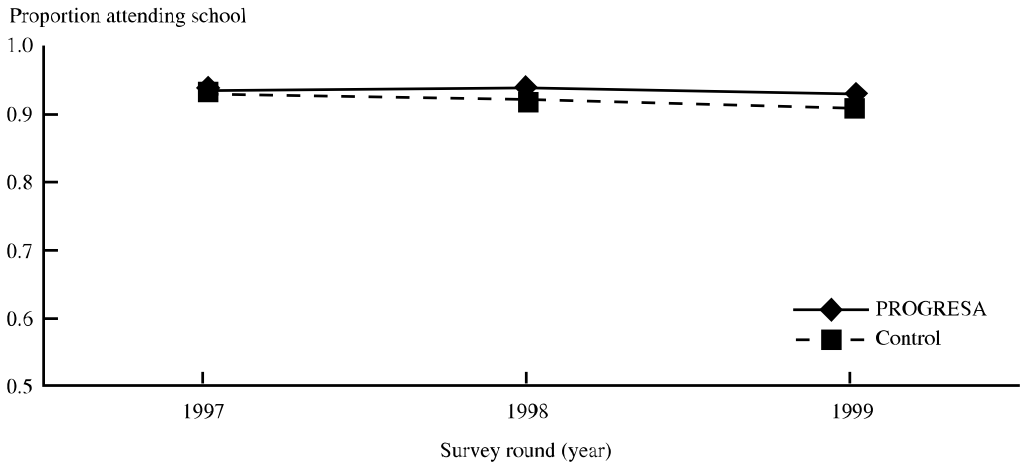


Source: Parker and Skoufias (2000).

At the primary school level, in which 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).[51]

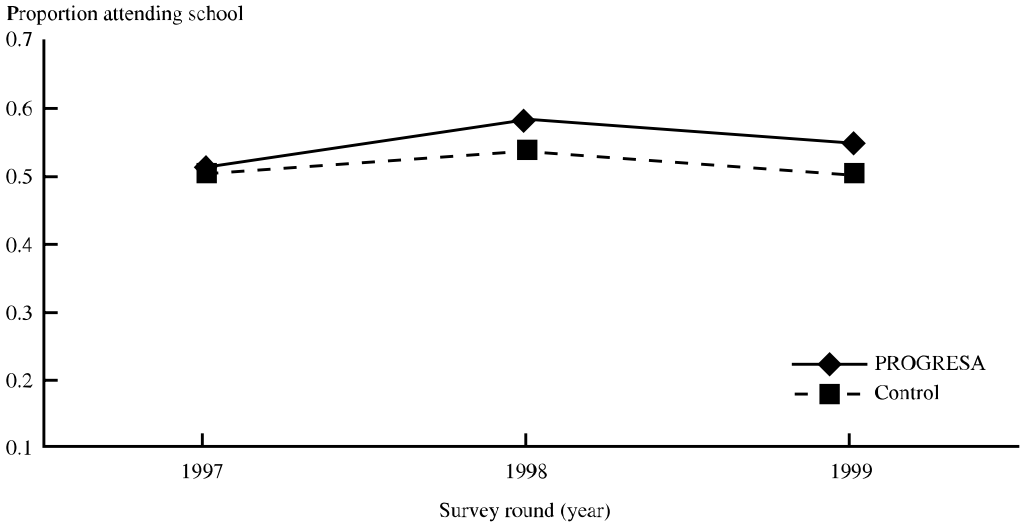
[51]For clarification, all the impact estimates discussed in this chapter are statistically significant (i.e., have associated *t*-values that are greater than or equal to 2). Impact estimates with *t*-values less than 2 are referred to as insignificant or not statistically significant.

Figure 6.2a School attendance of children 8–11 years old



Source: Author's calculation.

Figure 6.2b School attendance of children 12–17 years old



Source: Author's calculation.

At the secondary school level, in which the initial enrollment rates before PROGRESA were 67 percent for girls and 73 percent 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 of girls from 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 1–9 suggests that the program can be expected to increase educational attainment of the poor of both genders 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 18-year-old youth 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 percent.

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 percent per year (Schultz 2000a). Children, when they reach adulthood, will have permanently higher earnings of 8 percent 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.

