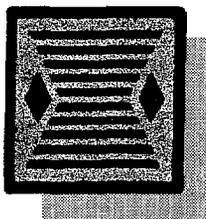


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**FOOD AND INCOME SUBSIDIES AND PRIMARY
SCHOOLING IN RURAL HONDURAS: AN
EVALUATION OF THE IMPACT OF THE BONO
(BMJF) AND PL 480 - TITLE II SCHOOL FEEDIN
PROGRAMS**

September 1995

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Miguel Calderon, Sally Crelia and Magdalena Garcia**

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1. SUMMARY

This report presents the methods and preliminary results of the study on the impact of USAID/CARE's PL 480 Title II food and PRAF's bonos (BMJF) income subsidy programs on primary schooling in Honduras. Its purpose is to provide a basis for discussion in drafting policy recommendations for improving the cost-effectiveness of school-based subsidy programs.

The cost and cost-effectiveness of the programs are presented in a separate report. This report investigates the impact of distributing food and bonos through primary schools on schooling indicators: enrollment, repetition, age at initiation, attendance, achievement scores, and a composite indicator "years ahead", which compares children's achieved rate of progress through school with the ideal schedule of starting at age 7 and progressing at the rate of one grade per year.

Two main sources of data are used to draw inferences about program effectiveness: a) a national, household sample survey of 2700 households (the USAID/ADAI Survey of Socioeconomic Indicators, referred to in this report as the National Socioeconomic Survey) undertaken in 1993/94, which provides information on program participation in the merienda and bonos programs and on schooling indicators, and b) the USAID/ADAI/LAC HNS survey of 132 randomly selected rural primary schools and 2112 randomly selected students located in high poverty municipalities of the 9 poorest departments in Western Honduras (referred to in this report as the Schools Study). In addition, a separate study of about 1,500 households drawn from a sample of health centers in poor, rural municipios of the western part of Honduras provided information on the dietary intake of children; a sufficient number of school-aged children were in the sample to analyze the effects of school program participation on dietary adequacy.

Results

1. Both the school feeding program and the bono program have a significant, positive effect on students' rate of academic progress. The effects occur among all children who reside in communities where the programs are available through schools, and not only among children who are recipients of a particular program.
2. The effect of having school feeding available is to increase the average rate of academic progress through primary school by over a fourth of a year among all 7 to 13 year old children; the effect of the bono program is to increase academic progress by over half a year.

3. The effect of the program is larger among older children (age 10-13 years). One reason is that the program is cumulative (that is, each year a child stays in school and passes contributes to the linkelihood of his remaining in school in the following years as well). Another is that children are more likely to drop out at older ages, so the potential for the program to have an impact is greater. Children aged 10 - 13 with access to bono program schools gain almost a year, and children with access to merienda schools over a third of a year, compared to children with no program available.
4. The programs do not appear to have differential effects on girls as compared to boys, nor on poor children (below the poverty line) as opposed to non-poor children. None of the programs shows any differential effect based on urban/rural location.
5. None of the programs showed a measurable effect on the probability that a school-aged child would be enrolled in the current year. The lack of program effect is probably due to the high rates of enrollment overall. About 86% of age-eligible children (7-13) are currently enrolled in school; among children between 8 and 11, the enrollment rates are well over 90%.
6. The merienda and combined programs have a significant, positive effect on the probability of not repeating a year. The availability of the merienda increases the probability of not repeating by .10, or ten percentage points ($p=.004$). The effect of the bono on repetition was smaller (7 percentage points), and of marginal significance ($p = .08$). This effect of the bono is noteworthy because, among children not repeating, about 10% receive the bono, while among repeaters (a much smaller group), about 17% receive the bono.
7. Girls are less likely to repeat than boys. Being a girl is associated with an increase of .04 in the probability of not being a repeater ($p=.01$). In the rural, western schools of the Schools Study, girls stay in school longer than boys.
8. The bono program has a positive, highly significant effect on attendance rates. Availability of the bono alone raises attendance by six percentage points; the combined program raises attendance by three percentage points. Merienda has no observable effect on attendance.
9. None of the programs was associated with any systematic differences in academic achievement, as measured by the standard tests used by the Ministry of Education.
10. For all outcomes for which a significant effect was observed, including rate of academic progress, probability of repeating, and attendance, the observed effect was smaller for the combined program than for either effective program alone. This is probably due to the fact that combined program schools tend to be in far more

economically deprived areas and serve a more disadvantaged population than schools offering a single program.

11. The majority of mothers receiving the bono report that they would prefer to receive the bono than an equivalent value of food. The reason given is that with the bono they can buy what they choose. Over 90% of the mothers say that they themselves control the bono and decide what to do with it.

12. According to the Health Centers Study data, children who live in households which receive the benefits of the school merienda consume diets which are more adequate in calories (increase of adequacy by 7%, $p = .09$); protein (increase of 11%, $p = .06$); and vitamin A (increase of 25%, $p = .0001$). Receipt of school bono benefits was not associated with any change in dietary adequacy.

13. The school merienda does not appear to substitute for meals provided at home. Over 95% of children in all kinds of schools report eating a meal before leaving for school and upon returning home from school. There was no difference among children from the different program types.

14. Both programs reach a much higher percentage of rural children than urban. The merienda program reaches 13% of urban children and 40% of rural; the bono reaches 7% of urban children and about 12% of rural. Rates of coverage are higher in both programs for children in households below the poverty line. The merienda program is fairly evenly distributed among rural areas; the bono program reaches significantly more of the population in the rural west and south than in the other rural areas.

Discussion

Both the bono and the merienda program have significant effects on the key indicator, rate of academic progress, or "years ahead"; the effect of the bono program is considerably larger. The bono program is also significantly associated with increased attendance, while the merienda shows no effect. However, the merienda program has a slightly larger effect of reducing repetition; the bono program has a smaller, only marginally significant effect. The results suggest that the two program have distinct effects, so eliminating one in favor of the other would probably lose some program benefits. Attendance contributes to learning. Reducing repetition, itself a reflection of learning, contributes to the efficiency of the educational system; overall years ahead is also an indicator of educational efficiency. Further, evidence from the Health Centers Study suggests that the merienda program, but not the bono, is associated with a greater likelihood of achieving dietary adequacy.

In terms of the measures we have used in the current study, the bono program appears to be significantly more cost-effective than the merienda. But the effect of having a mid-day meal on concentration and ability to learn were not directly measured in this study,

nor was it designed to measure dietary impact. If the merienda is to be phased out in favor of the bono, this should be done gradually, with an effort at community organization to promote a locally-managed alternative school meal, and the effects of school performance and dietary indicators should be monitored.

A further serious concern is the long term stability and viability of the bono program, which was originally intended as a short term response to the negative effects of structural adjustment. The bono, which started only in 1990, has already been suspended once; its effectiveness over time is probably dependent on its reliability. For its effects on educational progress and achievement to be felt in the larger economy, it needs to be available continuously for a generation of children. Given the positive results of this study, consideration should be given to how the long-term continuation of this program might be achieved.

The effect of the bono on years gained is greatest in the upper grades. Since enrollments are already high in the early grades, cost-effectiveness of the bono might be enhanced by making the bono available starting only in grade 3, as an incentive for parents to keep their children in school.

Because coverage of both programs is higher in the rural areas, there is a concern that needy households in urban areas may not have access to these benefits. There is effective targeting to the poor in both programs; the targeting is more pronounced in the bono program, because there is no within-school targeting for the merienda program. This should not be changed, as it is not reasonable to try to target the merienda within the school. Coverage is greater for the merienda program: nationally, about 10% of all households receive benefits from the bono program; almost 30% receive school merienda.

The effectiveness of the combined program (that is, schools offering both bono and merienda) appears consistently lower than that of either program alone. We attribute this finding to the fact that, as a policy decision, the combined program was made available in the neediest areas, where other disincentives to schooling are strong. This suggests that the bonos, originally intended to improve socioeconomic conditions, are not enough, by themselves, to compensate in the short run for the longer-term effects of being in a disadvantaged community. Despite the provision of the bono, policies to promote economic development of communities through other means are still needed.

This study finds that some concerns regarding both programs appear to be unfounded. Mothers receiving the bono express a strong preference for benefits in this cash-like form rather than in the form of food; the issue does not appear to be control, but rather convenience and choice. The women report that they, not their husbands or families, decide how to use the bono. Women receiving the merienda were not asked their preference for receiving food versus cash. Regarding the merienda, there is no apparent substitution of the school food for home-provided meals.

We have no direct information on whether children in non-merienda schools bring any food to eat in the middle of the school day; based on the sample of children in the Health Centers Study, the practice does not appear widespread: among children under 5, 72% did not report eating in school. Of those who did, 60% were participants in the merienda program. In cases where a snack would be provided from home, the merienda clearly may be a substitute for this home-provided snack. Providing the merienda at school saves the household's resources; given the very low incomes of households in the Schools Study, there is some doubt whether the neediest parents can afford to provide a snack from home. Recall, though, most parents report making both a financial and a labor contribution to the merienda program, but presumably this contribution is below the value of the daily school meal.

2. INTRODUCTION

Honduras is one of the poorest countries in the Western Hemisphere, with an estimated population of 5.3 million in 1991 (World Development Report, 1993). Extreme poverty affects over 50% of the population and nearly 80% of the rural population, which constitutes 57% of the total. The national economy at US\$580 per capita GNP, lags behind all but Haiti, Guyana and Nicaragua in the region. In recent years, economic stabilization and adjustment programs are reported to have increased income earning opportunities in agricultural and export-oriented activities, but increased hardships for net consumers of food in rural areas and urban dwellers. According to the national household survey of 1993/94 (Preliminary Tables, Feb. 1995, USAID/IMPACT), more than half of all Honduran households - both urban and rural - consume less than 75 % of recommended caloric needs. In rural areas (55 % of total population), almost half of all children under five (45 %) are stunted; nationally, some 40% of all children under five years are stunted.

USAID has provided food commodities (PL 480 Title II) through primary schools and health centers in Honduras for over 3 decades with the objective of reducing malnutrition, hunger and poverty. The distribution of food has also acted as an incentive for increased school attendance and greater utilization of health services. In July 1990, the World Bank and other donors including USAID assisted the Government of Honduras in initiating an income subsidy or coupon program (bonos) through a specially formed entity "Programa de Asignación Familiar" (PRAF) to subsidize the incomes of the poorest segments of the population, providing a safety net against food insecurity and malnutrition during a period of economic adjustment in the country. The bonos program is also implemented through primary schools and health centers.

The presence of both food distribution and bonos programs implemented through the same delivery systems (schools and health centers), in similar communities concurrently, provided an opportunity to assess the relative costs and effectiveness of income versus food subsidies in terms of cost per unit of income transferred and increased social services utilization. The

LAC HNS project therefore agreed to include this as part of a broader effort to document the costs and effectiveness of nutrition activities in the region.

The policy relevance of the study in Honduras is that USAID has been asked by GOH and other donors to monetize food commodities and support the expansion of the bonos program instead of continuing food distribution. Most recently (May 1995), USAID's primary implementing agency of Title II food programs in Honduras - CARE - has proposed a restructuring of its own portfolio. This includes shutting down school and health center-based food distribution in 7 out of 10 departments where they now operate, and instead, concentrating in 3 most impoverished departments with the majority of food and monetized food used to build infrastructure. Upon USAID's urging, CARE has agreed to reconsider this decision in light of the results emerging from this study. A comparison of the costs and effectiveness of the programs would assist GOH, USAID and CARE in these decisions.

This report provides information on the effectiveness of the programs. The costs and cost-effectiveness results are reported in a companion volume (Phillips et al, 1995).

In terms of the broader relevance of this study, the World Bank is promoting expansion of bonos-type subsidy programs in other Latin American and Caribbean countries, and would like to demonstrate its cost-effectiveness based on the Honduran experience. Globally, USAID's Title II programs have been among the least well evaluated and costed programs, and methods of assessment used in this study are of interest to others in developing their own evaluations.

Also, food and monetary resources (dollar and local currency funds) are declining rapidly. An important concern of USAID missions worldwide, is whether and in what form food aid should be continued. Comparative evaluations of different types of food distribution programs and alternatives to food distribution are of interest.

This report investigates the impact of distributing food and bonos through primary schools on schooling indicators: enrollment, repetition, attendance, academic achievement scores, and a composite indicator "years ahead". Nutritional impacts are not addressed in any detail because they are not considered by USAID or the implementing agencies to be the primary objective of the programs.

Two main sources of data are used in this study to draw inferences about program effectiveness: a) a national, household sample survey (the USAID/ADAI National Survey of Socioeconomic Indicators) undertaken in 1993/94, which provides information on program participation in the merienda and bonos programs and on schooling indicators, and b) the USAID/ADAI/LAC HNS survey of 132 randomly selected rural primary schools and 2112 randomly selected students located in high poverty municipalities of the 8 poorest departments in Western Honduras. Information on food consumption was obtained from a survey of households drawn randomly from lists of health center and feeding center clients in poor, rural areas of western Honduras (see Sanghvi *et al.*, 1995 for detailed methods).

3. METHODOLOGY

The study is an opportunistic, non-experimental, cross-sectional comparison of schools, households and children who participate in merienda only, bonos only, merienda plus bonos, or neither program. Targeting issues are investigated through an analysis of participant profiles obtained from the 1993/94 nationally representative random sample survey of households. Impacts of individual and combined programs are estimated from data on schooling indicators obtained from both data sources; a) the national household survey and b) the school evaluation survey in Western Honduras.

The conceptual framework is in annex A, the map showing the 1994/95 study areas is in annex B, and questionnaires for the 1993/94 national household survey, and 1994/95 school evaluation survey are in annexes C and D, respectively. Models used to estimate program impacts after controlling for possible confounders are given in Annex E.

3.1 1993/94 National Household Survey of Socioeconomic Indicators

SAMPLE: A nationally representative sample of 2875 urban and rural households, was randomly drawn from six regions or domains ("dominios), three of which are urban and three are rural. There were about 480 households interviewed in each region.

DATA COLLECTION: Eleven interviewers and one supervisor were trained and collected data from September 1993 to July 1994.

DEFINITION OF PROGRAM EXPOSURE: The national survey was based on a nationally representative sample of households. The households were drawn from the communities in which they lived, not based on the schools their children attended. To identify households with access to the different school programs, we had to find an indirect measure. We have defined a child as having access to a school program if, in the community (that is, the cluster) in which he lives, there are any children receiving the benefit of that program. Since the great majority of children attend schools close by, we have assumed that in general, the children from a cluster all attend the same school. Still, the possibility exists that, in a given cluster, some children attend a school with merienda, while others attend a different school with the bono. All such children would be defined as belonging to a community offering both programs. Table 3.5 shows the participation rates according to various definitions of program exposure.

DATA ANALYSIS: The following effects of the programs were estimated using multiple regression models:

- Years ahead
- Enrollment
- Age at entering school
- Repetition
- Dropout

These outcomes are described below. Details of the models are in Annex E.1.

Years Ahead: The goal of the school feeding and bono programs is to encourage more children to enroll in school, to keep them from dropping out early, and to encourage them to progress steadily through the grades, with the ultimate objective of improving the amount they learn in school. We constructed a variable, "years ahead" to capture the combined effects of these individual possible impacts of the program.

Years Ahead measures the number of years by which a student's progress in school meets or fails to meet the expectation of (1) entry into school by age 7, and (2) progress through school at the rate of 1 grade per year. The computation of the variable is as follows:

$$(\text{GRADE} - 1) - (\text{AGE} - 7) = \text{YEARS AHEAD}$$

"Grade" refers to the child's current grade if enrolled, or highest grade completed if not currently enrolled. Thus, if a child of age 7 is currently in first grade, years ahead is equal to zero, indicating that the child is neither ahead of or behind his expected level. A child of age 6 in first grade would have a score of +1, indicating that he is one year ahead of his expected progress. A ten-year-old who is in grade 3 because he repeated one grade would have a score of -1: $(3-1) - (10-7) = -1$. A child of ten who dropped out after third grade would have the same score. Note that a child who dropped out would fall further behind, and his "years ahead" score would fall, with each passing year. Thus, this measure combines the effects of starting school early or late; passing or repeating grades; and dropping out.

Children are expected to enroll in first grade between the ages of six-and-a-half and seven-and-a-half, and, of course, each year of school lasts ten months. This means that some eight-year-olds in first grade, whose "years ahead" score would be -1, are in fact not behind. (Similarly, some nine-year olds in second grade would not be ahead, although their score would be +1). There is no way to avoid this source of error, since age was reported in whole years in the survey. Since our interest here is not in the absolute level of "years ahead", but rather in the differences attributable to program type, this error will not alter or bias the results.

Enrollment: All children were asked whether or not they were currently enrolled in school. The response to this question was used to estimate the effects of the bono and merienda programs on the probability of a child being enrolled in the current year. Enrollment rates were calculated based on the expectation that all children age 7 - 13 should be in elementary school: the rate reported is the percentage of children in this age range living in the community and currently enrolled in school.

Age at Entering School: All household members under age 15 were asked their age at entering school, whether or not they were currently attending school. Advancing the age of enrollment by creating an incentive to enroll is one possible way by which program benefits may contribute to students' more rapid progress through school.

Repetition: All children currently enrolled in school were asked if they were repeating a grade from the previous year. In the present analysis, we estimated the effect of the bono and merienda programs on the probability of not repeating a year. We used the probability of not repeating (that is, of having advanced from the previous year) so that a positive coefficient on the program variables would represent a positive, that is, beneficial effect. These analyses apply only to those children age 7 - 13 currently enrolled in school.

Dropout: All children under age 15 who were not currently attending school were asked when and why they dropped out. This question applies only to children who were once enrolled. We estimated the effect of the program on the probability that a child age 7 - 13 had not dropped out. As with repetition, the probability of not dropping out was used so that a positive coefficient on the program variables would represent a positive or beneficial effect of the programs.

3.2 1994/95 School Survey.

