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**POVERTY, INEQUALITY, AND >SPILL-OVER= IN MEXICO'S
EDUCATION, HEALTH, AND NUTRITION PROGRAM**

by

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EXECUTIVE SUMMARY

This report provides an evaluation of the community level effects of PROGRESA using household level data from various rounds of PROGRESA's evaluation sample (the ENCEL surveys). These surveys, along with ENCASEH 1997, provide a valuable source of information on household and community level characteristics before and after the implementation of the program.

Other reports in the evaluation series have focused on the direct effects of PROGRESA, using the control and treatment groups in the ENCELS. The objective of this report is slightly different, in that it explores the possible spill-over effects of the program on the wider community. Hence instead of focusing on program effects at the individual level, we focus on aggregate community level indicators of well-being such as poverty, inequality, and school and health care attendance rates, in order to assess the impact of PROGRESA at this level.

Using the data sets mentioned above, we develop five indicators with which to measure the potential impact of PROGRESA at the community level. These indicators are: 1) changes in rates of relative poverty, 2) changes in inequality, 3) school continuation rates, 4) changes in nutrition surveillance rates, 5) changes in prices (inflation). Exploiting the longitudinal aspect of the evaluation data, we construct >difference in differences=estimators and use regression techniques to isolate community level program effects. The main results from this analysis are as follows.

Poverty: Although relative poverty increased in the evaluation sample between March and October, this increase was significantly less in PROGRESA communities relative to control ones. For the relative poverty line set at the 25th centile of consumption in March, the difference in changes in poverty rates was 4 percentage points between treatment and control localities. The same result is found for higher order poverty measures (poverty gap and squared poverty gap). In all cases, the increase in poverty was significantly less in PROGRESA communities relative to non-PROGRESA localities.

Inequality: The two inequality indicators used in the evaluation were the coefficient of variation and the standard deviation of the log of consumption. For both measures, there was a decline in inequality in the survey between March and October, and for both indicators, the decline was greater in PROGRESA localities relative to controls. The results are even stronger when the richest 1% of households are excluded from the sample.

School Continuation: School continuation rates between the school years 1997-98 and 1998-99 were constructed for 5 different age groups, and by sex and beneficiary category. Significant >spill-over= effects appear to exist among children aged 11-12, especially girls. That is, non-beneficiary children in this age group, living in PROGRESA communities, have significantly higher continuation rates than non-beneficiary children in non-PROGRESA communities. This >spill-over= effect is especially strong for girls, where continuation rates are almost 10 percentage points higher for non-eligible girls in PROGRESA communities relative to non-eligible girls in non-PROGRESA localities.

Nutrition Surveillance Rates: Community level nutrition surveillance rates were constructed for pre-school children by beneficiary status. These data indicate important spill over effects in terms of the health care behavior of non-beneficiary households. Estimates of mean changes in nutrition surveillance rates for pre-school children show that 6 months after the program, there was no difference in mean changes in surveillance rates among non-program children in treatment and control localities. However, one year after program inception (in May 1999), the increase in mean rates of surveillance was nearly 7 percentage points higher among non-beneficiary children in PROGRESA localities, compared to this same group in treatment localities. These results indicate not only the strong presence of possible spill over effects of PROGRESA, but also that these effects take some time to manifest themselves.

Inflation: To assess whether PROGRESA is having an inflationary impact in the locality, we compare prices of 10 commodities from the ENCASEH and ENCEL98O, and 33 products from the ENCEL98M and ENCEL98O surveys. There was only one significant price increase found between ENCASEH and ENCEL98O (jitomate), and this occurred in both treatment and control localities. Seven significant price increases were found in PROGRESA localities between the March and October ENCEL surveys, but 5 of these increases were also found in control localities. Multivariate analysis of difference in differences in prices also indicated no program related inflationary pressure. On the contrary, between March and October 1998, there is evidence that mean increases in prices were actually *higher* in *control* localities relative to treatment, even after controlling for possible intervening factors such as availability of a Diconsa store, drought, and insect diseases.