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 percent 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.[52]

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 such as 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 com-

[52]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.

pleted the sixth grade and are thus qualified to enroll in junior secondary school, increasing 11.1 percentage points for both genders combined or 14.8 percentage points for girls and 6.5 percentage points for boys, representing percentage increases of over 20 percent for girls and about 10 percent 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 children who do return to school tend to return only for a year, whereupon they drop out again, suggesting that the program's impact is primarily to increase continuation rates 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 Dropout Rates, Progression through Grades, Grade Repetition Rates, and School Reentry Rates

These questions are explicitly addressed in a study by Behrman et al. (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) found that the impacts of the program on children who were previously out of school are not sustainable over time. This suggests that those children 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 15–25 percent 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. In addition, the lower incidence of child work due to the PROGRESA program is found to account for 65 percent (in November 1999) to 82 percent (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). In addition, analysis of school-standardized tests did not show any significant impact of PROGRESA in improving student scores on achievement tests (Behrman et al. 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 6–16, 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 eight years into the future. As of November 1999 there is no statistical evidence that female PROGRESA 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 because of the cumbersome nature of the form design used to register school attendance (Adato et al. 2000a). 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 owing 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 toward education. The program is viewed as allowing parents whose children were always motivated to acquire education, but who faced severe economic hardship that made it impossible to incur travel and other educational expenses and who needed 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 nonattendance at school, especially for older children, is consistent with the program design and initial estimates of program impact (Schultz 2000a) 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 tradeoff, with others in the family willingly substituting for schoolgoing 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 is very demanding.

But children's lack of interest in school is also an important factor in explaining nonattendance 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 or 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 because of poor attendance. Non-beneficiaries in some communities are reluctant to contribute toward 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 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 favor 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 scholar-

ships to academic performance. Most were in favor 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 because of 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 0.8 visits and the poor make about 0.65 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 a 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. Survey results for 1998 indicate that 44 percent of 12- to 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 Instituto Mexicano del Seguro Social (IMSS)–Solidaridad from January 1996 to December 1998. This information, compiled 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 at 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 four 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 preventive care in PROGRESA areas have made younger children more robust against illness. Specifically, PROGRESA children from birth to five years of age have a 12 percent lower incidence of illness than non-PROGRESA children do (Gertler 2000, 2004).

Impact on Adult Health

The analysis also finds that adult members in beneficiary households are significantly healthier (see Figure 6.3; Gertler 2000). On average, PROGRESA beneficiaries have 19 percent fewer days of difficulty with daily activities, 17 percent fewer days incapacitated, 22 percent fewer days in bed, and are able to walk about a 7 percent longer distance 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 percent fewer days of difficulty due to illness than non-PROGRESA individuals, and are able to walk about 7.5 percent more without getting tired. For those older than 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 (see Figure 6.4; Gertler 2000). In addition, there was a significant increase in nutrition monitoring visits, immunization rates, and prenatal care. Regarding prenatal care, the evaluation analysis indicates that PROGRESA increased the number of first visits in the first trimester of pregnancy by about 8 percent. This shift to early prenatal care significantly reduced the number of first visits in the second and third trimesters 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- to 50-year-olds and for those older than 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.

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 12–36 months (Behrman and Hoddinott 2000). These estimates imply an increase of about a sixth (16 percent) in mean growth per year, corresponding to about 1 cm 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- to 36-month age range.