SAMPLE: Lists of government primary schools located in Choluteca, Copan, El Paraiso, Francisco Morazan, Intibuca, La Paz, Lempira, Ocotepeque and Santa Barbara Departamentos (states) were drawn up. From these, schools located in municipalities rated as "mal", "muy mal" and "deficiente" - based on poverty indicators developed by the Honduran fund for social investments (FHIS) in 1992 - were selected as the sampling universe.

The schools were organized into the following groups:

- Schools where only the food distribution (merienda) is implemented
- Schools with only the coupon (bonos or BMJF) program

- Schools where in addition to food, the BMJF coupon program is also implemented
- Schools with neither the food nor the coupon program

From each list, 40 schools were randomly selected. If a school was found not to have the designated program, an alternate school was selected. The final sample of schools by department and study group is shown in Table 3.1. In the bonos-only group, a total of 12 school were located and these form the universe as well as the study sample. Out of a total of 8,278 public, primary schools in the country, 3,767 were excluded due to location in non-study states (departamentos), and another 310 were excluded due to location in economically better-off municipalities. The final universe from which 132 were selected comprised 4,200 schools. In each selected school, a sample of 16 children (8 girls, 8 boys) were randomly selected from all grades. This number represents approximately 10 percent of all children enrolled in the selected schools. The children were selected irrespective of whether or not they participated in a particular program. Table 3.2 shows the final sample of students by grade and study group. The characteristics of the sample schools are shown in Table 3.3, and of the sample households in Table 3.4.

DATA COLLECTION: Four teams of one supervisor and two interviewers each were trained for data collection which was completed during May 1994 to November 1994. School records were located at each school for the 1993 school year and current school year. Data was collected on: daily attendance by male and female students by grade, annual enrollment, school test scores, drop-out rates and retention rates at each grade level, as well as information on the distribution of food supplements daily and the dates and value of coupons distribution. A series of questions on program costs at the school level were also included in the questionnaires. Household visits were completed for 16 randomly selected children for information on household socio-economic status and the use of bonos and merienda. The questionnaires are in Annex D.

In March 1995 the selected schools were revisited by trained test administrators to assess the academic achievement scores of selected children in the schools. Head-counts were taken on the day of visit, and supplementary data collected on school teachers training and school days and hours worked.

DEFINITION OF PROGRAM EXPOSURE: In this case, there is no ambiguity about program exposure, since the sample is based on school, stratified according to which program(s) they offered. A child is defined as having access to whichever programs are in fact offered in the school he attends.

DATA ANALYSIS: The following effects of the programs were estimated using multiple regression models:

- Years ahead
- Attendance
- Academic performance

How these effects are measured are described below. Details of the models are in Annex E.2

Years Ahead: Information on students' age and grade was collected from a random sample of sixteen students drawn from all grades in each sample school. This was used to estimate whether there were systematic differences in their 'years ahead' score, according to the formula described above (National Socioeconomic Survey).

Attendance: Information on attendance in each grade, calculated as a percentage of currently enrolled students was collected in a one-day revisit of the sample schools. The teacher reported the day's actual head-count attendance on the day of the visit.

Academic Performance: A standardized test of academic performance (ref) was administered to a random sample of sixteen students drawn from all grades in each school during the one-day revisit. This test, which covers Spanish, Mathematics, Science, and Social Studies, is used by the Ministry of Education to evaluate school performance in elementary schools. The scales used in the present analysis were Spanish Language and Mathematics, as these are the scores given the highest priority by the Ministry of Education. Scores are reported as average percent correct overall, and on these two subtests.

4. PROGRAM DESCRIPTIONS

4.1 GENERAL OVERVIEW

Title II School Feeding (Programa de la Merienda Escolar)

The objective of the school feeding program is to reduce school absenteeism, desertion and class repetition. The program has been in operation since 1959, and is estimated to have reached approximately 300,000 primary school children in 1993 and 1994, or about 52% of the total population of the public school system. Some 3,800 schools in 9 departments in the poorer western regions of the country participate (Comayagua, Copan, Choluteca, Intibuca, La Paz, Lempira, Ocotepeque, Santa Barbara and Valle). This represents approximately 46% of all public schools in the country. All children in all grades +are entitled to+ participate in the program. There is no further targeting within schools.

The food is provided to schools based on enrollment at a level of 1.25 lbs of a corn-based blended cereal (ICSMF), 0.25 lbs oil and 1 lb soy-fortified bulgur (SFB), per child per month. The estimated annual totals for 1994 are: 3 million lbs of ICSMF, 1.4 million lbs of SFB and 600,000 lbs of oil. These products were selected for ease of preparation and require relatively little cooking time. Commodities are unloaded at the port of Cortes on the northern shore of Honduras, warehoused in San Pedro Sula at a central storage site, and distributed 3-4 times per year to intermediate and community-level storage sites. The distribution (storage and transportation) occurs under the supervision of CARE and Ministry of Education staff. At the school, teachers supervise food preparation and distribution, and community volunteers provide fuel and labor for cooking.

A beverage consisting of the blend of corn-soybean flour fortified with vitamins and minerals and mixed with water (food value of 200 calories and 8 grams protein) is provided for each child, 160 days a year (2.5 lbs/month/child). This is estimated to cover 20% of the daily energy requirements and 50% of daily protein requirements. Each food ration was valued at US\$0.04 per feeding day per student in 1992. ++The parents of beneficiaries generally pay a fee, estimated at one Lempira (Lp), to help cover school-level administrative costs of the program. In the Schools Study, between 95% and 100% of parents in merienda schools said they made a contribution to the merienda program. In addition, parents of children in merienda schools often contribute their time in helping to transport the food from the warehouse, and they may contribute fuel for cooking as well. ++

According to the World Bank, previous program evaluations have identified the following issues, some of which are addressed in this study: the small size of the subsidy, both in economic and nutritional terms; relatively high operating costs, estimated at about half the value of the subsidy; and lack of targeting, except for the exclusion of Tegucigalpa.

BMJF Coupon Program Through Schools (Bono Mujer Jefe de la Familia)

The PRAF bono program was developed to mitigate the effects of structural adjustment on the most vulnerable elements of the Honduran population. The pilot BMJF program began in May 1990. As its title suggests, the program was originally intended to target female-headed households which had been shown in a recent survey to be disproportionately represented among the poorest households. After a three-month effort of attempting to identify such households, it was concluded that they were not numerous enough to justify basing a large-scale poverty alleviation program exclusively on this characteristic. Accordingly, the target population of the program changed (though the title did not). The BMJF's target population came to consist of low income children in primary schools attending grades 1-3 in areas most affected by malnutrition and extreme poverty. The latter areas were defined as municipalities in 7 of Honduras' 18 Departments where the prevalence of extreme poverty and of malnutrition exceeded determined levels. Within the targeted municipalities all schools are selected for participation. Within schools, the teachers determine eligibility of individual students to participate in the program. Eligibility criteria include economic status of the family, and each school uses its own specific indicators (for example, female-headed, number of family members, land ownership, occupation etc.). Once a child is deemed eligible as a beneficiary, provision of coupons continues until the child completes sixth grade or drops out of school; there is no further consideration of the child's household economic status.

The coupon subsidy amounted to Lps. 20/month per child during the study period and has now (1995) been raised to Lps. 30/month. The coupons are distributed to eligible parents (generally the mother) by teachers three or four times a year, contingent on the child attending school. Average administrative costs of the BMJF program were estimated at 16% in 1991 by the World Bank. By the end of 1991, mothers of 120,000 school children had begun receiving coupons (monthly for the 9 month school year), equivalent to US\$37 (in 1991 and US\$20 in 1994) per year for each child in school, with a limit of three children per household. In 1994, the number of participating children had reached 190,244. The following table shows the number of participating children nationally for each year since the start of the program.

Schools which offer the bono may also participate in the school feeding program; in fact, more schools offer the combined programs than offer bono or merienda alone.

4.2 Program Characteristics

National Survey

Table 4.2 shows children's participation in each program, according to the availability of the program in the community, based on the nationally representative survey. Among enrolled children in bono communities, about one third receive the bono; in combined-program schools, about a fourth of enrolled children receive this benefit. In merienda

communities, about 75% to 78% of enrolled children receive the merienda on average, but this distribution is highly skewed: the vast majority (over 90%) of children in merienda communities are in schools in which close to 100% of children participate in the merienda.

The bono program serves children starting in grades 1 to 3, continuing to provide them with bonos as long as they remain in primary school. It is noteworthy that 43% of bono participants are in grades 4 - 6, compared with the overall average of 37% of enrolled children in this age group. This suggests that bono recipients are more likely to continue on to higher grades than other children.

According to the design of the program, the bono is intended to be withheld from children who repeat a grade, as an incentive to students to maintain their efforts to make academic progress. However, there is no evidence that repeaters are denied the bono; on the contrary, repeaters are on average more likely to be bono recipients than are non-repeaters (though the numbers of repeaters in the bono program are smaller than of non-repeaters). Table 4.3 shows the percentage of children in each grade, and of repeaters and non-repeaters who receive the bono.

Schools Study

Among the schools in the Schools sample, Between 65% and 75% of children in schools which provide the bono participate; these higher participation rates than those seen in the national sample are consistent with the bono program's higher rate of coverage in the rural west, which was the area from which the Schools Study sample was drawn. In the schools offering merienda, between 96% and 100% of children participate in merienda.

Participation rates in bonos, but not in merienda, vary by grade. Participation falls off in higher grades. Bono participation is consistently much higher in schools offering the combined program than in schools offering the bono only, except in the first grade. This may reflect the fact that combined program schools are in needier areas. In 1994, bono-only schools had been in the program an average of 3.1 years; in the combined program schools, average length of participation was 3.2 years. Average length of time in the merienda program was 11.4 years for merienda-only schools, and 13.6 years for combined program schools. Neither of these differences is significant. Table 4.4a shows the details of schools' participation in the programs; Table 4.4b shows children's participation rates.

4.3 Mothers Attitudes and Use of Bono and Merienda Programs

Mothers of children in the Schools Study sample who were in the bono or combined program schools were asked about their preferences for bonos as compared with food in school. The majority of respondents (about 77%) said they would prefer to receive bonos; in the bono only group, 18% said they would prefer to receive food, while 11% of the group receiving both benefit said they would prefer food. These results are shown in Table 4.5.

Of those who said they would prefer food, the commonest reasons for this preference were price (prices are rising, so a fixed amount of money buys less) and convenience (not needing to go shopping). Only 22% of the bono group, and 12% of the combined-program group said they would prefer food because they could control its use. Only 2 to 5% of respondents who preferred bonos gave control as the reason; over 95% said they preferred bonos because they could buy what they chose. Over 90% of the mothers in this group said that they themselves decided how to use the bonos. Only 2% said their husbands controlled this decision. The number of respondents is small, but these results suggest that intrahousehold control of resources is not the main determinant of a woman's preference to receive benefits as cash or food.

Over half the mothers (61 - 62%) change the bono directly into cash when they receive it; 37% buy goods directly with the bono. Of those who change the bono to cash, over 86% do so in a bank, and about 10% in a store. Only about 4% of women report that there was a charge for changing the bono into cash. In contrast, 93% of mothers in the merienda program reported making a contribution to the merienda program, and 97% of the combined program mothers did so. The amount of the contribution was not specified.

4.4 Schooling Characteristics of Children

National Survey

Table 4.6 shows the enrollment, repetition, and drop-out rates of children, according to the availability of the different programs in their communities, and the average score of children in terms of years ahead of ideal schooling. Current enrollment rates (percent of children aged 7 - 13 currently enrolled in school) range from 82% in the communities with merienda to 89% in communities offering bonos or no program; repetition rates vary significantly, from 21% in no-program communities to 13% in merienda schools. On average, children are about one year behind the ideal rate of academic progress, and the score does not vary by program group.

About half the children in school are girls (46% to 51%), and this does not differ by program group. The distribution by grades does vary by program group, however (see Table 4.7). About 72% of households in the combined program have children in grades 1 - 3, compared with lower percentages (57%-62%) in the other programs. This suggests that children drop out earlier in the schools offering the combined program, and this is confirmed by the lower average age at drop out in these communities: 10 years, as compared with over 11.5 years in communities offering the other programs, and almost 11 in the communities without a program.

Schools Study

Table 4.8 shows the repetition, failure, and dropout rates, and the number of years in takes on average to complete a grade. Among enrolled children, the number of years per grade falls steadily at higher grades, from 1.8 in grade 2, to 1.2 in grade 6. The same is true of dropout, repetition, and academic failure to pass. This is because, at higher grades, children who are failing to make adequate academic progress drop out. Among children in the Schools Study, the average number of years it took to complete one grade was about 1.5; the figures ranged from 1.66 years/grade in bono schools to 1.44 years in schools with no program, and did not vary significantly by program group.

Girls tend to have higher pass rates, lower rates of repetition, and lower dropout in the early grades; this difference disappears after grade 3. Academic achievement scores show no significant variation by program type. Table 4.9 shows the scores by grade and program type, for the overall test and for the Math and Spanish subscales.

Girls tend to stay in school longer than boys. The ratio of girls to boys starts out about even in first grade; at higher grades, the ratio is progressively more skewed toward girls. (See Table 4.10.) Presumably, this is because boys' labor has a higher value to rural households.

4.5 School Characteristics

National Survey

Enrollment

Table 4.11 shows enrollment by age and region. Enrollments are high throughout the country in the younger ages (8 - 11) and consistently higher in Tegucigalpa. Enrollments drop off after age 11, and this trend is most notable in the rural west, which is the most disadvantaged region.

Repetition Rates

Table 4.12 shows repetition rates by grade and program. Note that in this table, the Merienda and Bono columns include both the program alone and combined with the other program. Repetition rates are highest in first grade, and drop off sharply after that. In grades 5 and 6, only about 5% of children are repeating the previous grade, as compared with almost 40% in grade 1. This is of course because children who repeat tend to drop out before they reach the higher grades.

Distance

Virtually all children live in communities with a school within an hour's walking distance (see Table 4.13). According to the National Socioeconomic Survey, the figures range from 96% for Combined Program communities to 100% in Merienda communities. In the Schools Study (see Table 3.5), the average time to walk to school was between 16 and 18 minutes, and did not differ by program group. Over 90% of the children could walk to school in less than 40 minutes.

Provision of Textbooks

Most (92%) of the children in communities offering any of the food programs receive textbooks from their schools, compared to only 66% of children in communities with no program. This is because schools serving better-off communities can ask their students to purchase texts, while schools in poorer communities must provide them. Provision of textbooks is not an indicator of school quality, but rather of the economic situation of the school's community.

Length of School Day

Schools hold classes for an average of 5 hours per day; this does not differ much by program group, though the class day is slightly longer (5.24 hrs) in schools in communities with no program.

Use of Private Schools

There is very little use of private schooling. On average, between zero and two percent of children in any cluster attended private school; these percentages are too small to see any differences by program group. Among household which did not participate in any program, about 3.7% of children attended private school; among participant households, the figure was under 1% for all program groups.

Schools Study

Enrollment

Average enrollment in 1993 ranged from 135 students in merienda schools to 194 students in schools with no program. The proportion of girls was about half, and did not vary by program.

According to an earlier study by PRAF, school enrollment appeared to have increased in the early months of the BMJF program implementation. However, it is unclear whether enrollment increased during this period in non-BMJF program areas as well (e.g., due to

population growth, migration, increased demand for schooling independent of the coupon program), or whether the increase in BMJF areas was due to a shifting of the children from non-participating to participating schools. It is also not clear in which socio-economic groups in whom this increased enrollment occurred. +++ In our Schools Study sample in rural, low-income areas of the occidente, enrollment did tend to increase over time, but there was no apparent systematic change in enrollment after the start of the bono program, as shown in Table 4.14

While enrollment rates in the first grade are now quite high in Honduras, enrollment falls off sharply at higher grades. Table 4.15 shows the average enrollment in schools as a proportion of the school's enrollment in grade 1.

Indicators of School Quality

There were no significant differences by program group in indicators such as number of class days per year (which ranged from 193 to 217), student/teacher ratio (19 - 25), or students per classroom (37 - 45). The majority of schools in all groups had five or six grades. Among bono schools, 25% had only 4 or fewer grades (recall there were only 12 schools in this group); in the no-program group, only 2.5% were in this category; and among merienda and combined program schools, 12% and 10% respectively did not include higher grades.

5. PROGRAM COVERAGE AND TARGETING

According to the National Socioeconomic Survey, 23.8% of children aged 7 - 13 were in communities which offered none of the school programs. The comparable figures were 29.8% of children living in communities with schools offering the merienda only; 13.6% of children living in communities offering the bono only, and 33.6% of children in communities offering both programs.

Overall, 13.2% of households in Honduras have a member receiving School Bonos, and 28.7% of households have children receiving the Merienda Escolar. (Both these figures include households also participating in the other program.)

Tables 5.1 and 5.2 show the characteristics of households in communities which have each type of program available, and the comparable characteristics of households actually participating in each program (that is, receiving the benefits directly).

5.1 Indicators of Targeting by Geographic Area

Program coverage varies by geographic area. The merienda and combined programs are targeted to rural areas, while the bono program is somewhat more available in urban areas. This can be seen in the characteristics of households which have the programs available (Table 5.1), and those which themselves participate (Table 5.2). Overall, 66% of Honduran households are rural, but 75% of households in communities with merienda available, and 72% of those with the combined programs available are rural, while only 52% of households with bono available are rural. Households with no program available are also disproportionately urban.

The degree of targeting toward rural households is much more pronounced if only program participant households are considered. Table 5.2 shows the household characteristics of those households actually participating in each program. A much higher proportion of participant households are rural than of households which simply have the program available. Fully 93% of households receiving both merienda and bono in school are rural; for merienda 84% of participating households are rural. In contrast, Bono program participants are about equally distributed between urban and rural areas, which means participation rates are higher in rural than urban areas.