POVERTY, INEQUALITY, AND SPILL-OVER IN MEXICO'S FOOD, HEALTH, AND NUTRITION PROGRAM

Sudhanshu Handa, Raul Perez, and Beatriz Straffon

This report provides an evaluation of the community level effects of PROGRESA using data from various rounds of the household surveys of the evaluation sample (the ENCEL surveys). The evaluation sample is derived strictly from households in the second phase of incorporation into PROGRESA. There are four rounds of the evaluation survey, which are essentially a census of the (approximately) 24,000 households in the 506 localities in the evaluation sample. In addition to the evaluation surveys, we also use the ENCASEH 1997, which is the census of all households living in localities considered to be eligible for PROGRESA benefits in the second round of incorporation. This survey provides a valuable source of information on household and community level characteristics before the implementation of the program.

Other reports in the evaluation series have focused on the direct effects of PROGRESA, using the control and treatment groups in the ENCEL surveys. The objective of this report is slightly different in that it explores the possible spill-over effects of the program on the wider community. Hence instead of focusing on program effects at the individual level, we focus on aggregate community level indicators of well-being such poverty, inequality, and school and health care attendance rates, in order to assess the impact of PROGRESA at this level.

1. INDICATORS

Based on the information available in the household surveys mentioned above, we construct a variety of indicators *at the community level* and use these to assess the potential impact of PROGRESA at the level of the community.

Poverty

Although PROGRESA's objective is to reduce poverty in the long term by providing incentives for households to invest in human capital, the program provides substantial cash benefits for both education and food that can be expected to have an important short term impact on household welfare. Using per adult equivalent household consumption expenditure as our indicator of well-being, we measure the change in welfare in localities receiving PROGRESA benefits relative to otherwise identical localities who are not receiving benefits (control localities). We use a number of measures of relative well-being, borrowed from the literature on poverty, to perform this comparison.

We construct two relative poverty lines based on household per adult equivalent consumption expenditures from the March 1998 ENCEL, which is when households were just beginning to receive PROGRESA

benefits. The lower poverty line is set at 36 pesos per adult equivalent per month, which corresponds to the 10th centile of the distribution of consumption expenditures in March 1998 for the entire sample of households. The upper poverty line is set at 91 pesos, which corresponds to the 25th centile of the distribution of consumption expenditures. For each locality, we estimate the proportion of households whose consumption falls below each of these two lines in March (P_M) and in October (P_O).¹ We construct the change (or first difference) in relative poverty as $P_O - P_M = D_1$ for each of the 506 localities in the ENCEL survey. We then compare the average change in poverty between PROGRESA (D_1^P) and control (D_1^C) localities (this is the >double difference= or >difference in differences= estimator common in the program evaluation literature) to see if significant differences exist in changes in poverty between the two groups of communities. Note from the definition of D_1 that negative values indicate reductions in poverty over time.

The indicators described above are equivalent to the >head count= measure of relative poverty, since they simply count the number of households below the relative poverty lines. For the upper poverty line, we also calculate the poverty gap and squared poverty gap to see whether PROGRESA has had an impact on the depth and severity of poverty in the locality.²

Crucial to the validity of this poverty analysis is a consistent measure of consumption expenditures from the two ENCEL surveys. Aggregate real consumption per adult equivalent dropped dramatically between March and October (the reduction in median consumption was 20%). A detailed analysis of this change shows that the large decline was primarily due to lower reported consumption by households in the richest deciles of the consumption distribution. For example, 91% of the households in the *poorest* decile in March actually reported an increase in real consumption in October, while only 8% of households in the *richest* decile in March reported an improvement in consumption in October. In general, the percent of households reporting an improvement in per adult equivalent consumption increases as we move to the lower (or poorer) deciles of the distribution of consumption.

There are two potential reasons for the direction and nature of this change in consumption between March and October. The large decline in reported consumption by the richest households maybe an attempt by these households to gain admission into PROGRESA, while the increase in consumption among poorer households may be directly due to these households receiving cash transfers from PROGRESA. Furthermore, the October expenditure questionnaire was more detailed, and asked households to recall their expenditure on individual items instead of on broad groups of commodities (such as meats, fruits and vegetables, etc.) as was done in the March survey. This questionnaire design is better able to capture smaller purchases, and may have resulted in a more complete coverage of expenditures made by poorer households.