Figure 6.3a Incidence of illness for newborns to two-year-olds

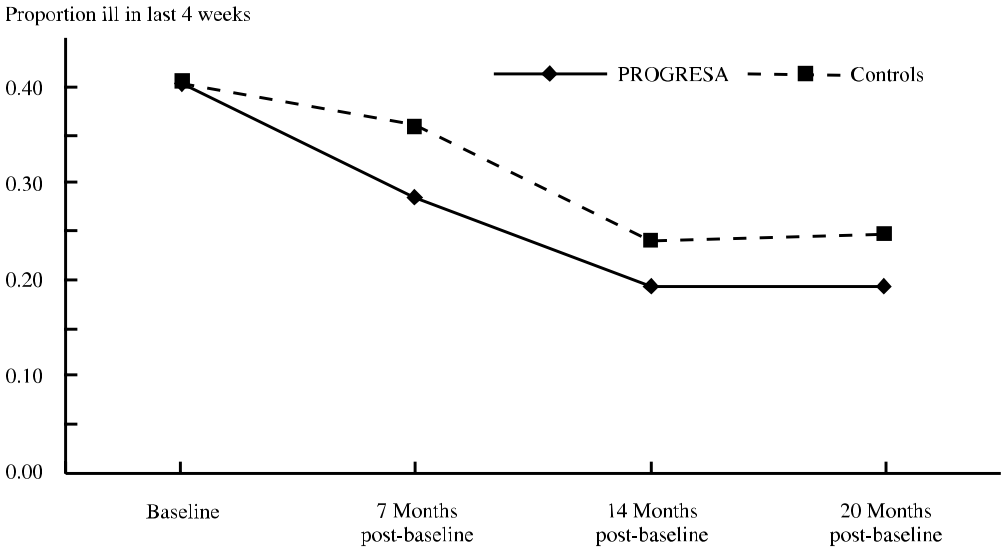
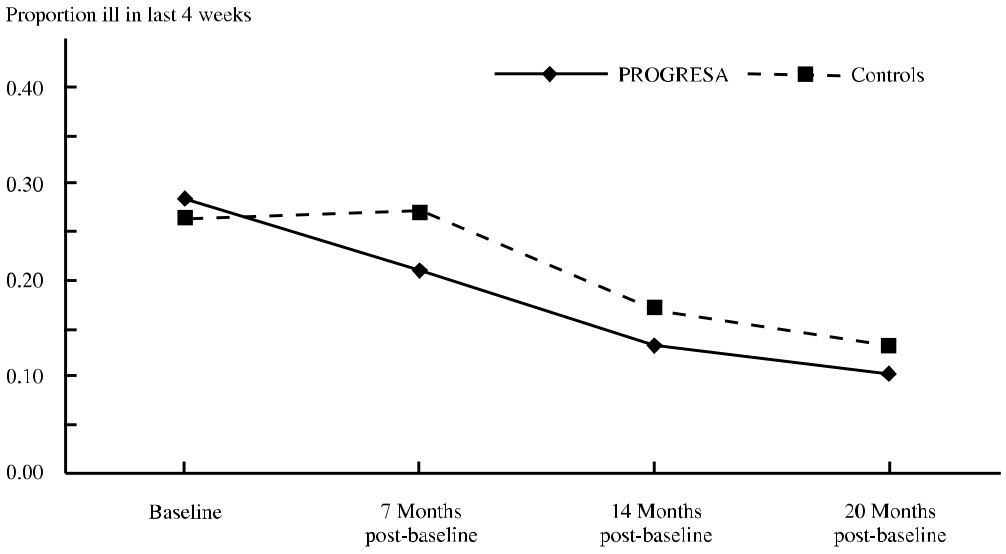


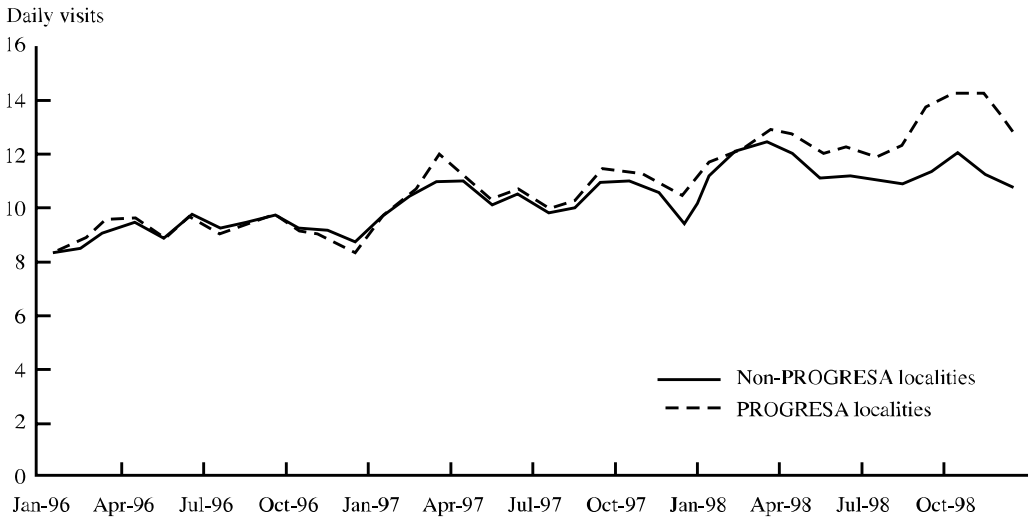
Figure 6.3b Incidence of illness for three- to five-year-olds



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 percent increase in lifetime earnings (Behrman and Hoddinott

Figure 6.4 Daily visits to public clinics



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–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 et al. 2000a). In 1999, registration of beneficiaries was reported to have reached 97 percent and health care professionals report little problems with filling out forms. Appointment books have proven to be an effective mechanism for ensuring compliance to scheduled visits despite the reported lack of time, transportation, and awareness of the benefits of preventive 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 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, which diminishes 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

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 a household's permanent income than estimates of current income that is subject to peaks and troughs. Consumption measures what people actually consume and thus provides 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 nonmonetary private transfers from individuals outside the household was investigated using two methods of empirical analysis. Descriptive statistics compared the frequency and level of interhousehold 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 deserves 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 percent. (Hoddinott et al. 2000). The rest of the transfers were likely used for savings or other purchases such as durable goods.