Another way to understand the degree of geographic targeting is to see the relative rates of coverage (percent of age-eligible children participating) for the programs. The following table shows the rates of coverage of the program by geographic region and by poverty status. Both the merienda and bono programs have their highest rates of coverage in the poorest geographic regions of the country: the rural west, and the rural south. Both programs have higher rates of coverage overall in rural than urban areas, but the bono program is concentrated in the neediest of the rural areas, while the merienda program also has high rates of coverage in the rural north and remaining rural areas.

In both urban and rural areas, merienda is more widely available than the bono. The percentage of the urban population covered by the bono program (6.1%) is much smaller than the rate of coverage in rural areas (11.5%). The merienda program also has much higher rates of coverage in rural than urban areas (56%, as compared with 13.1%). Most of the urban merienda coverage is in the smaller cities. This is important, because it means that both programs are less available in cities, even though the percent of poor children is not different between urban and rural areas.

5.2 Indicators of Targeting by Economic Status

5.2.1 Income and Expenditure Levels

Communities with merienda or combined merienda and bonos are worse off economically than bono-only communities or than communities with no program. Average

annual household expenditure per adult-equivalent (that is, per person, adjusted for the age and sex composition of the household) is lower by almost 1,000 Lps in the merienda or combined-program communities than in communities with bono only or with no program available. At the community (or cluster) level, there is no difference in average expenditure between communities with bono only and those with no program.

But further targeting clearly takes place within communities. Participating households in all the programs have household expenditure levels much lower than non-participating households in the same clusters. In bono communities, average annual expenditure per person is Lps 2644, while among participating households, the figure is Lps. 1,721. The difference is more pronounced for the combined program groups: in clusters offering the combined program, average household expenditure per person is 1,739, compared with Lps. 1,101 among households actually participating in the programs. Households receiving both bono and merienda escolar are notably worse off than those in the other programs (as measured by expenditure levels), and all participant groups have much lower expenditures than those not participating in any program. This suggests that, within communities, the programs disproportionately reach those of lower income.

Rates of coverage of the population are shown above (Table 5.3), broken down by poverty status. In this study, the poverty line was determined by calculating the cost of an adequate food basket composed of foods consumed by households in the poorest quartile, with a small allowance for non-food purchases. Because of the significant difference in cost of living between urban and rural areas, the poverty line was calculated separately for urban and rural households. Both the bono and merienda programs are targeted toward poor households. The degree of targeting is more pronounced for the bono program than for the merienda. This is not surprising, since bono recipients are chosen within schools on the basis of their economic status, while all children in merienda schools receive the merienda.

There appears to be significant coverage (in percentage terms) of non-poor households in both the merienda and bono programs; but the number of non-poor households is much smaller. In absolute numbers, about 17% of merienda participants, and 14% of bono recipients are from non-poor households. Overall, the percent of children from non-poor households in this sample is about 21%. (This is a smaller percentage than of non-poor households (average 30%), because non-poor households have fewer children, and this table is based on number of children.)

5.2.2 Housing Conditions

Indicators of housing quality confirm that communities with combined merienda and bonos are somewhat worse off than communities with either program alone, with a lower percentage of households having piped water or electricity available, and a higher percentage having mud floors. These differences are much more pronounced when only program participants are considered. Participants in the combined program have worse housing

conditions than the other groups: more mud floors, less availability of electricity and piped water. Participant households in the bono program also have poorer quality housing indicators, even though they are not disproportionately rural.

5.2.3 Food Consumption, Dietary Adequacy and Anthropometric Status

Another indicator of economic well-being is dietary adequacy. There is no obvious difference in average caloric intake per adult-equivalent among communities in the different program groups, nor between communities with and without programs. Considering only program participants, there is still no difference in average calorie consumption per adult-equivalent. But Merienda and Merienda plus Bono Program communities do appear to have higher percentages of children with low height and weight for age. In an average community of Honduras, about 40% of the children are stunted (height-for-age below -2 SD), and about 22% are of low weight (weight-for-age below -2 SD). In the merienda and combined communities, the figures are comparable to these, while in the Bono and No Program communities, the percentages are somewhat lower (though still high by international standards). Recall, though, that in Bono and Combined Program communities, only between 15 and 20% of households receive the Bono, and these recipient households are poorer and therefore more likely to contain children of low weight and height.

Participants in the combined merienda and bono program are far more likely than other groups to spend more than 70% of their household budgets on food. This is a very significant indicator of low economic status, again suggesting that the combined program is successfully targeting the neediest of households.

6. RESULTS: IMPACT ON SCHOOLING

6.1 IMPACT ON YEARS AHEAD

These results are from the analysis of the national household survey and show the nature and magnitude of effects of the programs nationally.

6.1.a Program Effects:

The results of the model show that both the bono and the merienda program have positive and significant effects on years ahead, controlling for the other variables in the model. (Complete model results are shown in Appendix E3. A summary table of the coefficients of interest is in Table 8.1.) The effects of the programs on years ahead are summarized in the tables below.

Table 6.1

Outcome variable: Years Ahead, All Children 7 - 13

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Merienda Only | .265 | .011 |
| Bono Only | .614 | .000 |
| Both | .241 | .022 |

[Overall regression $F=33.84$, $p=.0000$; Adjusted $R^2=.439$]

This means that the overall effect of having the merienda program available in the community is to raise years ahead by about a quarter of a year (.265 of a year); the overall effect of having the bono program available is to raise years ahead by over half a year (.614). The overall effect of having both programs available together is about the same as having merienda alone, and much lower than the effect of having bono alone. This may be due to the fact that communities with both programs are systematically worse off by many indicators than communities with no program or with only one (see descriptive results above). We have attempted to control for socioeconomic and other differences among communities, but there may be unmeasured differences which contribute to a lower rate of academic progress, which we were unable to control. It is also possible, though we consider it unlikely, that combining the two programs may put an excessive burden on teachers, and thus contribute to a lowering of the quality of instruction, resulting in poorer academic performance and slower progress through school.

Program intensity, measured by the percent of enrolled children who actually receive bonos, appears to have an independent, positive effect on years ahead: the coefficient on Pct Bono is positive at .347, and has a marginal level of significance of .06. On average, in schools which offer the bono program, 28% of enrolled children receive the bono (34% in communities with schools offering only the bono, and 25% in communities with schools offering both programs). (Recall that the percentage of enrolled children receiving benefits was much higher---65% to 75%---in the Schools Study.)

6.1.b Other Factors Affecting Years Ahead - Household Characteristics:

Age: Children fall further behind as they get older. On average, an additional year of age is associated with an additional deficit of .43 of a year (significant at $p=.000$). This is consistent with the observation that the average time taken to complete one grade is 1.5 years (see Table xxx, above).

Sex: Girls tend to advance more rapidly in school than boys. Being a girl, on average, is associated with a .24 year increment in years ahead ($p=.000$). There are several possible explanations for this. We know that the dropout rate for girls is

lower than for boys. The ratio of boys to girls is about equal in grade 1, and becomes progressively more skewed in favor of girls at higher grades. Presumably this is because boys' labor is needed to contribute to household income, while girls' labor has lower potential for producing income. (It may also be true that education makes a bigger difference in the potential economic contribution of girls as compared with boys, giving a greater incentive for parents to keep their girls in school longer.)

Household Composition: Children from larger households tend to show slightly slower academic progress: the effect is significant ($p=.05$), but small. The more school-aged children there are in a child's household, the lower the child's years ahead score: an additional school-aged child (controlling for total household size) reduces the average years ahead by .15 of a year. This may be due to the greater need for children to contribute to household chores and to income-producing activities where there are fewer adults and more children in the household. As more children are enrolled, however, each child tends to score higher on years ahead. There is no difference in the rate of academic progress between children in households headed by males versus females.

Parents' Level of Education: Both mother's and father's highest grade completed significantly affect the academic progress of the child. On average, if the mother completed one additional grade, the child scores about .07 of a year higher on years ahead; one additional grade of father's education is associated with a .03-year increment in child's academic progress. This suggests that the effects of raising educational levels go beyond the child him or herself, and are passed on to the next generation.

Household Income: Income level in this survey was measured by household annual expenditures (including the value of goods received as home production, gifts, and pay, and adjusted for the age and sex composition of the household). Children from higher income households had significantly faster rates of academic progress, with a 1,000 Lempira increase in annual expenditure per adult-equivalent associated with a .04-year increase in years ahead.

Other indicators of household economic well-being showed effects consistent with that of income: having more rooms in the house (controlling for household size) and having electricity were also associated with better academic progress.

6.1.b Other Factors Affecting Years Ahead - Community Characteristics:

Geographic Location: The sample of the National Socioeconomic Survey was selected to represent six regions of the country, referred to as Domains (Dominios). Controlling for the availability of the bono and merienda programs, children in the Rural West had significantly higher academic progress than the comparison group (rural south), and higher than any other domain. On average, being in the Rural

West was associated with .27 of a year higher score on years ahead than in the rural south; this effect was significant at $p=.01$. This is surprising, since the Rural West, which includes Copan, Choluteca, Intibuca, and Santa Barbara, is known to be an economically deprived region of the country. Controlling for the intensity of the bono program (percent of enrolled children receiving bonos), however, the years ahead score is not significantly higher for children in the Rural West. Presumably, in this poorer region of the country, targeted for various kinds of public assistance programs, there are more children eligible for the bono program.

Socioeconomic Status: Years ahead scores are lower in communities of lower socioeconomic status by several indicators. In communities with a higher percentage of households living below the poverty line, children show lower academic progress. For each additional ten percent of households below poverty, average years ahead is reduced by .04 of a year. Similar negative effects are seen for percent of household with mud floors (an indicator of low socioeconomic status, since the model controls for urban/rural location through the Dominio variables). The percent of households containing malnourished children (below -2 SD of weight-for-age), a sensitive indicator of the economic conditions of the community, is also negatively associated with children's academic progress: for each ten percentage points of increase, average years ahead is reduced by .06 of a year.

Enrollment: The rate of enrollment in the community (percent of age-eligible children, aged 7 - 13, currently enrolled in school) was very significantly associated with years ahead, and had a large effect. For each additional ten percent of children enrolled, years ahead rose by .12 of a year ($p=.0001$).

6.1.c Other Factors Affecting Years Ahead - School Characteristics:

Children in the survey were asked how many hours of classes they attended per day, and whether the school provided textbooks. These were considered to be measures of the quality of the school they attended. Class hours had a significant, positive effect on years ahead: for each additional hour of classes, years ahead was higher by .29 of a year ($p=.04$).

6.1.d Interactions - Differential Program Effects on Sub-Groups

To determine whether the observed program impacts varied within sub-groups of program participants, interaction effects were measured and resulted in the following:

Age: The bono program appears to have significantly greater effect on years ahead among older children than among younger ones. Taking both the program coefficient and the interaction term coefficient into account, the average effect of the bono program on children aged 7 - 9 is to increase years ahead by .13 of a year, while

among children 10 - 13, the effect is to increase years ahead by .82 of a year. This suggests that the effect of the bono program is cumulative: as children get older, the effect of the presence of the bono program becomes larger.

The same effect is seen in the merienda program, but it is not as pronounced, and does not quite reach statistical significance ($p=.09$). Using both coefficients to estimate program effect, the merienda program increases years ahead by .17 of a year among younger children (age 7 - 9), and by .38 of a year among older children. Again, this is probably because the effects of the program being available are cumulative. The effects of a school offering both programs are very similar to those of the school offering merienda only, but smaller: .04 of a year for younger children, and .23 of a year for older children.

The table below summarizes the relevant regression results.

Table 6.2

Program effects on "Years Ahead", All Children, Interacted with Age of Child

| <u>Program and Interaction</u> | <u>Coeff.</u> | <u>Significance</u> |
|--------------------------------------|---------------|---------------------|
| Merienda only, age 10 - 13 | .381 | .001 |
| Meri. Only x age 7 - 9 | -.217 | .095 |
| Net effect on 7 - 9 year olds = +.17 | | |
| Bono only, age 10 - 13 | .821 | .000 |
| Bono only x age 7 - 9 | -.694 | .000 |
| Net effect on 7-9 year olds = +.13 | | |
| Both, age 10 - 13 | .238 | .047 |
| Both x age 7 - 9 | -.201 | .063 |
| Net effect on 7-9 year olds = +.04 | | |

[Overall regression $F=.443$, $p=.0000$; Adjusted $R^2=.443$.]

Sex: Girls have significantly higher scores on years ahead than boys do. However, there are no differences in program effects based on the sex of the child. None of the interaction coefficients is even close to statistical significance, and the size of the coefficients is small.

Poverty: The income level of the household, as measured by annual expenditures (Lps) per adult-equivalent household member, significantly affects children's academic progress. Controlling for other factors, a higher level of expenditure is associated with greater academic advancement. A per-adult-equivalent increment of 1,000 Lps/year is associated with an increase of .04 of a year in years ahead.

However, there is minimal evidence that either the merienda program or the bono program have a differential effect on children below the poverty line. The coefficients on Bono Only and Merienda Only are not statistically significant. The coefficient on Both is -.22, and approaches significance at $p = .069$. All the coefficients are negative, suggesting that, if there is any interaction effect at all, it is that the programs have a greater effect in households above the poverty line. In the case of communities offering both programs, the effect on households above the poverty line is to increase years ahead by .34 of a year; for households below the poverty line, the increase is about .10 of a year.

Geographic Location: There is some evidence that the effects of the merienda and bono programs are different in different regions: there are some significant interaction effects between program and domain. For example, the merienda program appears to have a greater effect in Tegucigalpa than elsewhere, raising years ahead by 1.0 year in that domain, compared with smaller increases in the other domains. This may be because the merienda program is primarily rural, and only offered in the poorest schools of Tegucigalpa, where the incentive effect of a school meal may be higher.

While many of the interactions with domain are significant, no clear pattern emerges. This is in part because the availability of the programs varies by region (See Table xxx), so that there is confusion between the programs having differential effects and their simply not being available.

When the domains were aggregated into rural and urban areas, there was no evidence of any differential effects of the programs based on urban/rural location. Of course, both programs are more widely available in rural than in urban areas (see Table 5.3).

The effects of the programs are quite similar when the analysis is restricted to children currently enrolled in school. (This is not surprising, since, as we saw above, about 86% of children aged 7 to 13 were enrolled in school in the year of the survey.) Children in schools offering the merienda only score .276 of a year higher on years ahead, on average, than children in schools with no program. Children in schools offering the bono only score half a year higher. As in the previous analysis, children in schools offering both programs do a little worse than children in schools with merienda only.

Individual receipt of the bono has no additional effect, once the effect of the school's offering the bono is accounted for. The addition of the variable representing individual bono receipt has no additional effect and is not statistically significant. It appears that the effect of the program is fully captured in the fact that the school offers the program.

6.2 IMPACT ON ENROLLMENT

All the estimates of determinants of enrollment were made using the National Socioeconomic Survey, because it included a nationally representative sample of children whether or not they were enrolled in school. The Schools Survey drew its sample only from children who were currently enrolled, so of course it was not possible to look at the probability of enrollment using this survey. Although no program effects were observed, the model as a whole was able to account for close to half of the variability in the probability of enrollment (Adjusted $R^2 = .464$).

6.2.a Program Effects

None of the programs showed a measurable effect on the probability that a school-aged child would be enrolled in the current year. The lack of program effect is probably due to the rather high rates of enrollment overall. About 86% of age-eligible children are currently enrolled in school.

6.2.b Geographic Location

We expected to see differences in enrollment based on geographic location, but none of the variables representing Dominio showed a significant effect on the probability of a child being enrolled.

6.2.c Child Characteristics

Girls were slightly more likely to be enrolled than were boys, but the effect was small, and only approached statistical significance ($p = .06$). Not surprisingly, age of the child was a very significant determinant of enrollment: older children were less likely to be enrolled than younger children. This is consistent with the known high dropout rate in higher grades.

6.2.d Household Characteristics

The more school-aged children there are in a household, the less likely any child is to be enrolled. Controlling for household size, one additional child age 7 - 13 in the household reduces by .26 the probability that any child in the household will be enrolled. This may be due to the greater strain on household resources in households with more children and fewer adults; there may be greater need in such households for children to go to work or help with household tasks.

Female versus male household headship and parents' level of educational level had no significant effect on the probability of enrollment. Expenditures per adult-equivalent showed a weak positive relationship with enrollment, which did not reach statistical significance ($p=.08$), and other indicators of household economic status showed no effect.

6.3 IMPACT ON REPETITION

These results are from the analysis of the national household survey and show the nature and magnitude of effects of the programs nationally. Repetition was measured by asking children in school whether they were currently repeating a year. This means that repetition was measured only for children currently enrolled in school. Recall that on average, over the whole sample, 83% of currently enrolled children were not repeating the year; 17% were repeaters.

The model estimated to explain the probability of not repeating a year explained only about 9% of the variability in repetition.

6.3.a Program Effects

The merienda and combined programs have a significant, positive effect on the probability of not repeating a year. The availability of the merienda increases the probability of not repeating by .10, or ten percentage points ($p=.004$), and the combined program is associated with a .07 increase (about 7 percentage points) in the probability of not repeating ($p=.02$). The bono program shows a similar effect of .07, which did not reach statistical significance ($p=.08$). The relevant regression coefficients are shown in the table below.

Table 6.3

Program effects on Not Repeating Grade, Enrolled Children 7-13 yrs

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Merienda Only | .099 | .005 |
| Bono Only | .074 | .087 |
| Both | .078 | .026 |

[Overall regression $F= 4.63$, $p=.0000$; Adjusted $R^2=.090$]

Individual receipt of the bono does not significantly affect the probability of not being a repeater. The addition of this variable does not add to the explanatory power of the model, though it does very slightly raise both the level of statistical significance and the magnitude of the effect.