The >double difference= estimator we use to measure the impact of PROGRESA on relative poverty focuses on differences between control and treatment localities. A key issue regarding the consumption data is whether the dramatic changes in consumption observed between the two surveys are the same for

¹ Consumption expenditures from the October survey are deflated to March 1998 in order to use the 36 and 91 peso cut-off points established in March.

² See Skoufias, Davis, and Behrman (1999) for a discussion of these different poverty indicators.

treatment and control localities. If they are, then in principle the double differencing should eliminate any systematic measurement error since this error is the same for all localities. Figures 1 and 2 show the change in real consumption between the two surveys by decile for control and treatment households.³ Figure 1, which graphs the mean change in consumption in pesos, shows that consumption increased (on average) in poorer deciles and declined in richer deciles. More importantly, Figure 1 also shows that this pattern in consumption change is consistent for control and treatment localities. Figure 2, which graphs the percentage of households in each decile whose consumption either increased or stayed the same, shows the same main result. Virtually no households in the poorest deciles had a decline in real consumption, while over 90% of households in the richest decile (decile 10) had a decline in consumption, and this pattern is the same for treatment and control localities. This consistency between control and treatment groups is important for the validity of the >double difference= estimator employed below.

Inequality

Since PROGRESA provides cash transfers to the poorest households in the locality, we would expect this injection to reduce income (or consumption) inequality in these localities, relative to control localities. This hypothesis is tested by constructing two common inequality indicators for each locality for each point in time (ENCEL98M and ENCEL98O), and then calculating the change in inequality for each locality. We then compare these changes between control and treatment communities, using the >difference in differences= method described above.

The two inequality measures used are the coefficient of variation of monthly adult equivalent consumption (defined as the standard deviation divided by the mean), and the standard deviation of the log of monthly adult equivalent consumption. Both indicators are multiplied by 100 so the calculated differences over time are *percentage point* differences. As in the poverty analysis, the differences are defined as (October-March), so a *negative* value is a *reduction* in inequality.

School Continuation Rates (>Permanencia=)

PROGRESA provides cash benefits to households that enrol their children in school and maintain an 85% attendance record. These benefits start at grade 3 of primary school and continue up to the end of secondary school. Since drop out rates begin to increase around age 11 (near the end of primary school), the value of PROGRESA benefits increases steadily from grade 3, with a large jump (from \$135 to \$200 Pesos) between the final year of primary school to the first year of secondary school. Have these monetary incentives had a positive impact in maintaining children in school? In particular, have there been any >spill-over= effects of the program in PROGRESA communities? We test this >spill-over= hypothesis by comparing school continuation rates of non-beneficiary households in PROGRESA and non-PROGRESA localities. If significant spill-over effects exist, we should find greater continuation rates for non-beneficiary households in PROGRESA localities relative to non-PROGRESA or control localities.

³ Deciles are based on consumption in March.

The ENCASEH 1997 and ENCEL980 surveyed children in successive school years. We measure continuation rates by matching children in the two samples and comparing their school enrolment status in each year. Children are indicated as >continuing= if they were enrolled in 1997 *and* in 1998, *or*, if they were *not* enrolled in 1997 but then enrolled in 1998. Using this definition, we calculate continuation rates for each locality for children of different age groups, sex, and beneficiary status. We expect to find significantly greater continuation rates among beneficiary (poor) children in treatment localities relative to control. However, we are especially interested in comparing continuation rates among *non-beneficiaries* in control and treatment localities. Higher continuation rates among this group of children in PROGRESA localities would be consistent with the positive >spill-over=effect hypothesis. We construct community level school continuation rates for 5 age groups (10-11, 11-12, 12-13, 13-14, 14-15), by sex, and by eligibility status (poor and non-poor), and perform comparison tests for differences in means between control and treatment localities.

Spill-over in Nutrition Surveillance Rates

The PROGRESA cash supplement is linked to regular nutritional check-ups (weighing and measuring of children under 5 years old) by beneficiary families with small children. Given the almost full participation of families in PROGRESA, we expect that visits to the health clinic would have risen for beneficiary households. However, our interest is in the community effects of this aspect of the program, and in particular, the potential spill-over effects on other households created by the additional health care attention sought by beneficiary households.