In November 1998, median food expenditures were only 2 percent higher. However, in November 1999 median food expenditures were 10.6 percent higher in PROGRESA households when compared with comparable control households (Hoddinott et al. 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 rose by 7.1 percent. There is also clear evidence that dietary quality has improved in PROGRESA households (Hoddinott et al. 2000). The impact is greatest on the acquisition of calories from vegetable and animal products. These quantitative findings from the seven-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 et al. 2000). There is also some evidence that information conveyed during the *pláticas* 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 preschool children. Statistical analysis of the caloric acquisition in households containing at least one child below the age of five revealed that such concerns are unfounded (Hoddinott et al. 2000). The impact of participation in PROGRESA on caloric acquisition is, if anything, slightly higher for these households.

Impact of PROGRESA on Women's Status and Household Relationships

Methodology

Measuring the impact of PROGRESA on women's status and household relationships 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. 2000b). 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 toward 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 intrahousehold 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 semistructured 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 toward 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, and so forth 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 group 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 *pláticas;* and have more control over household expenditures.

Impact on Attitudes toward 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 toward 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 than the program is having on this one.

Cost Analysis of PROGRESA

Methodology

In conducting an economic analysis of PROGRESA it is necessary to highlight two of the complicating factors involved. First,

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. Second, 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
- 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 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, for example, 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 (1) targeting costs associated with the targeting of transfers to the most marginal localities as well as only to the poorest households within these localities; (2) 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 (3) 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 that 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 percent increase in the number of trips. Using an estimate of a 40 percent increase, this implies that only 28.6 percent 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 bimonthly 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 Leche Industrial CONASUPO (LICONSA) and the Subsidio a la Tortilla (TORTIBONO) 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 percent of the program cost. This is followed by the costs associated with conditioning the program, which account for 26 percent of the program cost. Thus the costs associated with both the targeting and the conditioning of the program make up 56 percent 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 percent (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 complex, involving 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 preceding cost analysis 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 is 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 such as 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 7

Conclusions and Future Policy Considerations

Poverty alleviation programs such as PROGRESA are an important component of the set of instruments that governments have at their disposal for redistributing income and assets among households. The availability of a variety of programs and instruments that can be used gives rise to the need for an evaluation of the impacts of these programs in relation to their stated objectives.

Program evaluation can improve the design and implementation of programs so that they can have a larger effect on household welfare. In addition, program evaluation, when applied consistently across a wide spectrum of programs, allows governments to have a greater effect on social welfare with the same budget by reallocating resources from less effective to more effective programs. In addition to these economic considerations, there are also social and political reasons for justifying program evaluations. Primary among these is that program evaluation can serve as a means of increasing the accountability of governments toward their citizens by providing a template for comparing sensibly whether public funds are used effectively toward poverty alleviation.

In the case of PROGRESA the national elections that were forthcoming in the year 2000 and the increasing public support in favor of the opposition parties contributed to an unprecedented willingness by the Zedillo administration to support a rigorous and politically neutral evaluation of the program. Undoubtedly, the decision to evaluate PROGRESA was meant to serve a political purpose by signaling a break from the wasteful practices of the past and thus indirectly increasing the administration's chances of reelection. However, at the same time the decision to evaluate the program established a precedent that any future administration could hardly afford not to imitate.

With these considerations in mind, 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 2000a). In addition, most of the increase in school attendance is attributable to children, 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 percent 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 percent lower incidence of illness as a result of the program's benefits and adults report a decrease in 19 percent 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 12–36 months of age (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.

One of the most important contributions of IFPRI's evaluation of PROGRESA was that the program was continued in spite of the historic change in the government of Mexico after the 2000 election. The overwhelming (and unprecedented) evidence that a poverty alleviation program shows signs of having a significant impact on the welfare and human capital investment of poor rural families in Mexico has contributed to the decision of the Fox administration to continue with the program and to expand its coverage in the poor urban areas of the country after some improvements in the design of the program.

The majority of the improvements in the design of PROGRESA (renamed Oportunidades by the Fox administration) were based on findings of the evaluation of PROGRESA that revealed areas of needed improvements in some of the structural components and the operation of the program. For example, the evaluation revealed a larger program impact only on the schooling attendance of children of secondary school age. This suggests that it would be preferable to reorient the funds from primary school to families with children of secondary school age. Oportunidades did exactly that by extending the benefits of the program to children attending high school (*preparatoria*) rather than just junior high school, as it was in the earlier PROGRESA. Also, initially the award of PROGRESA's educational benefits was conditional on regular school attendance but not performance. Oportunidades improved on this design feature by linking benefits to performance, such as granting bonuses to encourage successful completion of a grade, or linking benefits with participation in other programs. For example, the creation of a related program, Jovenes con Oportunidades, aims to create income-generating opportunities for poor households through preferential access to microcredit, housing improvements, adult education, and social insurance.