6.3.b Other Factors Affecting Repetition - Child Characteristics

Children in the lower grades (1 - 3) are, on average, more likely to be repeaters than those in the higher grades. This is because children who repeat grades are also more likely to drop out, so that in the higher grades, only the non-repeaters remain. The highest rate of repetition occurs in first grade. At each successive grade, children show a slightly increased likelihood of not being a repeater, as compared with the previous grade. After grade 3, there is little change in the likelihood of repetition.

The availability of the merienda increases the probability of not repeating by .10, or ten percentage points ($p=.004$). Girls are less likely to repeat than boys. Being a girl is associated with an increase of .04 in the probability of not being a repeater ($p=.01$). Older children are less likely to be repeaters, once again, probably because they drop out rather than repeat as they get older.

6.3.c Other Factors Affecting Repetition - Household Characteristics

Educational levels of the child's mother and father showed no effect on the probability of repeating. Children were significantly less likely to be repeaters in households whose income is derived primarily from agriculture. Possibly this is because in agricultural households children's labor is in demand, so that a child who fails is kept out of school to work rather than allowed to repeat. However, this is a purely speculative explanation. Economic level did not affect repetition, nor did most of the indicators of housing quality.

6.3.d Other Factors Affecting Repetition - Community Characteristics

Children from urban households are significantly more likely to be repeaters than are rural children. Again, this may be related to the higher demand for child labor in rural than in urban areas. Enrollment rate at the community level is associated with lower likelihood of repeating. As with other outcome measures, we assume that the percent of children enrolled in school is a reflection of the quality of the local school, and this higher quality may contribute to children's ability to pass to the next grade. If enrollment rate at the community level reflects the value which the community places on education, this too could contribute to children's academic progress.

6.4 IMPACT ON ACADEMIC ACHIEVEMENT

These results are from the analysis of the schools survey that was conducted on a random sample of 132 schools categorized by program type and show the nature and magnitude of effects of the programs in the nine departments where the schools are located (Choluteca, Copan, El Paraiso, Francisco Morazan, Intibuca, La Paz, Lempira, Ocotepeque

and Santa Barbara). Academic achievement was measured by administering a standard test of achievement in Spanish and Mathematics; the test was scored as the percentage of correct answers. Results are analyzed in terms of the average test score for each school and grade.

Academic achievement scores were noticeably higher in grade 1 than in subsequent grades (see Table 4.9, above). Except for Grade 1, there were no significant differences among the grades in total score, nor were there significant differences on average by program type.

The overall model explaining academic achievement accounted for 46% of the variability in this outcome variable (Adjusted $R^2 = .460$).

6.4.a Program Effects

None of the programs was associated with any systematic differences in academic achievement. All the program coefficients were negative, but none came close to statistical significance. When measures of program intensity were added to the model (number of days per school year that merienda was served, and percent of enrolled children receiving the bono), the negative effect of the bono only program approached statistical significance. The relevant coefficients are shown in the table below.

Table 6.4
Outcome Variable: Academic Achievement

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Bono Only | -4.713 | .313 |
| Merienda Only | -3.646 | .335 |
| Both | -5.577 | .174 |

[Overall Regression $F=10.73$, $p=.000$; Adjusted $R^2=.459$]

Table 6.5
Outcome Variable: Academic Achievement,
With Programs and Program Intensity Variables

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|-------------------------|---------------|---------------------|
| Bono Only | -9.270 | .082 |
| Percent Receiving Bonos | .082 | .077 |
| Merienda Only | -3.813 | .743 |
| Merienda Days/Year | .003 | .970 |
| Both | -11.592 | .307 |

[Overall Regression $F=10.30$, $p=.0000$; $R^2=.46$]

It is not reasonable to think that either the merienda or the bono program could reduce children's ability to learn. It is plausible, however, that the bono program might provide an incentive to keep in school children who would otherwise become discouraged due to poor performance and leave school. We also know that both programs are in relatively poorer areas, so that academic performance might be lower because of socioeconomic and cultural factors whose influence was not completely controlled in the model.

6.4.b Other Factors Affecting Academic Achievement - School Characteristics

A number of school characteristics showed a significant association with academic achievement, but none of the effects were large, and some were in unexpected directions. Greater walking distance of children from the school was negatively associated with academic achievement, as was having a mud floor. But academic achievement was slightly higher in groups with a higher number of students per classroom, and percent of teachers with professional training also showed a negative association with academic achievement score. Neither teacher attendance on the day of the visit nor the number of teachers per grade, nor school size had any measured effect on children's test performance.

Household Characteristics

All household characteristics were measured at the community level, as the percent of households having a particular characteristic, or the average value of a characteristic. These represent the character of the community more than the household of the individual child. The only characteristic which had a significant association with academic achievement was the percent of households having mothers working outside the home. This variable showed a positive association with children's academic achievement.

6.5 ATTENDANCE

These results come from the Schools Study. Attendance was measured by head count, and analyzed by grade/sex group within the school. The variables in the model were able to explain over half of the variability in attendance (Adjusted $R^2 = .529$).

Program Effects

The availability of the bono program had a highly significant and large effect on attendance. Availability of the bono program alone was associated with an average 6 percentage point increase in attendance. There was no measured effect of the merienda

program on attendance rates; the effect of the combined programs was about half that of the bono alone, and did not reach statistical significance. The relevant coefficients are shown in the table below.

Table 6.6

Outcome Variable: Attendance Rate by Grade and Sex Category

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Bono Only | 6.224 | .003 |
| Merienda Only | -2.768 | .218 |
| Both | 3.379 | .075 |

[Overall Regression F=31.605, p=.000; Adjusted R²=.529]

In a model which included variables to measure program intensity (days of merienda per year and percent of enrolled children receiving the bono), these program intensity variables showed no significant effect at all on attendance. Controlling for program intensity, though, did result in increasing the measured effect of combined programs from about 3 percentage points to about 8 percentage points, and this effect reached statistical significance (p=.05). The table below shows the relevant results.

Table 6.7

Outcome Variable: Attendance Rate by Grade and Sex Category

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|------------------------|---------------|---------------------|
| Bono Only | 7.583 | .004 |
| Merienda Only | 2.281 | .670 |
| Both | 7.675 | .056 |
| Percent receiving bono | -.017 | .406 |
| Merienda days/year | -.037 | .296 |

[Overall Regression F=30.137, p=.000; Adjusted R²=.529]

There is an attendance criterion for receipt of the bono: children are required to maintain a certain attendance record in order to continue to be eligible. We do not have information on how well this requirement was enforced; for example, we do not know if bonos were ever refused to children in the program because they did not maintain attendance.

Other Factors Affecting Attendance

Older schools had much higher attendance rates than newer schools. Schools older than 10 years, and those older than 25 years, had attendance rates about 17 percentage points higher than schools in buildings less than ten years old. This could possibly have to do with a school's long standing and recognition in the community.

Attendance of students was better in schools where teachers' attendance was also higher, and in schools where there was a higher number of teachers per grade. Attendance was higher where there were more class days per week. Fewer students per classroom was also associated with better attendance, though the effect was small. Attendance rates tend to be slightly better at higher grades.

7. RESULTS: NUTRITIONAL CONSIDERATIONS

Merienda

Children who participate in the school merienda bring their own containers---bowls, cups, or glasses---to hold the drink. This means that quantities consumed are quite variable from one child to another and from day to day. On average (based on the total number of enrolled children and the total amount of food distributed), the merienda provides about 200 calories and 8 grams of protein per serving, or 20% of average daily caloric needs and 50% of average daily protein needs for children in this age group. The merienda is distributed only on class days. It was estimated from the Schools Study that the merienda is given 160 days per year. Thus the average daily amount of calories and protein provided by the merienda on an annual basis, even if entirely additional to the food the child eats out of the home food supply, would not be sufficient to see a measurable effect on children's growth. This amount of food might easily be burned up in increased activity. Note that increased activity is not a waste of calories, since activity levels are correlated both with cognitive stimulation and with physical health.

Children are in school for about 5 hours a day, and they walk an average of 18 minutes each way. This means that children with no snack in school would have to go almost six hours without eating, an unreasonable period of time. The potential contribution of the merienda, therefore, is not only, nor even mainly in terms of children's nutritional status as measured by their achieved growth, but also in terms of maintaining children's ability to concentrate by reducing short term hunger. We have no information on whether children without the merienda available bring a mid-day snack with them from home.

Availability of the merienda in the school does not appear to displace meals served at home. In the Schools Study, there was no difference among program groups in the likelihood that a child ate before coming to school, or after coming home from school.

Close to 100% of children report eating both before school and after school, regardless of program group. While we do not have complete dietary information on the children, these results suggest that the merienda is additional to food consumed at home, not a substitute for it. Table 7.1 shows these results.

The Health Centers Study provided data on the dietary intake and meal patterns of 723 children age 5 and over drawn randomly from a sample of health centers and feeding centers (lactarios) in poor, rural areas of western Honduras. Among these children, 75% did not report eating school meals. (Of course, some of these children are not in school yet.) Of the 199 children who did eat in school, 60% were merienda participants, and 40% were not. These data suggest that the practice of bringing food from home to eat in school is not as common as would be ideal.

The same Health Centers Study found that in households that had children receiving the school merienda, dietary adequacy of children age 5 and over was significantly higher than in households not receiving the merienda. The effect of the merienda was to raise caloric adequacy of children on average by 7 percentage points ($p=.09$); to raise protein adequacy by 11 percentage points ($p=.06$); and to raise adequacy of vitamin A intake by 25 percentage points ($p=.0001$). No effect of participation in the school bono was observed in this data set. These results suggest that the merienda may be having a positive nutritional impact on children in households whose children participate in the program. The regression results are shown in Table 7.2.

Bono

The potential contribution of the bono to children's nutritional status is through its contribution to household income and thus its potential for increasing or improving the household's food availability. Using data from the National Socioeconomic Survey, we investigated the effect of the bono on household food consumption and on children's dietary adequacy. The results of this analysis are not available at this time, but will be forthcoming in a future report.

8. DISCUSSION

The overall implications of the study findings for primary schooling in Honduras are summarized in Table 8.1. Using the stated numbers of recipients of bonos (205,000) and CARE merienda (278,000) nationwide, the estimated number of children who live in communities where these programs function, and the estimated increases in schooling indicators attributable to the programs, we estimate that in 1993, the bonos program helped accelerate the progress of primary school children in grades 1 through 6 by 335,000 child years, and merienda by 78,000 child years; there were 35,000 fewer enrolled children

repeating school in bonos areas, and 24,000 in merienda areas; and an estimated 30,000 additional enrolled children were attending school in bonos areas (with no measurable effect on attendance in merienda areas).

Both programs appear to contribute in important ways to overcoming what is considered a major constraint in schooling in Honduras - the delay in completing 6 grades of primary schooling once children enroll in first grade. If, as current estimates suggest, the average enrolled child takes 9.5 years to complete 6 grades instead of 6 years, and if there are 900,000 children enrolled in primary schools (grades 1 - 6), then there is a loss of 3.15 million child years of schooling in this group. Our results suggest that the bonos program is saving 0.11 percent of this loss per year (at 1993 coverage levels of approximately 23% or 205,000 children provided with bonos). The merienda program is saving approximately a fourth of this amount and, in addition, is likely to provide nutritional and, possibly, cognitive benefits. The latter were not directly measured in this study, but indirect indication of the cognitive effect comes from the measured effect of the merienda on repetition, which presumably depends on improved learning.

Table 8.1

Summary of Program Effects on Schooling Outcomes

| Program | Years Ahead ^a | Non-Repetition ^a | Academic Achievement ^b | Attendance ^b |
|-------------------|--------------------------|-----------------------------|-----------------------------------|-------------------------|
| Merienda Only | .265** | .099*** | -4.7 ns | -2.77 ns |
| Bono Only | .614*** | .074+ | -3.6 ns | 6.22 ** |
| Merienda and Bono | .241* | .078* | -5.6 ns | 3.38 + |

+ p < .1

* p < .05

** p < .01

*** p < .001

a. Source: National Household Survey

b. Source: Schools Study

With respect to comparing the cost-effectiveness of the bonos and merienda, the additional possible benefits of merienda in terms of nutritional contribution and improved concentration and learning (possibly reflected in the effect of merienda on repetition) need to be taken into account. The programs may in some respects be complementary rather than substitutes for each other, as they have different effects. In the cost study (Phillips *et al.*, 1995), it was found that the costs of the bono program are significantly lower than those for the merienda, both in terms of cost for a given value of benefit delivered and in terms of the cost of achieving an effect on years ahead.

The merienda program has been operating in Honduras for over 30 years. In the present study, we found that on average, schools in the School Study sample had been offering the merienda program for an average of 11 years. In contrast, the bono program started on a pilot basis in 1990, and had been operating for only four years at the time of this study. Coverage has been expanding (except between 1993 and 1994), but many of the children in this study have been exposed to the program only for one or two years. The average time in the program in the Schools Study sample was just over three years. Thus the comparative effectiveness of the two programs must be interpreted in the light of the much shorter duration of the bono program.

The programs have been shown to affect different outcomes. Both affect the rate of academic progress, and the probability of repetition. The bono program improves attendance rates (both alone and in combination with the merienda). The effect of the bono program on rate of academic progress ("years ahead") is over twice that of the merienda; the merienda has a somewhat greater effect on repetition rates. The effect of the bono on repetition rates is particularly noteworthy, however, because the bono reaches a higher proportion of repeaters than of non-repeating children. Although the policy of the bono program is to deny benefits to repeaters as an incentive for making good academic progress, this policy is not being enforced. The results of this study suggest that the policy should not be enforced, since the program is reducing repetition rates in any case.

An additional consideration, however, is that program resources are limited. If the choice is between giving the bono to a non-repeater as an incentive to continue in school, or to give it to a repeater, probably the effect in terms of academic achievement and learning will be greater if a non-repeater is targeted. However, repeaters need help, possibly even more than non-repeaters, to stay in school. Losing these children through dropout could have a long term negative impact on the economy.

In a model which measured the effect of individual receipt of the bono on repetition, along with the availability of the program, the effect of being a bono recipient was actually negative (though of marginal significance statistically). If, indeed, some children are encouraged to repeat rather than drop out as a result of the bono, this can be counted as a benefit, since repetition surely improves the level of learning of children, compared to dropping out.

It may be this incentive to stay in school rather than drop out which accounts for the surprising negative effect of the bono on academic achievement score in the model which controls for program intensity. This effect, significant only at $p = .08$, was to reduce academic achievement scores by 9 percentage points. The effect is seen only in a model controlling for program intensity. We already have observed that program intensity, that is, percent of enrolled children receiving the bono, is higher in the needier areas served by combined programs, and in needier schools. Thus program intensity controls in part for the socioeconomic context in which the program operates. If the bono program is keeping children in school who would otherwise drop out due to academic failure, then the apparent

negative effect of the bono program on learning is a plausible result. It might even indicate a positive effect, in terms of keeping high risk children in school, albeit at higher repetition rates and lower academic achievement scores.

It is also possible that the time burden of the program, especially of the combined programs, interferes with teachers' ability to spend their time in classroom activities. We consider this a less likely explanation, in part because the bonos in any case are distributed only three times a year, and so should not greatly reduce classroom time. However, the possibility should be explored further.

One of the most consistent and striking results of this study is that the effects of the combined bono and merienda program are always the same or even less than the effect of either program alone. The most likely reason for this is that the combined program operates in needier school and communities. This is the result of a government policy decision to expend these concentrated resources only in the most disadvantaged areas. We know, from other studies and from the results of our own analysis, that indicators of low socioeconomic status, at both the household and community levels, are negatively associated with schooling outcomes.

We have attempted to control for these characteristics statistically, by including as many indicators as we could in the model. The results suggest that there are unobserved, possibly unobservable characteristics of the schools or the communities in which the combined program operates, which are also associated with poorer schooling outcomes. The important implication of this is that there is a limit to what these programs can accomplish on their own, in terms of counteracting the effects of socioeconomic deprivation. The bono program was implemented as an overall poverty alleviation measure as well as specifically to affect schooling. In the limited time that the program has been in existence, it has apparently not eliminated the barriers to academic achievement and progress.

This study looks at schooling outcomes as a result of these programs, not at nutritional outcomes. Although the merienda program provides food, the quantities provided are probably too small to have a measurable effect on nutritional status as measured by growth. These amounts, delivered only during days when school is in session, would easily be burned up in increased activity (which itself can have health and cognitive benefits). It is likely that the main effect of the merienda is to improve children's concentration by providing something to eat in the middle of a long school day. The Health Centers Study data suggest that there may, however, be a positive dietary effect of the merienda program.

In recent policy statements, CARE has expressed its intention of reducing or eliminating its involvement in school feeding. It would be useful to have direct information on whether children without access to the merienda bring food from home to eat at school. If they do, promoting this practice might be an alternative to the continued provision of the merienda, although the extremely low levels of household income and expenditures

measured in this study suggest that a critical segment of the population may not be able to afford to send a mid-day snack with their children. Recall, though, that parents in merienda schools already report contributing both cash and labor to the merienda, though the value of the monetary contribution may be less than the value of the daily school meal. Any decision to phase out the merienda program should ideally be done carefully, making an effort at community organization to provide a substitute for the program. The effects on schooling indicators and on dietary indicators should be monitored.

This study found a number of concerns about both the merienda and the bono to be unfounded. It is clear that the availability of the merienda has no effect on the likelihood that a child will eat both before and after school. Almost all children eat at home before and after school, and the merienda had no effect on the self-reported size of either meal.

In the bono program, a concern was that providing cash-like benefits created a risk that these benefits would be diverted from uses which benefit children. We have not yet analyzed the marginal effect of the bono on household and children's food consumption (this will be discussed in a future report), but at least we know that the vast majority of women (about 90%) report that the bono they receive is under their own control. Most women who now receive the bono report that they would prefer the bono to an equal value of food, because of the convenience of being able to buy what they want. Those who preferred food gave as their reason that food conserves its value in the face of price inflation. Control over the benefit was not generally given as a reason. These results should alleviate the concern that the bono might be diverted by the male household head or other household member. (This, of course, says nothing about how the bono is used by the mother herself.)