We therefore investigate whether there is a significant change (increase) in visits for nutritional surveillance on the part of children living in non-beneficiary households in treatment localities, relative to these same children living in control localities. In the absence of positive spill-over effects, there should be no significant change in the behaviour of non-beneficiary children living in PROGRESA localities relative to these same children in control localities. However, if there are positive spill-over effects, we should see a significant increase in health center visits among these children, relative to non-beneficiary children in control localities.

To test the spill-over hypothesis, we follow the same methodology as before, and construct community level average clinic attendance rates for poor and non-poor children, and then test for difference in differences using regression techniques. We test two sets of differences. The first is changes in mean rates for health visits between March 1998 (round 1, or baseline) and October 1998 (round 2), and the second is changes between the baseline and May 1999 (round 3), using the ENCEL surveys. We do not use November 1999 (fourth) round of the ENCEL survey because it only covered health visits for children 2 years old and under, while the previous rounds covered children 5 years old and under.

Prices

The total accumulated cash injection into poor rural communities due to PROGRESA is quite substantial. For example, a preliminary estimate of the value of cash transfers to households in the evaluation sample (second wave of incorporation) between March and September indicates an average of \$11,200 pesos in total transfers per beneficiary community. Converting this to monthly per adult equivalent terms gives

approximately \$52 pesos, compared to mean monthly consumption per adult equivalent of \$164 pesos in PROGRESA localities, implying that the value of the PROGRESA injection over this 6 month period is roughly equal to 30% of mean consumption.

Given this sudden large injection of money into PROGRESA localities, an obvious question is whether or not these transfers are causing inflationary pressure in PROGRESA localities. Using price information from the community modules of the ENCASEH, ENCEL98M, and ENCEL98O, we compare price changes between control and treatment localities to see if there has been a significant increase in prices in treatment localities compared to control ones. The ENCASEH and ENCEL98O price questionnaires contain only 10 products in common, so our analysis of these data sets is based on these ten commodities only. The two ENCEL surveys contain 33 common commodities whose prices we compare. In addition, not all localities report a price for all commodities in each survey (i.e., there are missing values), hence our analysis of price changes is limited to localities that reported a price for the same commodity in both of the relevant surveys.

2. EMPIRICAL METHODOLOGY

For each of the indicators described above, we estimate OLS regression equations over the 506 localities in the evaluation sample, and include a dummy variable indicating treatment localities. The coefficient on this dummy variable is the focus of our attention, as it measures the (mean) difference between treatment and control communities, while the t -statistic on this coefficient indicates whether this (mean) difference is statistically different from 0.

For the poverty and inequality measures, it is also interesting to directly estimate the impact of a peso's worth of PROGRESA benefits on poverty and inequality. Using data on transfers received between March and September (aggregated to the community level), we also provide some quantitative estimates of the impact of these transfers (measured in pesos) on the poverty and inequality indicators described above.

The regression equations we estimate include a series of variables that control for possible differences (other than whether or not a community receives PROGRESA benefits) among localities, which may also influence changes in poverty, inequality, and educational outcomes. These variables are:

- 1) median consumption per adult equivalent of the locality
- 2) the proportion of indigenous families living in the locality
- 3) the proportion of the locality classified as poor by PROGRESA
- 4) distance (in kilometers) to the municipal capital
- 5) the occurrence of natural disasters in the locality

Information collected from the ENCEL98O community questionnaire show that 80% of localities suffered at least one natural disaster in the period between March and October 1998, and nearly half suffered 2 or more disasters. The most important (or frequent) natural disasters reported were drought (sequias) and crop diseases (plagas). We experimented with various ways of capturing the effect of natural disasters on

poverty and inequality, and settle with two indicators, one for whether the community suffered from crop disease and the other indicating drought, as these two had the strongest impact on consumption in the locality.⁴

The above list of control variables is modified slightly for the analysis of educational outcomes and spill-over effects. Instead of the total population of the community we use the population of children between 6 and 16 years (roughly the school age population), and we drop the two natural disaster variables (sequias and plagas) and include an indicator of whether the locality has a telesecondary school (an indicator of school access).⁵ For the analysis of nutritional surveillance, we use the distance to the nearest health clinic instead of distance to 'telesecundaria'.