Yet in spite of these improvements in the program, the evaluation findings suggest that some issues remain to be resolved. For example, the qualitative analysis revealed that although the program strengthened social relationships between beneficiary women, the targeting of the program within these communities has introduced some social divisions between beneficiaries and non-beneficiaries. The quantitative evaluation of PROGRESA's targeting method suggests that in poor rural communities it may be preferable to include all residents into the program instead of discriminating among households. Also, 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 implies 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. Last, it is also important to find ways to maintain and improve the quality of the information provided in the *pláticas.*

The opportunity to conduct a rigorous evaluation of the PROGRESA program has set a higher set of standards for the design and conduct of social policy in Mexico and in Latin America in general. As policymakers now have a better sense of the basic elements of a program that can be effective toward alleviating poverty in the short run and, perhaps, in the long run, the list of questions and concerns about program choices and design cannot help but grow longer. 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, as 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? What if the benefits were given to fathers rather than the mothers in the household? Are programs aimed toward younger children to be preferred over programs aimed toward older children?

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 of these features as part of their structure. It is hoped that 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.

Finally, the critical question of whether the vicious cycle of poverty and its intergenerational transmission are indeed broken can be determined only by following the cohorts of children currently in the program. At least in Mexico, the evaluation of PROGRESA's impact in the short term has provided a solid foundation for determining whether the program was able to have a significant difference in the welfare and earnings of these children as adults.

APPENDIX A

Summary of Mexican Anti-Poverty Programs

It is important to note that the Mexican government distinguishes between three types of anti-poverty programs.[53] 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 Programa de Becas de Capacitacion para Desempleados (PROBECAT) nor Programa de Apoyos Directos al Campo (PROCAMPO) is classified as an anti-poverty program by the Mexican government although we describe these programs in the following paragraphs.

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

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 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.

[53]This appendix was prepared with the help of Susan W. Parker.

TORTIBONO and LICONSA

Two other important food subsidy programs include TORTIBONO, which currently provides approximately 1.7 million poor families with one free kilogram of tortillas daily 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 younger than 12 years of age, corresponding to 4.2 million children. The average subsidy of LICONSA results in a savings of approximately 52 percent per liter of milk with respect to equivalent brands of milk. It is important to note that both TORTIBONO and LICONSA cannot operate in the communities where PROGRESA benefits are received. Nevertheless, both TORTIBONO and LICONSA are in the process of transition toward 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 three different nutritional programs. The largest is its school breakfast program which during the year 2000 gave a total of 3 million free breakfasts daily to children in preschools and primaries. DIF has two other sub-programs that include Programa de Asistencia Social Alimetaria a Familias (PASAF) and Program de Cocinas Polulares y Unidades de Servicios Integrales (COPUSI). 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, and assisted 571,000 individuals in 2000 (Poder Ejecutivo Nacional 2000).

CONAFE (National 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 that 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

The general objective of Instituto Nacional Indigenista (INI, National Indigenous Institute) is to design and implement public policies oriented toward 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,* which are residences that 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 levels. Its operation is supported by community committees that 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 by Fondo para la Infraestructura Social Municipal (FISM) (Fund for Municipal Social Infrastructure), which consists of funds decentralized to municipalities under the spending areas of 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 an education grant from both 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

Fondo Nacional de Apoyo a Empresas Sociales (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 projects last year with a budget of about 80 million dollars). The most common activities that have been financed include commerce and fishing projects.

PET

The Temporary Employment Program (PET), begun in 1995, is another important source of income for families that 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 reforesting projects. Through the Secretariat of Communications and Transportation, another 278,000 temporary jobs were created. Finally, the Secretariat of Agriculture and Rural Development began operating within the Temporary Employment Program supporting 228,000 producers. In all, more than one 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 differences in productive activity. About 90 percent 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

The Modernization and Integral Quality Program (Programa Calidad Integral y Modernizacion [CIMO]) 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 (number of hectares) determines the amount of the cash transfer, which currently ranges from 700 to 800 pesos per hectare depending on the season. In the year 2000, approximately 2.9 million producers benefited, covering a square area of approximately 14 million hectares.