Participants in the merienda program make a financial contribution to the program. Very few of the bono recipients said that they were charged a commission for exchanging the bono or using it in direct purchases.

9. CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions:

1. Both the school feeding program and the bono program have a significant, positive effect on students' rate of academic progress. The effects occur among all children who reside in communities where the programs are available through schools, and not only among children who are recipients of a particular program.
2. The effect of having school feeding available is to increase the average rate of academic progress through primary school by over a fourth of a year among all 7 to 13 year old children; the effect of the bono program is to increase academic progress by over half a year.

3. The effect of the program is larger among older children (age 10-13 years). One reason is that the program is cumulative (that is, each year a child stays in school and passes contributes to his remaining in school in the following years as well). Another is that children are more likely to drop out at older ages, so the potential for the program to have an impact is greater. Children aged 10 - 13 with access to bono program schools gain almost a year and children with access to merienda schools over a third of a year, compared to children with no program available.

4. The programs do not appear to have differential effects on girls as compared to boys, nor on poor children (below the poverty line) as opposed to non-poor children. None of the programs shows any differential effect based on urban/rural location.

5. None of the programs showed a measurable effect on the probability that a school-aged child would be enrolled in the current year. The lack of program effect is probably due to the high rates of enrollment overall. About 86% of age-eligible children (7-13) are currently enrolled in school; among children between 8 and 11, the enrollment rates are well over 90%.

6. The merienda and combined programs have a significant, positive effect on the probability of not repeating a year. The availability of the merienda increases the probability of not repeating by .10, or ten percentage points ($p=.004$). The bono has a slightly smaller effect, of marginal significance ($p = .08$). The positive effect of the bono on repetition is notable because among children not repeating, about 10% receive the bono, while among repeaters, about 17% receive the bono.

7. Girls are less likely to repeat than boys. Being a girl is associated with an increase of .04 in the probability of not being a repeater ($p=.01$). In the rural, western schools of the Schools Study, girls stay in school longer than boys.

8. The bono program has a positive, highly significant effect on attendance rates. Availability of the bono alone raises attendance by six percentage points; the combined program raises attendance by three percentage points. Merienda has no observable effect on attendance.

9. None of the programs was associated with any systematic differences in academic achievement, as measured by the standard tests used by the Ministry of Education.

10. For all outcomes for which a significant effect was observed, including rate of academic progress, probability of repeating, and attendance, the observed effect was smaller for the combined program than for either effective program alone. This is probably due to the fact that combined program schools tend to be in far more economically deprived areas and serve a more disadvantaged population than schools offering a single program.

11. The majority of mothers receiving the bono report that they would prefer to receive the bono than an equivalent value of food. The reason given is that with the bono they can buy what they choose. Over 90% of the mothers say that they themselves control the bono and decide what to do with it.

12. According to the Health Centers Study data, children who live in households which receive the benefits of the school merienda consume diets which are more adequate in calories (increase of adequacy by 7%, $p = .09$); protein (increase of 11%, $p = .06$); and vitamin A (increase of 25%, $p = .0001$). Receipt of school bono benefits was not associated with any change in dietary adequacy.

13. The school merienda does not appear to substitute for meals provided at home. Over 95% of children in all kinds of schools report eating a meal before leaving for school and upon returning home from school. There was no difference among children from the different program types.

14. Both programs reach a much higher percentage of rural children than urban. The merienda program reaches 13% of urban children and 40% of rural; the bono reaches 7% of urban children and about 12% of rural. Rates of coverage are higher in both programs for children in households below the poverty line. The merienda program is fairly evenly distributed among rural areas; the bono program reaches significantly more of the population in the rural west and south than in the other rural areas.

Policy Implications

Both the bono and the merienda program have significant effects on the key indicator, rate of academic progress, or "years ahead"; the effect of the bono program is considerably larger. The bono program is also significantly associated with increased attendance, while the merienda shows no effect. However, the merienda program has a slightly larger effect of reducing repetition; the bono program has a smaller, only marginally significant effect. The results suggest that the two program have distinct effects, so eliminating one in favor of the other would probably lose some program benefits. Attendance contributes to learning. Reducing repetition, itself probably a reflection of learning, contributes to the efficiency of the educational system; overall years ahead is also an indicator of educational efficiency.

In terms of the measures we have used in the current study, the bono program appears to be significantly more cost-effective than the merienda. But the effect of having a mid-day meal on concentration and ability to learn were not directly measured in this study, nor was it designed to measure dietary impact. If the merienda is to be phased out in favor of the bono, this should be done gradually, with an effort at community organization to promote a locally-managed alternative school meal, and the effects of school performance and dietary indicators should be monitored.

A further concern is the long term viability of the bono program, which was originally intended as a short term response to the negative effects of structural adjustment. The bono, which started only in 1990, has already been suspended once; its effectiveness over time is probably dependent on its reliability. For its effects on educational progress and achievement to be felt in the larger economy, it needs to be available for a generation of children. Given the positive results of this study, consideration should be given to how the long-term continuation of this program might be achieved.

The effect of the bono is greatest in the upper grades. Since enrollments are already high in the early grades, cost-effectiveness of the bono might be enhanced by making the bono available starting only in grade 3, as an incentive for parents to keep their children in school.

The current policy of denying program benefits to children repeating a grade is not being observed. In fact, a higher percentage of repeaters receive the bono than of non-repeaters. At the same time, the bono program appears to reduce repetition rates. In terms of academic achievement and total learning, it might be more cost effective to target non-repeaters in order to keep them in school, since these non-repeaters may be the more capable and motivated students. However, the alternative to repeating for many children would be dropping out, and this can have negative consequences for the economy in the long term. Probably, therefore, the policy of denying benefits to repeaters should not be enforced. Efforts to promote attendance and thus pass rates should be made, but keeping children in school is preferable to allowing dropouts.

Enrollment rates in the lower grades are already quite high. Therefore, the policy emphasis should be on reducing repetition and delaying or preventing dropout. In rural areas, enrollment rates for seven year olds are low compared to older primary school aged children; this is especially true in the most disadvantaged area, the rural west. Since the demand for children's labor competes with schooling at older ages, another policy objective should be earlier enrollment in rural areas.

Because coverage of both programs is higher in the rural areas, there is a concern that needy households in urban areas may not have access to these benefits. Both programs show effective targeting to the poor: in both programs, the percentage of the poor population covered is higher than of the non-poor. But the low rate of leakage of benefits to the non-poor is due in part to the very high percentage of children who are poor (about 70%), especially in the rural areas. In both programs, the percentage of non-poor children receiving benefits is under 20%. The targeting is more pronounced in the bono than in the merienda program, because there is no within-school targeting for the merienda program. This should not be changed, as it is not reasonable to try to target the merienda within the school.

The effectiveness of the combined program (that is, schools offering both bono and merienda) appears lower than that of either program alone. We attribute this finding to the

fact that, as a policy decision, the combined program was made available in the neediest areas, where other disincentives to schooling are strong. For example, children's labor is more likely to be needed by the household. This suggests that the bonos, originally intended to improve socioeconomic conditions, are not enough, by themselves, to compensate in the short run for the longer-term effects of being in a disadvantaged community. Despite the provision of the bono, policies to promote economic development of communities through other means are still needed. Since the bono program has only been in existence since the end of 1990, the longer term effect of the bono cannot be measured.

This study finds that some concerns regarding both programs appear to be unfounded. Mothers receiving the bono express a strong preference for benefits in this cash-like form rather than in the form of food; the issue does not appear to be control, but rather convenience and choice. The women report that they, not their husbands or families, decide how to use the bono. Women receiving the merienda were not asked their preference for receiving food versus cash. Regarding the merienda, there is no apparent substitution of the school food for home-provided meals. We have no direct information on whether children in non-merienda schools bring any food to eat in the middle of the school day; if this is a common practice, then the merienda clearly may be a substitute for this home-provided snack. Participating households contribute their time and a small amount of money to the merienda program, but assuming the value of the meal exceeds the cash contribution, the low income of many participating households suggests that they might not be able to afford to send an "extra" meal to school with their children.

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TABLES

Cuadro 3.1

Estudio de Escuelas Muestra de Escuelas por Departamento

| Departamentos | Bonos | Merienda | Bonos & Merienda | Sin Programa | Todos |
|-----------------------|-------|----------|---------------------|-----------------|-------|
| (4) Copan | 6 | 0 | 7 | 0 | 13 |
| (6) Choluteca | 1 | 0 | 12 | 0 | 13 |
| (7) El Paraiso | 0 | 0 | 0 | 40 | 40 |
| (8) Francisco Morazan | 5 | 0 | 0 | 0 | 5 |
| (10) Intibuca | 0 | 0 | 7 | 0 | 7 |
| (12) La Paz | 0 | 14 | 0 | 0 | 14 |
| (13) Lempira | 0 | 0 | 10 | 0 | |
| (14) Ocotepeque | 0 | 4 | 0 | 0 | 4 |
| (16) Santa Barbara | 0 | 23 | 3 | 0 | 26 |
| Todos | 12 | 41 | 39 | 40 | 132 |

Cuadro 3.2

**Estudio de Escuelas
Muestra de Estudiantes por Grado**

| Grado del Niño | Bonos n = 12 | Merienda n = 41 | Bonos & Merienda n = 39 | Sin Programa n = 40 | Todos n = 132 |
|-----------------------|-------------------------|----------------------------|--|------------------------------------|--------------------------|
| 1 | 58 | 144 | 127 | 148 | 477 |
| 2 | 34 | 122 | 113 | 109 | 318 |
| 3 | 31 | 102 | 114 | 103 | 350 |
| 4 | 26 | 125 | 107 | 116 | 374 |
| 5 | 25 | 89 | 89 | 92 | 295 |
| 6 | 18 | 74 | 74 | 72 | 238 |
| Todos | 192 | 656 | 624 | 640 | 2,112 |

Table 3.3

Characteristics of School by Program

| Characteristic | Program | | | |
|---|----------|----------|------------------|------------|
| | Bonos | Merienda | Bonos & Merienda | No Program |
| Number of Schools | 12 | 41 | 39 | 40 |
| Enrollment, 1993 | | | | |
| Mean | 160.55 | 134.83 | 148.56 | 194.05 |
| (SD) | (221.59) | (149.17) | (156.71) | (255.36) |
| Percent Girls, 1993 | | | | |
| Mean | 51.5 | 48.56 | 49.35 | 48.95 |
| (SD) | (4.45) | (5.99) | (4.73) | (7.55) |
| Highest Grade | | | | |
| < = 4 | 25.0% | 12.2% | 10.3% | 2.5% |
| 5 | 8.3% | 4.9% | 10.3% | 12.5% |
| 6 | 66.7% | 82.9% | 79.5% | 85.0% |
| Age of School | | | | |
| < 10 | 33.3% | 21.1% | 18.9% | 33.3% |
| 10 - 25 | 33.3% | 31.6% | 37.8% | 46.2% |
| > 25 | 33.3% | 47.4% | 43.2% | 20.5% |
| Number of Students/Classroom, 1994 | | | | |
| Mean | 40.45 | 37.53 | 45.54 | 43.94 |
| (SD) | (16.80) | (15.35) | (22.71) | (17.98) |
| Percent of Classrooms built in past 5 years | | | | |
| Mean | 40.08 | 38.31 | 38.22 | 35.07 |
| (SD) | (43.69) | (33.50) | (33.27) | (34.27) |
| Electricity in the School | 25.0% | 19.5% | 17.9% | 25.0% |
| Piped water in the School | 50.0% | 80.5% | 76.9% | 77.5% |
| Latrine in the School | 91.7 | 87.8 | 89.7 | 90.0 |
| Kitchen in the School | 50.0 | 75.6 | 79.5 | 40.0 |
| In good condition | 33.3 | 61.0 | 53.8 | 50.0 |

Source: Schools Study

Cuadro 3.4

Características de los hogares del estudio de las escuelas según tipo de programa disponible en la comunidad

| | PROGRAMA | | | |
|-----------------------------------|----------|-------|------------------|--------------|
| | Merienda | Bono | Meriendas y Bono | Sin Programa |
| No. de Hogares | 192 | 656 | 624 | 640 |
| No. de miembros | | | | |
| Promedio | 8,5 | 7,6 | 7,8 | 7,9 |
| (DE) | (2,9) | (2,2) | (2,6) | (2,9) |
| Educación de la madre (años) | | | | |
| Promedio | 2,5 | 2,1 | 2,7 | 3,0 |
| (DE) | (2,8) | (2,3) | (2,7) | (3,3) |
| Madre trabaja fuera de casa | 31,9% | 32,5% | 54,7% | 50,9% |
| Hogar con electricidad | 22,7% | 15,4% | 16,5% | 25% |
| Hogar con piso de barro | 64,5% | 64,4% | 68,2% | 62,4% |
| Hogar con llave de agua | 53,4% | 76,9% | 61,9% | 81,5% |
| Distancia de la escuela (minutos) | | | | |
| Promedio | 18,2 | 18,9 | 18 | 18,9 |
| (DE) | (18) | (16) | (19) | (21) |

Fuente: Estudio de escuelas

Table 4.1
BMJF Bono Beneficiaries, by Year

| Year | Number of Beneficiaries (children) |
|------|---------------------------------------|
| 1990 | 61,193 |
| 1991 | 120,100 |
| 1992 | 127,347 |
| 1993 | 205,271 |
| 1994 | 190,244 |

CUADRO 4.2
Participación en Programas de Ayuda Alimentaria en las Escuelas
por tipo de programa disponible en la comunidad*

| | PROGRAMA | | | | TOTAL |
|---|---------------|---------------|-----------------|--------------|---------------|
| | Merienda | Bonos | Merienda y Bono | Sin Programa | |
| Número de niños | 942 | 444 | 1.094 | 774 | 3.254 |
| Porcentaje de niños en la comunidad que reciben Bonos BMJF | 0 (0) | 29,9% (46) | 21,7% (41) | 0 (0) | 11,4% (32) |
| Porcentaje de niños matriculados que reciben bonos BMJF | 0 (0) | 36,6% (47) | 25,2% (43) | 0 (0) | 13,1% (34) |
| Porcentaje de niños en la comunidad que asisten a una escuela que da merienda | 60,9% (49) | 0 (0) | 66,2% (47) | 0 (0) | 39,8% (49) |
| Porcentaje de niños matriculados que reciben merienda | 74,2% (44) | 0 (0) | 78,1% (41) | 0 (0) | 46,6% (50) |
| Bonos BMJF disponibles en la comunidad | 0 (0) | 100% (0) | 100% (0) | 0 (0) | 47,3% (50) |
| Merienda disponible en la comunidad | 100% (0) | 0 (0) | 100% (0) | 0 (0) | 62,6% (50) |

Fuente: Encuesta Nacional Socioeconómica

*El programa está disponible en la comunidad si al menos un niño recibe los beneficios del programa

BP

Table 4.3

Percent of All Enrolled Children Receiving Bono
By Grade and Repetition

| Grade | Percent | N. of Cases |
|---------------|---------|-------------|
| 1 | 10.2 | 521 |
| 2 | 15.4 | 547 |
| 3 | 14.0 | 461 |
| 4 | 10.7 | 363 |
| 5 | 9.8 | 317 |
| 6 | 3.9 | 206 |
| <hr/> | | |
| Non-repeaters | 10.5% | 2006 |
| Repeaters | 17.0% | 404 |
| <hr/> | | |
| All | 11.6 | 2414 |

Source: National Socioeconomic Survey

Table 4.4a

Participation in Food and Income Subsidy Programs
and Primary Schooling in Rural Honduras

| School-Level Characteristics | School Program Type | | |
|--|---------------------|---------------|------------------|
| | Bonos Only | Merienda Only | Bonos & Merienda |
| No. Schools | 12 | 41 | 39 |
| No. Years in Merienda Program | | | |
| Mean | - | 11.40 | 13.64 |
| Standard Deviation | - | 11.28 | 9.65 |
| No. Years in Bonos Program | | | |
| Mean | 3.13 | - | 3.23 |
| Standard Deviation | 1.27 | - | .90 |
| Pct. Enrolled Children Receiving Bonos, Last Distribution | | | |
| Mean | 53.71 | - | 67.15 |
| Standard Deviation | 25.85 | - | 28.03 |
| Bonos Subsidy/Yr. per Child in School (Lps) | | | |
| Mean | 63.88 | - | 101.61 |
| Standard Deviation | 47.73 | - | 68.82 |
| Bonos Subsidy per Child, Last Distr. (Lps) | | | |
| Mean | 75.29 | - | 64.07 |
| Standard Deviation | 47.45 | - | 25.33 |
| Bonos Subsidy per Family, Last Distr. (Lps) | | | |
| Mean | 114.43 | - | 107.70 |
| Standard Deviation | 62.36 | - | 49.07 |

Source: Schools Study

Notes: * Significant differences at 0.05 level (categorical variables only)
[1] Missing more than 10% of cases

Table 4.4b

Participation in Food and Income Subsidy Programs
and Primary Schooling in Rural Honduras

| Child-Level Characteristics | School Program Type | | |
|---|---------------------|---------------|------------------|
| | Bonos Only | Merienda Only | Bonos & Merienda |
| Grade 1 | | | |
| No. Households | 57 | 166 | 148 |
| Child Currently Participates in Merienda* | .0% | 100.0% | 100.0% |
| Family Currently Participates in Bonos* | 74.4% | 1.4% | 65.5% |
| No. Years Participation in Bonos [1] | | | |
| Mean | 1.04 | - | 2.14 |
| Standard Deviation | .56 | - | 1.36 |
| Grade 2 | | | |
| No. Households | 34 | 141 | 131 |
| Child Currently Participates in Merienda* | .0% | 100.0% | 100.0% |
| Family Currently Participates in Bonos* | 73.9% | 2.5% | 85.0% |
| No. Years Participation in Bonos [1] | | | |
| Mean | 1.30 | - | 2.08 |
| Standard Deviation | .51 | - | 1.12 |
| Grade 3 | | | |
| No. Households | 30 | 118 | 133 |
| Child Currently Participates in Merienda* | .0% | 100.0% | 94.8% |
| Family Currently Participates in Bonos* | 74.3% | 2.0% | 85.2% |
| No. Years Participation in Bonos [1] | | | |
| Mean | 1.42 | - | 2.28 |
| Standard Deviation | .59 | - | .95 |
| Grade 4 | | | |
| No. Households | 26 | 100 | 84 |
| Child Currently Participates in Merienda* | .0% | 100.0% | 93.4% |
| Family Currently Participates in Bonos* | 57.0% | 4.0% | 73.8% |

Notes: * Significant differences at 0.05 level (categorical variables only)
 [1] Missing more than 10% of cases.

Table 4.4b (continued)

Participation in Food and Income Subsidy Programs
and Primary Schooling in Rural Honduras

| Child-Level Characteristics | School Program Type | | |
|---|---------------------|---------------|------------------|
| | Bonos Only | Merienda Only | Bonos & Merienda |
| No. Years Participation in Bonos [1] | | | |
| Mean | 1.93 | - | 2.54 |
| Standard Deviation | .95 | - | 1.08 |
| Grade 5 | | | |
| No. Households | 26 | 71 | 70 |
| Child Currently Participates in Merienda* | .0% | 98.9% | 94.4% |
| Family Currently Participates in Bonos* | 60.1% | .0% | 66.4% |
| No. Years Participation in Bonos [1] | | | |
| Mean | 1.76 | - | 2.82 |
| Standard Deviation | .98 | - | 1.05 |
| Grade 6 | | | |
| No. Households | 19 | 59 | 58 |
| Child Currently Participates in Merienda* | .0% | 100.0% | 89.2% |
| Family Currently Participates in Bonos* | 26.6% | 2.7% | 62.0% |
| No. Years Participation in Bonos [1] | | | |
| Mean | 2.49 | - | 2.83 |
| Standard Deviation | 1.13 | - | 1.15 |
| ALL GRADES | | | |
| No. Households | 192 | 656 | 624 |
| Child Currently Participates in Merienda* | .0% | 99.9% | 96.4% |
| Family Currently Participates in Bonos* | 65.4% | 2.1% | 74.7% |
| No. Years Participation in Bonos [1] | | | |
| Mean | 1.41 | - | 2.33 |
| Standard Deviation | .79 | - | 1.16 |

Source: Schools Study

Notes: * Significant differences at 0.05 level (categorical variables only)
[1] Missing more than 10% of cases

Table 4.5

Attitudes and Opinions of Mothers Who Receive Bonos and Their Use of Bonos

| | Program | | | |
|-----------------------------------|----------------------|-------|----------------------|-------|
| | Bonos | | Bonos & Merienda | |
| | Number of Households | Col % | Number of Households | Col % |
| Who decides on the use of bonos? | | | | |
| Mother | 114 | 90% | 425 | 92% |
| Husband | 2 | 2% | 8 | 2% |
| Other family member | 10 | 8% | 27 | 6% |
| All | 126 | 100% | 460 | 100% |
| The last time she received bonos: | | | | |
| Changed them for cash | 78 | 62% | 279 | 61% |
| Bought directly with bonos | 46 | 37% | 170 | 37% |
| Changed part and bought with part | 2 | 2% | 11 | 2% |
| All | 126 | 100% | 460 | 100% |
| Where did she change bonos | | | | |
| In a bank | 70 | 88% | 249 | 86% |
| In a shop | 8 | 10% | 30 | 10% |
| With a private person | 1 | 1% | 8 | 3% |
| Other | 1 | 1% | 2 | 1% |
| All | 80 | 100% | 289 | 100% |
| Did they charge a commission? | | | | |
| Yes | 3 | 4% | 14 | 5% |
| No | 77 | 96% | 276 | 95% |
| All | 80 | 100% | 290 | 100% |
| She would prefer to receive? | | | | |
| Food | 23 | 18% | 50 | 11% |
| Bonos | 96 | 76% | 358 | 78% |
| No opinion | 7 | 6% | 51 | 11% |
| All | 126 | 100% | 459 | 100% |
| Reasons for preferring food | | | | |
| Prices are rising | 6 | 26% | 17 | 34% |
| She has more control | 5 | 22% | 6 | 12% |
| She doesn't need to go shopping | 11 | 48% | 11 | 22% |
| Better quality food | 0 | 0% | 6 | 12% |
| No one would take it away | 0 | 0% | 1 | 2% |
| Other | 1 | 4% | 9 | 18% |
| All | 23 | 100% | 50 | 100% |
| Reasons for preferring bonos | | | | |
| She can buy what she wants | 91 | 95% | 343 | 96% |
| She has more control | 5 | 5% | 8 | 2% |
| Other | 0 | 0% | 5 | 1% |
| No opinion | 0 | 0% | 2 | 1% |
| All | 96 | 100% | 358 | 100% |

Source: Schools Study

CUADRO 4.6

Características Escolares de Niños, Por Tipo de Programa Disponible en la Comunidad
Promedio y DE

| | PROGRAMA | | | | TOTAL |
|---|--------------|--------------|-----------------|--------------|--------------|
| | Merienda | Bono | Merienda y Bono | Sin Programa | |
| No. de niños | 942 | 444 | 1.094 | 774 | 2,880 |
| Porcentaje que se matriculó el año pasado | 87,8 (33) | 95,1 (22) | 92,5 (26) | 91,3 (28) | 91,2 (28) |
| De estos, porcentaje que completaron el año pasado* | 95,2 (21) | 97,4 (16) | 96,9 (17) | 94,5 (23) | 95,7 (20) |
| De los que completaron, porcentaje que pasaron el grado | 86,8 (34) | 85,6 (35) | 86,4 (34) | 84 (37) | 85,8 (35) |
| Porcentaje que se matriculó este año | 82,4 (38) | 88,9 (31) | 85,2 (36) | 89 (31) | 85,8 (35) |
| De estos, porcentaje que no repiten este año* | 87,4 (33) | 82,3 (38) | 82,9 (36) | 79,1 (41) | 83,4 (37) |
| Años Ganados | -,95 | -,84 | -1,03 | -1,03 | -,98 |
| Porcentaje de niñas | 46 | 46 | 49 | 51 | 48,4 |
| Edad de inicio en 1er grado | 6,18 | 6,19 | 6,24 | 6,34 | 6,24 |

Fuente: Encuesta Nacional

*Las diferencias tienen significación estadística al nivel de $p < .05$

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Table 4.7

Characteristics of Children by Program in Which They Participate

| | Program | | | |
|---|----------|--------|------------------|------------|
| | Merienda | Bonos | Bonos & Merienda | No Program |
| Number of Children | 1914 | 382 | 517 | 2095 |
| Proportion of Girls | | | | |
| Mean | 47 | 46 | 49 | 51 |
| SD | (50) | (56) | (50) | (50) |
| Proportion by Grades | | | | |
| 1 - 3 | 62% | 56.8% | 72.1% | 61.0% |
| 4 - 6 | 38% | 43.2% | 27.9% | 39.0% |
| Age at Drop-out | | | | |
| Mean | 11.6 | 10.0 | 11.8 | 10.9 |
| SD | (1.76) | (2.42) | (1.48) | (2.29) |
| Percent attributing drop-out to lack of resources | 16.7 | 3.4 | 13.4 | 7.0 |

Source: National Survey

Table 4.8

Participation in Food and Income Subsidy Programs
and Primary Schooling in Rural Honduras

| | No. Children | No. Years per Grade | |
|-----------------|-----------------|---------------------|-----------|
| | | Mean | Std. Dev. |
| Grade 1: | | | |
| Girls | 241 | - | - |
| Boys | 272 | - | - |
| Combined | 513 | - | - |
| Grade 2: | | | |
| Girls | 228 | 1.8 | 1.1 |
| Boys | 215 | 1.9 | 1.1 |
| Combined | 443 | 1.8 | 1.1 |
| Grade 3: | | | |
| Girls | 205 | 1.5 | .7 |
| Boys | 217 | 1.5 | .5 |
| Combined | 422 | 1.5 | .6 |
| Grade 4: | | | |
| Girls | 152 | 1.3 | .3 |
| Boys | 148 | 1.3 | .4 |
| Combined | 300 | 1.3 | .3 |
| Grade 5: | | | |
| Girls | 117 | 1.2 | .3 |
| Boys | 120 | 1.3 | .3 |
| Combined | 238 | 1.3 | .3 |
| Grade 6: | | | |
| Girls | 102 | 1.2 | .2 |
| Boys | 95 | 1.3 | .2 |
| Combined | 197 | 1.2 | .2 |

Source: Schools Study

Table 4.8 (continued)

Participation in Food and Income Subsidy Programs
and Primary Schooling in Rural Honduras

| | N | % Days Attended | | Pass rate per 100 | | Repeaters per 100 | | Dropouts per 100 | |
|----------|-----|-----------------|-----------|-------------------|-----------|-------------------|-----------|------------------|-----------|
| | | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| Grade 1: | | | | | | | | | |
| Girls | 132 | 95.01 | 3.45 | 83.18 | 12.48 | 18.76 | 15.94 | 5.55 | 7.73 |
| Boys | 132 | 94.54 | 4.10 | 76.83 | 20.34 | 22.59 | 20.78 | 3.90 | 6.59 |
| Combined | 264 | 94.78 | 3.79 | 80.03 | 17.11 | 20.66 | 18.56 | 4.73 | 7.22 |
| Grade 2: | | | | | | | | | |
| Girls | 132 | 95.13 | 3.22 | 87.06 | 15.56 | 12.88 | 13.74 | 1.78 | 6.69 |
| Boys | 132 | 94.83 | 3.85 | 84.10 | 14.43 | 14.13 | 17.48 | 2.05 | 7.31 |
| Combined | 264 | 94.98 | 3.54 | 85.58 | 15.05 | 13.51 | 15.70 | 1.92 | 7.00 |
| Grade 3: | | | | | | | | | |
| Girls | 132 | 95.65 | 2.75 | 90.13 | 15.23 | 7.33 | 10.47 | 1.74 | 6.40 |
| Boys | 132 | 95.01 | 3.71 | 86.05 | 14.13 | 10.66 | 13.73 | 2.99 | 7.92 |
| Combined | 264 | 95.33 | 3.27 | 88.10 | 14.81 | 8.99 | 12.29 | 2.36 | 7.21 |
| Grade 4: | | | | | | | | | |
| Girls | 132 | 95.75 | 3.03 | 91.26 | 17.86 | 4.73 | 12.80 | 2.17 | 7.78 |
| Boys | 132 | 94.85 | 4.65 | 92.50 | 16.62 | 4.07 | 8.66 | 4.86 | 15.90 |
| Combined | 264 | 95.30 | 3.94 | 91.88 | 17.22 | 4.39 | 10.89 | 3.53 | 12.59 |
| Grade 5: | | | | | | | | | |
| Girls | 132 | 95.92 | 2.92 | 92.32 | 17.34 | 3.39 | 7.20 | 1.66 | 5.38 |
| Boys | 132 | 95.39 | 2.94 | 93.92 | 13.77 | 1.38 | 3.92 | 3.44 | 11.35 |
| Combined | 264 | 95.65 | 2.94 | 93.14 | 15.61 | 2.37 | 5.84 | 2.56 | 8.96 |
| Grade 6: | | | | | | | | | |
| Girls | 122 | 96.60 | 2.91 | - | - | - | - | - | - |
| Boys | 132 | 96.35 | 3.73 | 98.71 | 7.70 | .24 | 1.48 | 1.94 | 8.00 |
| Combined | 254 | 96.47 | 3.34 | 98.71 | 7.70 | .24 | 1.48 | 1.94 | 8.00 |

Source: Schools Study

CUADRO 4.9

**Rendimiento académico (porcentaje) por grado y tipo de programa
Promedio y (Desviación Estandar)**

| | | PROGRAMA | | | | | Numero de casos |
|--------------------|---------------------------------|-----------------|-------------|------------------------|---------------------|--------------|------------------------|
| Grado | Componentes de los tests | Merienda | Bono | Bono y Merienda | Sin Programa | Todos | |
| 1 | Total | 78 (16) | 60 (16) | 77 (13) | 67 (23) | 74 (19) | 359 |
| | Español | 80 (21) | 59 (19) | 82 (19) | 74 (26) | 78 (23) | |
| | Matemáticas | 79 (22) | 54 (22) | 75 (20) | 68 (29) | 73 (25) | |
| 2 | Total | 63 (28) | 62 (26) | 51(21) | 56 (22) | 57 (24) | 448 |
| | Español | 66 (30) | 64 (27) | 53 (27) | 59 (28) | 60 (28) | |
| | Matemáticas | 63 (29) | 63 (30) | 50 (23) | 43 (22) | 52 (26) | |
| 3 | Total | 60 (19) | 56 (20) | 55 (19) | 56 (20) | 57 (19) | 290 |
| | Español | 66 (24) | 68 (32) | 69 (24) | 66 (25) | 67 (25) | |
| | Matemáticas | 53 (22) | 45 (20) | 46 (23) | 45 (25) | 48 (23) | |
| 4 | Total | 55 (20) | 49 (22) | 55 (15) | 55 (14) | 55 (17) | 317 |
| | Español | 61 (25) | 55 (24) | 58 (26) | 61 (21) | 60 (22) | |
| | Matemáticas | 40 (15) | 37 (16) | 39 (17) | 37 (16) | 38 (17) | |
| 5 | Total | 54 (15) | 55 (26) | 47 (13) | 55 (13) | 52 (15) | 248 |
| | Español | 52 (23) | 60 (29) | 52 (22) | 54 (21) | 53 (22) | |
| | Matemáticas | 47 (17) | 43 (23) | 42 (18) | 45 (18) | 44 (18) | |
| Todos Total | | | | | | 60 (21) | 1,662 |
| Español | | | | | | 64 (26) | |
| Matemáticas | | | | | | 52 (26) | |

Table 4.10

Ratio of Girls to Boys, by Grade and Program Type

| Grade | Bonos Only | Merienda Only | Both | Neither | |
|-------|----------------|---------------|----------------|----------------|---------------|
| 1 | .97 (.29) | | 1.12 (.60) | 1.01 (.51) | .94 (.36) |
| 2 | .90 (.36) | | 1.15 (.66) | 1.00 (.56) | 1.14 (.56) |
| 3 | 1.79 (1.58) | | 1.34 (1.29) | 1.08 (.59) | 1.21 (.69) |
| 4 | 1.54 (1.43) | | .97 (.58) | 1.12 (.67) | 1.24 (.88) |
| 5 | 1.43 (1.04) | | 1.09 (1.16) | 1.19 (.67) | 1.04 (.93) |
| 6 | 1.03 (.69) | | 1.35 (1.13) | 2.07 (2.15) | 1.26 (.83) |

Source: Schools Study

CUADRO 4.11

**Matrícula (porcentaje de niños 7-13) por edad y dominio
Promedio y (DE)**

| DOMINIO | EDAD | | | | | | | TODOS |
|------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|
| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | |
| Tegucigalpa | 93,3% (25) | 95,2% (22) | 95,6% (21) | 94,5% (23) | 92,3% (27) | 89,6% (31) | 76,2% (43) | |
| SPS y Ciudades medianas | 80,9% (40) | 95,3% (21) | 94,6% (23) | 98,7% (11) | 95,4% (21) | 86,4% (35) | 60,7% (49) | |
| Ciudades pequeñas | 76,6 (43) | 87,6 (33) | 92,1 (27) | 94 (24) | 90,6 (29) | 79,1 (41) | 60,7 (49) | |
| Rural Norte y resto del país | 78,4 (41) | 91,5 (28) | 92 (27) | 93,2 (25) | 91,3 (28) | 81,4 (39) | 63,5 (48) | |
| Rural Occidente | 73,1 (45) | 87,2 (34) | 91,2 (29) | 94,1 (24) | 88,3 (33) | 72,6 (45) | 48,7 (51) | |
| Rural Sur | 85,3 (36) | 91,5 (28) | 94,2 (24) | 92,8 (26) | 96 (20) | 78,8 (42) | 67,2 (48) | |
| Todo el país | 79,8 (40) | 91,4 (28) | 92,9 (26) | 94,3 (23) | 91,9 (27) | 81,3 (34) | 62,6 (48) | 85,8 (35) |
| Número de niños | 420 | 513 | 465 | 510 | 423 | 462 | 367 | 3.161 |

Fuente: Encuesta Nacional

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CUADRO 4.12

Porcentaje de niños que no repiten este año o grado, según el programa disponible en la comunidad.