APPENDIX B

Characteristics of the Localities in the Evaluation Sample

	All	Control	Treatment
Committees present in the locality			
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 marshal	0.37	0.47	0.32
Communal property marshal	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 theater	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			
Preschool	0.82	0.83	0.82
Primary school	0.97	0.95	0.98
Telesecondary	0.17	0.25	0.13
Secondary school	0.01	0.01	0.01
High school	0.01	0.02	0.00

	All	Control	Treatment
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
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 care workers	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
Baby checkups 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 and crafts production.	0.00	0.00	0.00
Main first activity is construction.	0.00	0.00	0.00
Main first activity is 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 and crafts production.	0.02	0.01	0.03
Main second activity is construction.	0.03	0.02	0.03
Main second activity is 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
Main third activity is art and crafts production.	0.01	0.00	0.02
Main third activity is construction.	0.02	0.01	0.03
Main third activity is industrial production.	0.00	0.00	0.00

(*continued*)

	All	Control	Treatment
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, toothpaste, 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 PROBECAT	0.02	0.01	0.02
Temporary employment program (PET)	0.12	0.12	0.12

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

APPENDIX C

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.[54] 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. The various sources of income (excluding the PROGRESA cash transfers) were transformed into monthly income and then aggregated into four main sources of income:

1. Labor income
2. Income from self-employment (such as income from sewing, food preparation, construction or carpentry, commerce, produce transportation, repairs, and laundry or cooking)
3. Other income (such as pensions, interest income, rents, and community profits)
4. 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 programs such as Abasto Social de Leche, de Tortilla, and the National Institute of Indigenous People (INI). Figure 4.1 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, Ninos de Solidaridad, and Abasto

[54]This appendix was prepared with the help of Claudia Aburto-Szekely.

Social de Leche decreased dramatically. As discussed in the first part of Chapter 5, the set of beneficiary households is not identical to the set of eligible households. Beneficiary 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).

Second, we examined how the income contributed to beneficiary families by children between ages 8 and 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. Figure C.1a reveals that the total (labor + other) income (excluding PROGRESA cash transfers) 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.[55]

Figures C.1b and C.1c break down total income into its two components, that is, 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.

Next the impact of the PROGRESA cash transfers on poverty was estimated using the income per capita as reported in (and constructed from) 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 (2DIF) estimate of the impact of PROGRESA's cash transfers on the poverty rate in the sample. Such estimates allow for the possibility of preexisting 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 C.1 and C.2 present the estimated poverty rates in treatment and control localities in each survey round as well as a 2DIF estimate of the impact of PROGRESA's

[55]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.

Figure C.1a Mean household total income from childhood (excluding PROGRESA cash transfers) among beneficiary households with children 8–17 years of age

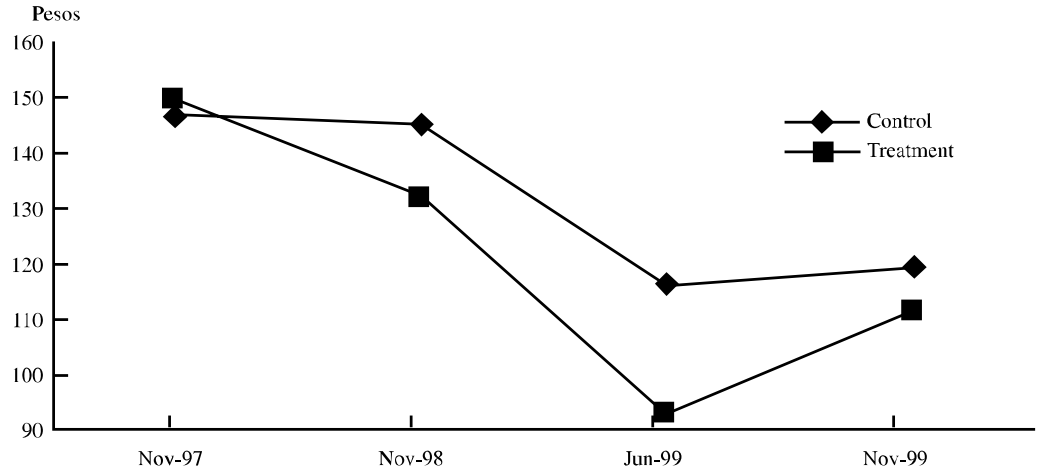


Figure C.1b Mean household labor income from children among beneficiary households with children 8–17 years of age