PROGRAMA

| | Comunidad con merienda | Comunidad con Bonos | Comunidad con ambos programas | No. de niños |
|--------------|-------------------------------|----------------------------|--------------------------------------|---------------------|
| Grado | | | | |
| 1 | 60,4 (49) | 60,2 (49) | 60,4 (49) | 517 |
| 2 | 87,8 (33) | 84,3 (36) | 84,5 (36) | 546 |
| 3 | 91,9 (27) | 89,8 (30) | 89,7 (305) | 461 |
| 4 | 92,21 (27) | 89,8 (30) | 89,6 (31) | 368 |
| 5 | 96,3 (19) | 93,9 (24) | 97,7 (19) | 316 |
| 6 | 95,8 (20) | 93,3 (25) | 94,8 (22) | 206 |

Fuente: encuesta nacional

Table 4.13
**School Characteristics by Type of Program
 Available in the Community**
 (Percent of Children in a School with the
 Indicated Characteristic)

| | Merienda | Bonos | Merienda & Bonos | No Program |
|---|----------|---------|---------------------|---------------|
| School Gives Texts | | | | |
| Mean | 91.5% | 92.6% | 91.6% | 65.8% |
| Std. Dev. | (28%) | (26%) | (27%) | (47.5%) |
| Class hours per day | | | | |
| Mean | 4.98 | 5.00 | 4.95 | 5.22 |
| Std. Dev. | (.69) | (.52) | (.46) | (.71) |
| Attended Private School This Year | | | | |
| Mean | 0.6% | 2.6% | 0.2% | 3.3% |
| Std. Dev. | (0.7%) | (15.9%) | (4.6%) | (18.0%) |
| School is Within One Hour's Distance | | | | |
| Mean | 99.6% | 99.1% | 95.7% | 98.9% |
| Std. Dev. | (6.1%) | (9.2%) | (20%) | (11%) |

Source: National Socioeconomic Survey

Table 4.14

Average School Enrollment as a Percent of Enrollment
in the Year the Bono Started

| | Start of Bonos Participation | | | | | Mean Pct. |
|------------------------|------------------------------|------|------|------|------|-----------|
| | 89 | 90 | 91 | 92 | 93 | |
| Grades 1-3 | | | | | | |
| No. Schools (Weighted) | 1 | 22 | 15 | 10 | 2 | |
| 1989 | 100% | 99% | 107% | 74% | 87% | |
| 1990 | 107% | 100% | 98% | 83% | 61% | |
| 1991 | 99% | 117% | 100% | 88% | 42% | |
| 1992 | 102% | 125% | 104% | 100% | 47% | |
| 1993 | 91% | 132% | 104% | 105% | 100% | |
| 1994 | 88% | 136% | 106% | 115% | 95% | |
| Grades 4-6 | | | | | | |
| No. Schools (Weighted) | 1 | 22 | 14 | 9 | 2 | |
| 1989 | 100% | 86% | 104% | 79% | 67% | |
| 1990 | 90% | 100% | 103% | 73% | 117% | |
| 1991 | 90% | 123% | 100% | 89% | 250% | |
| 1992 | 117% | 131% | 107% | 100% | 50% | |
| 1993 | 117% | 142% | 129% | 113% | 100% | |
| 1994 | 159% | 238% | 133% | 152% | 33% | |

Source: Schools Study

Table 4.15

Enrollment in Higher Grades as a Proportion of Enrollment in Grade 1

| Características | Programa | | | |
|---|----------|----------|------------------|--------------|
| | Bonos | Merienda | Bonos & Merienda | Sin Programa |
| Number of Schools | 12 | 41 | 39 | 40 |
| Enrollment (Proportion of 1994 Enrollment in Grade 1) | | | | |
| 1994 Enrollment - Girls | | | | |
| Grade 1 | 1.00 | 1.00 | 1.00 | 1.00 |
| Grade 2 | .59 | 1.01 | .85 | .79 |
| Grade 3 | .57 | .84 | .79 | .66 |
| Grade 4 | .49 | .63 | .67 | .51 |
| Grade 5 | .44 | .50 | .50 | .39 |
| Grade 6 | .28 | .38 | .40 | .44 |
| 1994 Enrollment - Boys | | | | |
| Grade 1 | 1.00 | 1.00 | 1.00 | 1.00 |
| Grade 2 | .68 | 1.02 | 1.22 | .62 |
| Grade 3 | .35 | .73 | .76 | .50 |
| Grade 4 | .29 | .67 | .56 | .47 |
| Grade 5 | .35 | .52 | .42 | .37 |
| Grade 6 | .39 | .42 | .32 | .30 |

Source: School Study

CUADRO 5.1

Características de la comunidades según el tipo de programa disponible en la comunidad

| | PROGRAMA | | | | |
|--|----------|---------|------------------|--------------|---------|
| | Merienda | Bonos | Merienda y Bonos | Sin Programa | Todos |
| (Promedio) | | | | | |
| No, de Hogares | 942 | 444 | 1.094 | 774 | |
| Porcentaje rural * | 71,6 | 46,6 | 69 | 51,2 | 62,4 |
| Educación de la madre (años) | 2,7 | 2,4 | 2,2 | 2,7 | 2,5 |
| Educación del padre (años) | 2,7 | 2,9 | 2,2 | 3 | 2,6 |
| Pobreza en hogar | 79,9 | 77,6 | 84,2 | 71,8 | 79,2 |
| Gastos por persona (lps) promedio | 1.662 | 2.644 | 1.739 | 2.609 | 2.054 |
| (DE) Desviación estandard | (1,236) | (2,459) | (1,687) | (2,605) | (2,016) |
| Consumo de calorías/a-e promedio | 1,917 | 1,991 | 1,971 | 1,923 | 1,945 |
| (DE) | (775) | (730) | (787) | (710) | (758) |
| Adecuación calórica % | 70,7 | 76,5 | 73,6 | 73,2 | 73,1 |
| Consumo mayor de 80% de adecuación | 359 | 40,5 | 35,6 | 35,3 | 36,3 |
| Hogar con electricidad * | 45 | 61,9 | 39,8 | 46,1 | 45,8 |
| Hogar con piso de barro * | 52,5 | 46,4 | 60,5 | 52 | 54,4 |
| Hogar con llave de agua en la casa * | 4,9 | 16,1 | 6,9 | 14,8 | 9,5 |
| Hogar con llave de agua fuera de la casa * | 71,3 | 61,4 | 45,6 | 60,4 | 58,7 |
| Número de miembros Promedio | 7,64 | 7,35 | 7,44 | 7,28 | 7,45 |
| (DE) | (2,93) | (2,51) | (2,45) | (2,30) | (2,57) |
| Número de niños 7-13 Promedio | 2,54 | 2,28 | 2,50 | 2,39 | 2,46 |
| (DE) | (1,15) | (,95) | (1,04) | (1,05) | (1,07) |

Fuente: Encuesta Nacional Socioeconómica

* Las diferencias entre los grupos tienen significado a $p < .5$

CUADRO 5.2

Características de hogares que reciben beneficios según el tipo de programa que da los beneficios

| | PROGRAMA | | | |
|--|------------------|----------------|------------------------|---------------------|
| | Merienda | Bonos | Merienda y Bono | Sin Programa |
| No. de hogares | 613 | 105 | 154 | 742 |
| Porcentaje rural | 83,7 | 61,5 | 92,7 | 38,8 |
| Educación de la madre (años) años (DE) | 2,44 (2,2) | 2,27 (2,1) | 1,88 (1,9) | 2,98 (2,3) |
| Gastos por persona promedio (DE) | 1,688 (1,334) | 1,721 1,425 | 1,101 724 | 3,233 31,914 |
| Consumo de calorías promedio por a-e (DE) | 2,033 (815) | 1,943 (717) | 2,025 (708) | 1,973 (777) |
| Consumo de calorías promedio Mayor del 80% de adecuación (DE) | 31 | 28,9 | 26,9 | 30 |
| Proporción que gastan en alimentos más de 70% del presupuesto familiar | 49,1 | 43,1 | 62,3 | 35,2 |
| Hogar con electricidad | 41,6 | 47,8 | 10,3 | 61,4 |
| Hogar con agua de llave | 71,2 | 63,6 | 44,7 | 74,8 |
| Hogar con piso de barro | 54,2 | 65,1 | 70,7 | 37,1 |
| Número de miembros promedio (DE) | 6,88 (2,36) | 7,67 (2,70) | 7,42 (2,48) | 6,66 (2,33) |

Fuente: Encuesta Nacional

CUADRO 5.3

Porcentaje de niños que reciben beneficios de los programas, por región (dominio) y nivel de pobreza

| DOMINIO | Merienda | | | Bono | | |
|--|-----------------|---------------|-----------------|-----------------|--------------|-----------------|
| | Pobre | No Pobre | Todos | Pobre | No Pobre | Todos |
| Tegucigalpa porcentaje N. | 11,7 215 | 8,2 72 | 10,8 287 | 9,8 215 | 4,7 72 | 8,5 (287) |
| SPS y ciudades medianas porcentaje N. | 12,2 280 | 6,4 103 | 10,6 384 | 4,7 280 | 0,9 103 | 3,7 (384) |
| Ciudades pequeñas porcentaje N. | 16,9 313 | 25,6 49 | 18,1 363 | 6,7 313 | 7,6 49 | 6,8 (363) |
| Todo urbano porcentaje N. | 13,7 808 | 11,0 224 | 13,1 1,032 | 6,8 808 | 3,6 224 | 6,1 (1,032) |
| Rural y resto del país N. | 54,4 912 | 41,7 248 | 51,7 1,160 | 8,6 912 | 8,3 248 | 8,5 (1,160) |
| Rural Oeste porcentaje N. | 65,2 256 | 83,1 34 | 67,3 290 | 36,4 256 | 16,9 34 | 34,1 (290) |
| Rural Sur porcentaje N. | 67,0 148 | 64,9 49 | 66,5 197 | 27,0 148 | 15,3 49 | 24,1 (197) |
| Todo rural porcentaje N. | 57,6 1,316 | 49,4 331 | 56,0 1,647 | 16,1 1,316 | 10,2 331 | 14,9 (1,647) |
| TOTAL porcentaje N. | 41,2 (2,125) | 34,0 (555) | 39,7 (2,680) | 12,5 (2,125) | 7,6 (555) | 11,5 (2,680) |

Fuente: Encuesta Nacional

Table 6.1

Outcome variable: Years Ahead, All Children 7 - 13

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Merienda Only | .265 | .011 |
| Bono Only | .614 | .000 |
| Both | .241 | .022 |

[Overall regression F=33.84, p=.0000; Adjusted R²=.439]

Table 6.2

Program effects on "Years Ahead", All Children, Interacted with Age of Child

| <u>Program and Interaction</u> | <u>Coeff.</u> | <u>Significance</u> |
|------------------------------------|---------------|---------------------|
| Merienda only, age 10 - 13 | .381 | .001 |
| Meri. Only x age 7 - 9 | -.217 | .095 |
| Net effect on 7 - 9 year olds=+.17 | | |
| Bono only, age 10 - 13 | .821 | .000 |
| Bono only x age 7 - 9 | -.694 | .000 |
| Net effect on 7-9 year olds = +.13 | | |
| Both, age 10 - 13 | .238 | .047 |
| Both x age 7 - 9 | -.201 | .063 |
| Net effect on 7-9 year olds = +.04 | | |

[Overall regression F=.443, p=.0000; Adjusted R²=.443.]

Table 6.3
Program effects on Not Repeating Grade, Enrolled Children 7-13 yrs

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Merienda Only | .099 | .005 |
| Bono Only | .074 | .087 |
| Both | .078 | .026 |

[Overall regression F= 4.63, p=.0000; Adjusted R²=.090]

Table 6.4
Outcome Variable: Academic Achievement

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Bono Only | -4.713 | .313 |
| Merienda Only | -3.646 | .335 |
| Both | -5.577 | .174 |

[Overall Regression F=10.73, p=.000; Adjusted R²=.459]

Table 6.5

Outcome Variable: Academic Achievement,
With Programs and Program Intensity Variables

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|-------------------------|---------------|---------------------|
| Bono Only | -9.270 | .082 |
| Percent Receiving Bonos | .082 | .077 |
| Merienda Only | -3.813 | .743 |
| Merienda Days/Year | .003 | .970 |
| Both | -11.592 | .307 |

[Overall Regression F=10.30, p=.0000; R²=.46]

Table 6.6

Outcome Variable: Attendance Rate by Grade and Sex Category

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|----------------|---------------|---------------------|
| Bono Only | 6.224 | .003 |
| Merienda Only | -2.768 | .218 |
| Both | 3.379 | .075 |

[Overall Regression F=31.605, p=.000; Adjusted R²=.529]

Table 6.7

Outcome Variable: Attendance Rate by Grade and Sex Category

| <u>Program</u> | <u>Coeff.</u> | <u>Significance</u> |
|------------------------|---------------|---------------------|
| Bono Only | 7.583 | .004 |
| Merienda Only | 2.281 | .670 |
| Both | 7.675 | .056 |
| Percent receiving bono | -.017 | .406 |
| Merienda days/year | -.037 | .296 |

[Overall Regression F=30.137, p=.000; Adjusted R²=.529]

Table 7.1

Percent of Children Who Ate Meals Before and After School

| | Program Type | | | |
|--------------------------------|--------------|----------|-------|-----------------------|
| | Bono | Merienda | Both | Neither |
| Ate yesterday before School | 96.4% | 97.3% | 98.2% | 96.9% |
| Ate yesterday after School | 99.0% | 98.0% | 98.2% | 96.7% |
| ----- | | | | Source: Schools Study |

Source: Schools Study

Table 7.2

Effects of School Food and Bono Programs on
 Dietary Adequacy of Children Over 5 in Households
 with Children who Receive the Benefit
 (Percent of Adequacy per Adult-Equivalent)

| Family Receives | Calories | | Protein | | Vitamin A | |
|--------------------|---|-------|---|-------|---|-------|
| | Coeff. | p (t) | Coeff. | p (t) | Coeff. | p (t) |
| Merienda | 7.42 | .094 | 11.19 | .065 | 25.12 | .0001 |
| Bonos BMJF | .23 | .959 | -2.27 | .709 | 8.85 | .157 |
| | R ² Adj=.109 F=1.9, p=.0004 | | R ₂ Adj=.160 F=2.5, p=.0000 | | R ² Adj=.478 F=8.1, p=.0000 | |

Source: Study of Health Centers

Table 8.1

Summary of Program Effects on Schooling Outcomes

| Program | Years Ahead ^a | Non-Repetition ^a | Academic Achievement ^b | Attendance ^b |
|-------------------|--------------------------|-----------------------------|-----------------------------------|-------------------------|
| Merienda Only | .265** | .099*** | -4.7 ns | -2.77 ns |
| Bono Only | .614*** | .074+ | -3.6 ns | 6.22 ** |
| Merienda and Bono | .241* | .078* | -5.6 ns | 3.38 + |