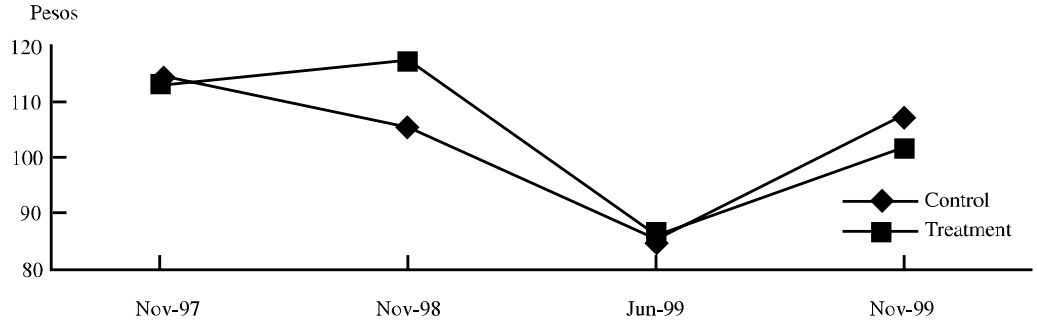
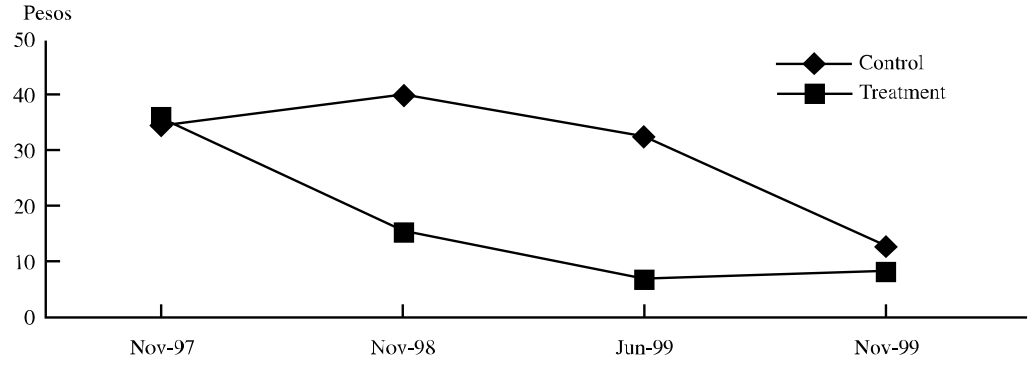


Figure C.1c Mean household other income from children among beneficiary households with children 8–17 years of age



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 2DIF estimate of the impact of PROGRESA on the poverty rate demoted 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 C.1 and C.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 percent 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

Table C.1 Poverty measures and difference-in-difference tests for total income per capita using *canasta basica* as poverty line

Measure		Mean	Standard error	*t*	2DIF	Standard 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 C.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

Measure		Mean	Standard error	*t*	2DIF	Standard error	*t*
Head count ratio							
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

declined by 36 percent, and the severity of poverty measure declined by 46 percent. 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

Adato, M. 2000. Final report: The impact of PROGRESA on community social relationships. September. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Adato, M., D. Coady, and M. Ruel. 2000a. Final report: An operations evaluation of PROGRESA from the perspective of beneficiaries, *promotoras,* school directors, and health staff. August. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Adato, M., B. de la Brière, D. Mindek, and A. Quisumbing. 2000b. Final report: The impact of PROGRESA on women's status and intrahousehold relations. August. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Baker, J. 2000. *Evaluating the impact of development projects on poverty: A handbook for practitioners.* Washington, D.C.: World Bank.

Becker, G. S. 1981. *A treatise on the family.* Cambridge, Mass.: Harvard University Press.

Becker, G. S., and N. Tomes. 1976. Child endowments and the quantity and quality of children. *Journal of Political Economy* 84 (4, pt. 2): S143–S162.

Behrman, J. 2000. Literature review on interactions between health, education and nutrition and the potential benefits of intervening simultaneously in all three. September. Washington, D.C.: International Food Policy Research Institute.

Behrman, J., and J. Hoddinott. 2000. An evaluation of the impact of PROGRESA on pre-school child height. July. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Behrman, J., and J. C. Knowles. 1999. Household income and child schooling in Vietnam. *The World Bank Economic Review* 13 (2): 211–256.

Behrman, J., and P. E. Todd. 1999a. Randomness in the experimental samples of PROGRESA (education, health, and nutrition program). February. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

———. 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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

———. 2001. Progressing through PROGRESA: An impact assessment of a school subsidy experiment. April. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English).

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.

Buddelmeyer, H., and E. Skoufias. 2004. An evaluation of the performance of regression discontinuity design on PROGRESA. Policy Research Working Paper No. 3386 (September). Washington, D.C.: World Bank.

Coady, D. 2000. Final report: The application of social cost–benefit analysis to the evaluation of PROGRESA. November. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Das, J., Do, Q. T., and B. Ozler. 2004. Conditional cash transfers and the equity-efficiency debate. Policy Research Working Paper No. 3280 (April). Washington, D.C.: World Bank.