+ p < .1

* p < .05

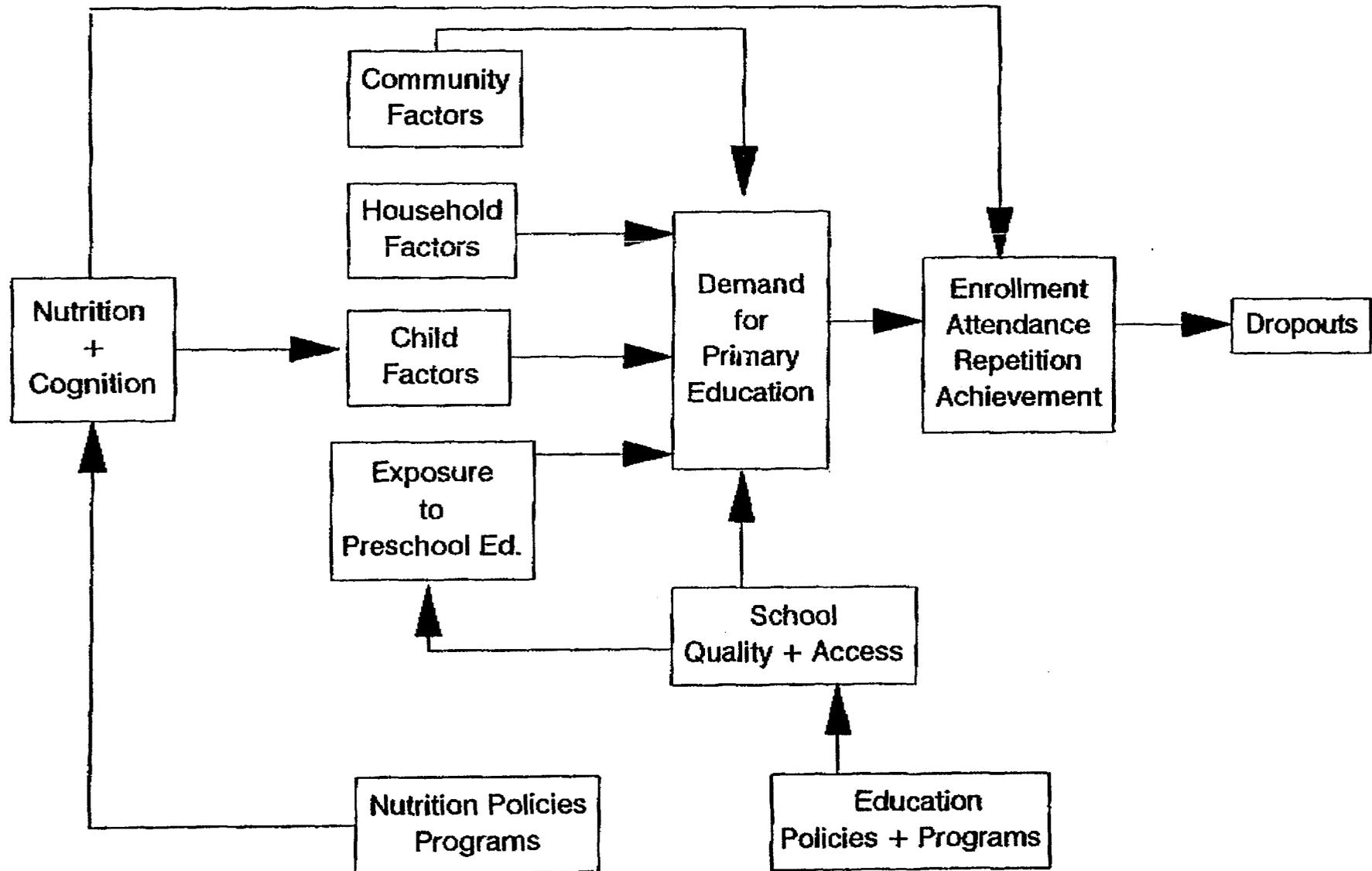
** p < .01

*** p < .001

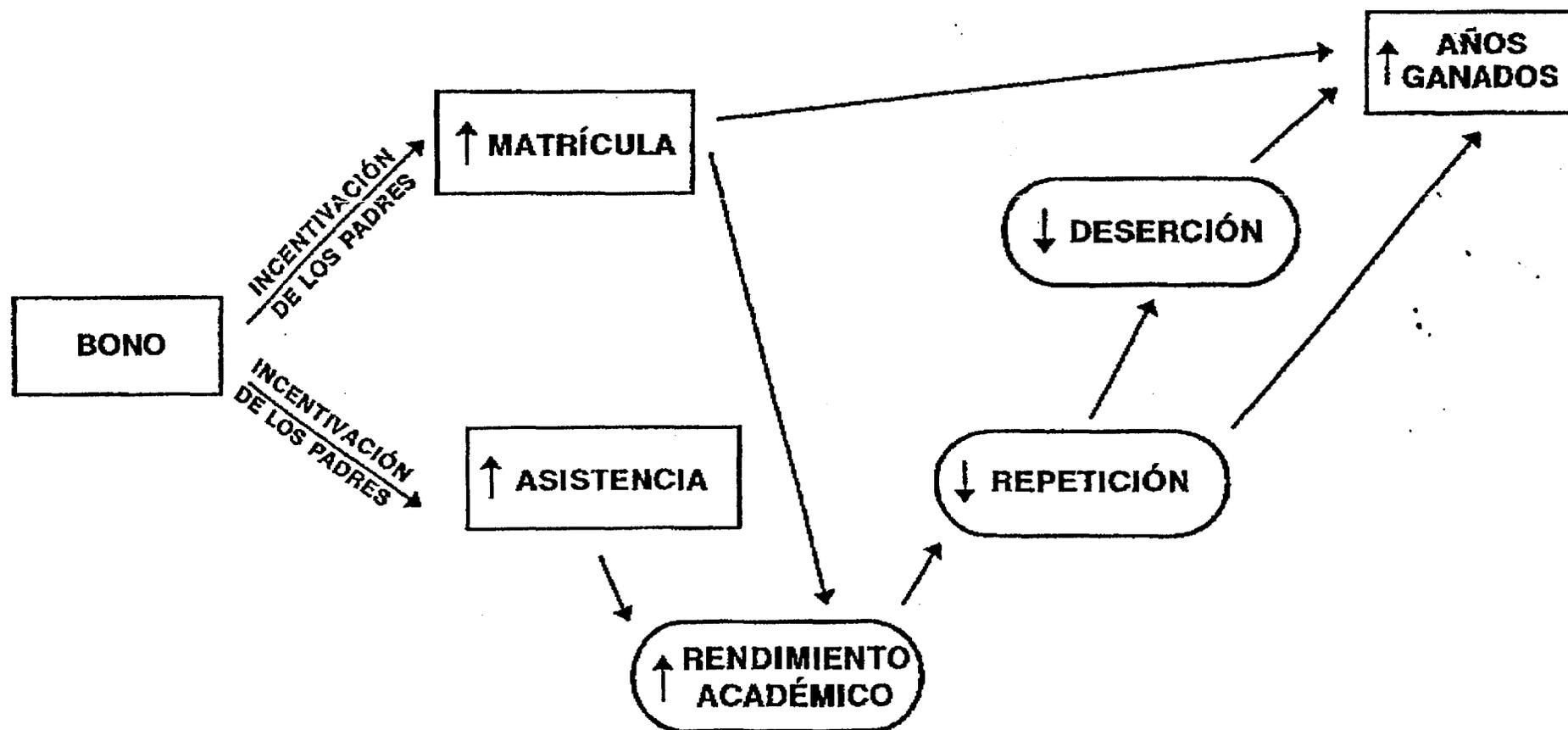
a. Source: National Household Survey

b. Source: Schools Study

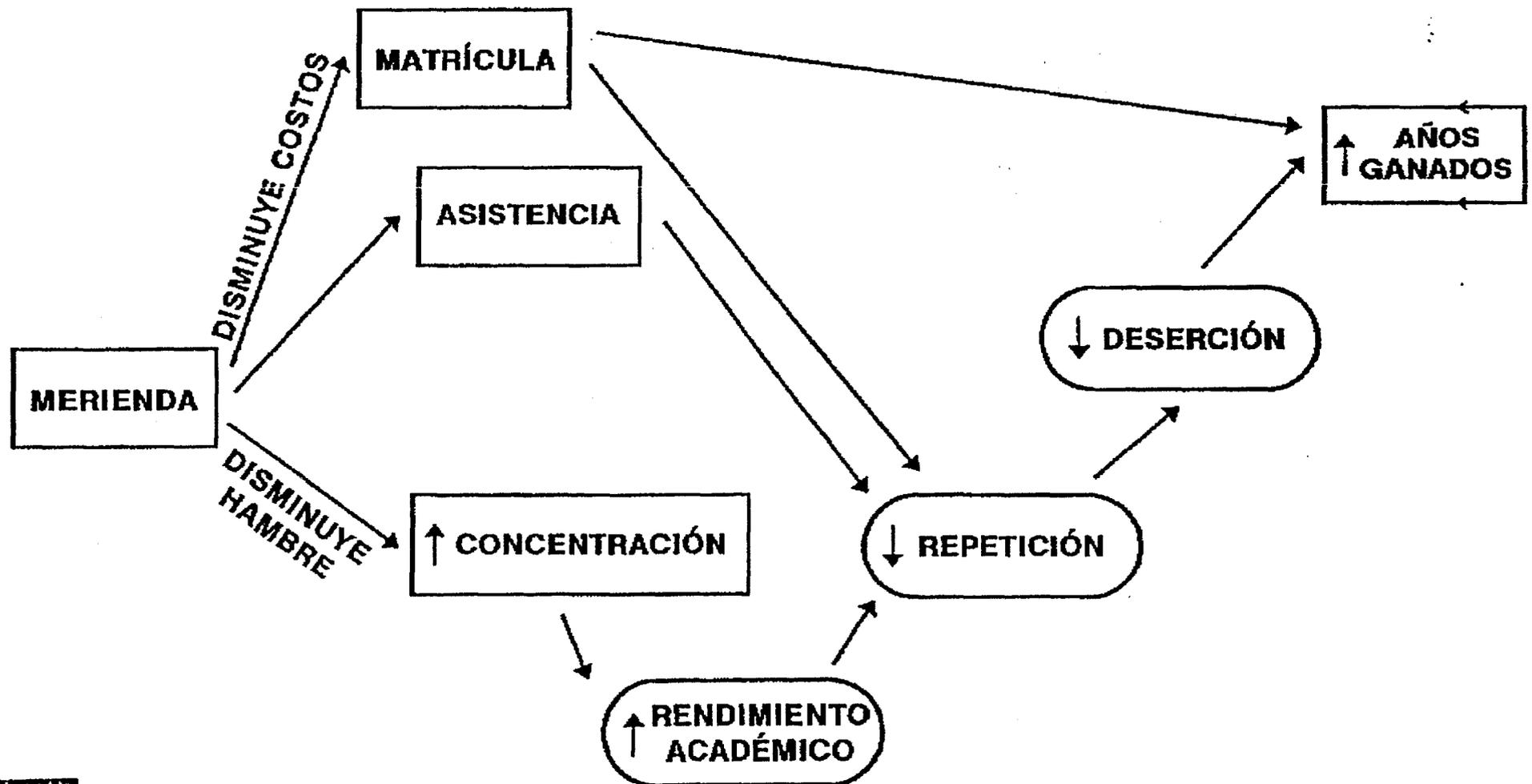
Conceptual Framework (School Study)



Esquema de los Efectos del Programa de Merienda Escolar

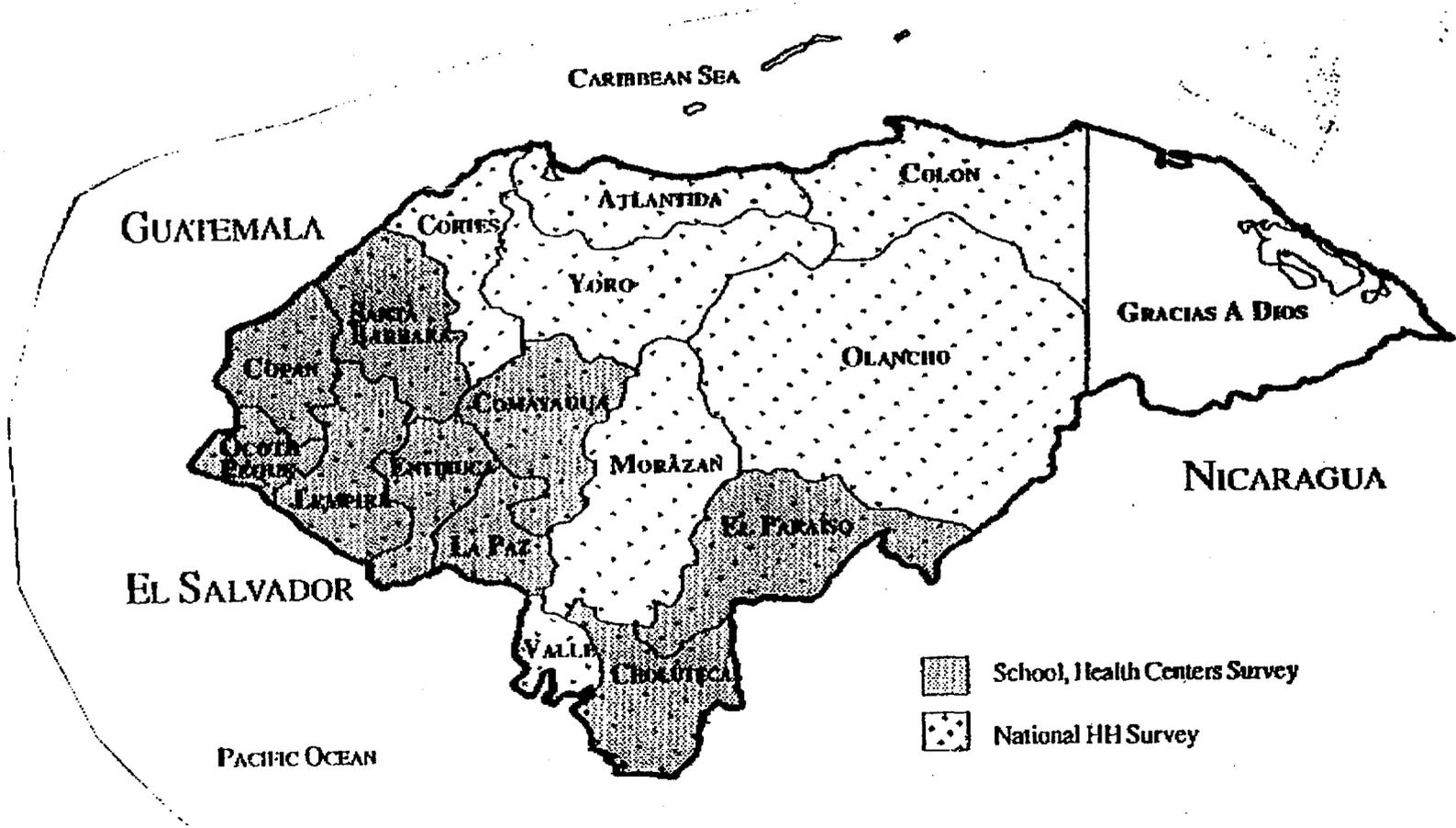


Esquema de los Efectos del Programa de Merienda Escolar



Honduras Bonos and Food Programs

Study Area



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ANNEX E

E.1 MODELS FOR ESTIMATING PROGRAM IMPACT: NATIONAL HOUSEHOLD SURVEY

The effect of each program on each outcome variable was estimated using OLS regression. All the analysis using the National Socioeconomic Survey was performed using the individual child as the unit of analysis. The estimating equation was of the general form:

$$\text{OUTCOME} = a + B_1 \text{ PROG} + B_2 \text{ CHILD} + B_3 \text{ HOUSEHOLD} + B_4 \text{ COMMUNITY} + e$$

Where,

PROG are the variables representing program exposure. These are:

Bono Only = at least one child in the community receives school bonos

Merienda Only = at least one child in the community receives merienda

Both = at least one child in the community receives bono and at least one child receives merienda

Pct Bono = Proportion of enrolled children receiving school bonos.

Indiv Bono = a dummy variable with a value of 1 if the child receives the bono, 0 otherwise.

Bono Only and Both represent the availability of the bono program in the community. Pct Bono represents the intensity of the program, assuming that the higher the proportion of enrolled children actually receiving benefits, the greater the visibility of the program in the community, and the greater the incentive effect it might have in attracting children to school. No comparable variable is computed for the merienda program because, in school where the merienda is offered, virtually all enrolled children participate in the program; there is no within-school targeting.

Individual receipt of program benefits (merienda or school bonos) is not included in the models estimated on all children, enrolled or not. This is because only enrolled children can be recipients of these benefits, so that program participation would be highly correlated by definition with the outcome variables. For analyses on enrolled children only (eg., of

repetition), individual participation is included instead of Pct Bono as a variable representing program exposure.

CHILD are characteristics of the individual child. Those included in the model were:

Age = age in completed years
Sex = 1 if child is a girl, 0 otherwise
Mother's Grade = highest grade completed by child's mother
Father's Grade = highest grade completed by child's father

HOUSEHOLD are characteristics of the child's household. Those included in the model were:

AgeHHH = age of household head in years
Agric = 1 if household derives most of its income from agricultural activities, 0 otherwise
Expend = annual household expenditures per adult-equivalent member of the household (that is, expenditures per person adjusted for age and sex), a measure of economic status
Cals = average daily calorie consumption per adult-equivalent household member
Mudfloor = 1 if house has a mud floor, 0 otherwise
Elec = 1 if house has electricity, 0 otherwise
Water1 = 1 if house has piped water inside the house
Water2 = 1 if house has piped water accessible outside the house
Latrine = 1 if household has a latrine
Toilet = 1 if household has a toilet
Rooms = number of rooms in house
HHSize = number of members currently living in the household
Child = number of school-aged (7 - 13) children
Chentr = number of children enrolled in school this year

COMMUNITY are characteristics of the community in which the child lives. Included in the model were:

Class hours = average number of hours per day of class reported by enrolled children in the community
Texts = percent of households reporting that enrolled children receive textbooks from the school
PHC1HR = percent of household living within one hour of a health center
PSCL1HR = percent of households living within one hour of a school
PEnrolled = percent of age-eligible children in the

community currently enrolled in school
 PPvtschl = percent of households with children in private school
 PMudflr = percent of households with mud floor
 PElec = percent of households with electricity
 PWater1 = percent of households with piped water in house
 PWater2 = percent of households with piped water accessible outside the house
 PLatrine = percent of households with a latrine
 PToilet = percent of households with toilet
 PPov = percent of households below the poverty line
 PWABM2 = percent of households with children of low weight for age (below -2 SD)
 PCals = percent of households with inadequate calorie consumption
 Rural = 1 if the community is rural, 0 otherwise
 Dominio: a set of dummy variables for the geographic areas (domains) represented in the sample. These are:
 Domin1 = 1 if community is in Tegucigalpa
 Domin2 = 1 if community is in San Pedro Sula or other medium-sized city
 Domin3 = 1 if community is in a small city
 Domin4 = 1 if community is in the rural north or rural rest of the country
 Domin5 = 1 if community is in the rural west.
 If all the Dominio dummy variables are equal to zero, the community is in the rural south.

We then estimated a series of equations testing interaction effects, to see if the merienda or bono programs had differential effects based on age, sex, poverty status, or urban/rural location of the child. In each of these models, we added three terms representing the possible interactions of each program type (merienda only, bono only, and both) with one of the following dummy variables.

Age 7-9 = 1 if the child is between 7 and 9 years old (inclusive); 0 otherwise

Girl = 1 if the cdrahild is a girl; 0 if the child is a boy

Pov = 1 if the child is below the poverty line based on the household's reported annual income per adult-equivalent, 0 otherwise

Rural = 1 if the child lives in a rural area; 0 otherwise

E2. MODELS FOR ESTIMATING PROGRAM IMPACT: SCHOOLS STUDY

The regression models used to assess program effects in the Schools Study used average scores by grade within each school rather than individual scores as the outcome variable. Attendance varied by sex of the child, so the outcome variable in this case was the average score for the grade/sex group within the school. The model was of the following form.

$$\text{OUTCOME} = a + B_1 \text{ PROG} + B_2 \text{ SCHOOL} + B_3 \text{ COMMUNITY} + B_4 \text{ GROUP} + e$$

Where

OUTCOME is the average outcome for the grade or grade/sex group

PROG are the variables indicating the program type in the sample school. These are dummy variables for

Bono = only bonos given
Merienda = only merienda given
Both = bonos and merienda given

and two variables representing program intensity

Pctbono = percent of enrolled students receiving the bono
Merienda days = number of days in 1993 that merienda was served

SCHOOL are school characteristics. Included in the model were:

Enrollment = number of students enrolled
Pctgirls = percent of enrolled students who are girls
Days = class days per week
S10yrs = 1 if school is over ten years old
S25yrs = 1 if school is over 25 years old
SWater = 1 if school has piped water
S5grades = 1 if school has 5 or 6 grades
Class size = number of students per classroom
Teachers = number of teachers per grade
TAttend = Percent of teachers present on day of revisit
Training = percent of teachers with professional training
Teacher Dist = percent of teachers living within 30 minutes of school

COMMUNITY are community characteristics, as follows.

Mud Walls = percent of households with mud walled houses
Mud floor = percent of households with mud floor
Elec = percent of households with electricity

Latrine = percent of households with latrine
Toilet = percent of households with toilet
Possess = average index of possessions owned
Radio = percent of households owning a radio
Water1 = percent of households with piped water inside
the house
Water2 = percent of households with piped water
accessible outside the house
Preschool = 1 if preschool is available
School/1000 = schools in community per 1000 population
Malnut = percent of malnourished children in community
Agric = percent of households primarily engaged in
agriculture
Female Head = percent of households with female head
Mother Works = percent of mothers working outside the
home
Mothers Educ = average education of mothers in years
Schl Dist = average walking distance to school, minutes

GROUP are the characteristics of the group whose outcome is
being measured. The two are

Grade

Sex = 1 if female