De Janvry, A., and E. Sadoulet. 2002. Targeting and calibrating educational grants: Focus on poverty or on risk? Paper presented at the First Meeting of the Social Policy Monitoring Network of the Inter-American Development Bank.

Duflo, E. 1999. Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment. Mimeo, MIT.

———. 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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

———. 2004. Do conditional cash transfers improve child health? Evidence from PROGRESA's control randomized experiment. *American Economic Review Papers and Proceedings* 94 (2): 336–341.

Grosh, M. 1994. *Administering targeted social programs in Latin America: From platitudes to practice.* Washington, D.C.: World Bank.

Haddad, L., J. Hoddinott, and H. Alderman, eds. 1997. *Intrahousehold resource allocation in developing countries: Methods, models, and policy.* Baltimore, Md.: The Johns Hopkins University Press for the International Food Policy Research Institute.

Hahn, J., P. Todd, and W. Van der Klaauw. 2001. Identification and estimation of treatment effects with a regression-discontinuity design. *Econometrica* 69 (1): 201–209.

Handa, S., M.-C. Huerta, R. Perez, and B. Straffon. 2000. Final report: Poverty, inequality, and "spillover" in Mexico's education, health, and nutrition program. April. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Heckman, J. J. 1992. Randomization and social policy evaluation. In *Evaluating welfare and training programs,* ed. C. Manski and I. Garfinkel. Cambridge, Mass.: 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. LaLonde, 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: North-Holland.

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 Desarollo Social, Mexico City.

Hoddinott, J., E. Skoufias, and R. Washburn. 2000. The impact of PROGRESA on consumption: A final report. September. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Jacoby, H., and E. Skoufias. 1997. Risk, financial markets, and human capital in a developing country. *Review of Economic Studies* 64 (3): 311–335.

———. 1998. Testing theories of consumption behavior using information on aggregate shocks: Income seasonality and rainfall in rural India. *American Journal of Agricultural Economics* 80 (1): 1–14.

Kakwani, N. 1993. Statistical inference in the measurement of poverty. *Review of Economics and Statistics* 75 (4): 632–639.

Killingsworth, M. R. 1983. *Labor Supply.* Cambridge Surveys of Economic Literature. Cambridge: 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, pp. 15–112.

Murray, D. 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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

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

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

Ravallion, M. 1999. The mystery of the vanishing benefits: Ms Speedy Analyst's introduction to evaluation. Policy Research Working Paper No. 2153. Washington, D.C.: World Bank.

Rawlings, L., and G. Rubio. 2002. Evaluating the Impact of Conditional Cash Transfer Programs: Lessons from Latin America. Washington, D.C.: World Bank.

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. 1988. Human capital, population growth, and economic development: Beyond correlations. *Journal of Policy Modeling* 10 (1): 83–111.

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. 2000a. School subsidies for the poor: Evaluating a Mexican strategy for reducing poverty. June. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English only).

———. 2000b. Final report: The impact of PROGRESA on school enrollments. April. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

———. 2000c. Impact of PROGRESA on school attendance rates in the sampled population. February. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Secretary of Social Development. 2000. www.sedesol.gob.mx, accessed March 3, 2005.

Skoufias, E. 1994a. Using shadow wages to estimate labor supply of agricultural households. *American Journal of Agricultural Economics* 76 (2) May: 215–227.

———. 1994b. Market wages, family composition and the time allocation of children in agricultural households. *Journal of Development Studies* 30 (2) January: 335–360.

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* 2 (1) Fall: 45–96.

Skoufias, E., B. Davis, and J. Behrman. 1999a. 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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

Skoufias, E., B. Davis, and S. de la Vega. 1999b. An addendum to the final report: An evaluation of the selection of beneficiary households in the education, health, and nutrition program (PROGRESA) of Mexico. December. Report submitted to PROGRESA. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and in Spanish).

———. 2001. Targeting the poor in Mexico: Evaluation of the selection of beneficiary households into PROGRESA. *World Development* 29 (10): 1769–1784.

Subsecretaría de Egresos. 2000a. El Presupuesto de Egresos de la Federación 1995–2000. September.

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

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. Washington, D.C.: International Food Policy Research Institute (on enclosed CD in English and Spanish).

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.: World Bank.

Willis, R. 1974. A new approach to the economic theory of fertility behavior. *Journal of Political Economy* 81 (2, pt. 2): S14–S64.

Yaschine, I. 1999. The changing anti-poverty agenda: What can the Mexican case tell us? *IDS Bulletin* 30 (2): 47–60.