3. RESULTS

Relative Poverty

Table 1 presents the estimates of mean differences in changes in relative poverty between control and treatment localities, for each of the two relative poverty lines.⁶ Recall that a negative change means a decline in the proportion of households classified as poor. The last line of Table 1 shows that the mean change for the 25% line is positive (7.7 percentage points), implying that poverty was increasing during this period among these localities. However the regression estimates indicate that this increase in poverty was significantly lower in PROGRESA localities relative to control. For the 10 (25) percent line, the difference is 2.2 (3.9) percentage points and in each case statistically different from 0. To gauge the sensitivity of these results to outliers in the data, we deleted all households that reported a change in consumption that was over 3 standard deviations from the mean, and used the remaining households to construct changes in relative poverty for each of the two lines. Regression results based on this truncated sample, are shown in the Appendix, and are consistent with the results discussed above.

Columns (2) and (4) in Table 1 shows the impact of the value of transfers per family on the change in poverty among these communities (control localities are given a value of 0). For the upper poverty line (column 4) the peso value of transfers has a large and significant impact on the change in poverty: an additional 100 pesos per eligible family reduces poverty by 3.1 percentage points in the locality.

Table 2 shows the estimated impact of PROGRESA on the poverty gap and squared poverty gap (using only the upper poverty line). The mean change in these two indicators is positive, indicating that the poor were worse off in October. However, the difference between control and PROGRESA localities is

⁴ The natural disaster variables were highly correlated with geographic location, hence we do not include regional indicators in the regression equations.

⁵ We experimented with other school supply indicators such as the number of primary school teachers and the number of primary school classrooms but these did not have any explanatory power.

⁶ For this and all other regression estimates, complete results for all coefficients are presented in the appendix.

significant, and the negative coefficients in both equations imply that the deterioration is significantly worse in non-PROGRESA localities relative to PROGRESA localities, and thus implies a positive impact of the program.

Column 2 of Table 2 shows the estimated impact of the value of transfers on the poverty gap and squared poverty gap. The value of transfers has a significant effect on the change in the poverty gap: an additional 100 pesos per eligible family decreases the change in poverty gap by 1.6 percentage points (this is a 74% change at the mean).

Complete results of all variables are presented in the Appendix. The other important community level characteristics that influenced the change in poverty during this period are the proportion of indigenous households, the presence of drought, and the median consumption of the community. Higher values for these variables tend to increase poverty rates.

Inequality

Table 3 shows mean changes in inequality for both indicators (last line of Table 3) as well as the regression estimate of the mean difference between control and treatment localities. According to the means, inequality declined over this sample of communities between March and October, while the regression coefficients show that this decline was greater in PROGRESA localities relative to controls, although the difference is statistically significant only for the standard deviation of log consumption. In column 3 for example, the results indicate that the reduction in inequality is 12.8 percentage points greater in PROGRESA communities compared to control communities.

The distribution of consumption expenditures tends to be skewed to the right due to a few households with extremely high consumption. To ensure that these few households are not responsible for the differences in inequality changes between treatment and control communities, we recalculate the inequality indicators *excluding* the top 1% of households in each round of the survey (the richest households). Table A5 in the Appendix repeats the regression analysis of Table 3 using this truncated sample, and the results are robust to the exclusion of these households. In fact for this sample, both indicators show statistically significant differences (reductions) in inequality in PROGRESA communities relative to controls.

School Continuation Rates

Tables 4-6 present estimates of the treatment effect (the difference between PROGRESA and control communities) for school continuation rates by age group and sex of the child. We start by estimating these effects for all children in the locality (in each age and sex group) and results of this procedure are shown in Table 4. Every single difference in Table 4 is positive, indicating higher continuation rates in PROGRESA localities relative to controls, and each difference is statistically significant at the 10% level or better. The largest program effects are found in the 12-13 and 13-14 age groups (these are children who were 12-14 years old in the ENCASEH) with estimated continuation rates 7.4 percentage points higher in PROGRESA localities relative to controls. Children who start school on time and do not repeat would normally enter secondary school at age 12, and it is at this stage that PROGRESA education subsidies increase

dramatically. The large estimated effects for the 12-14 year age groups probably occurs because of delayed enrolment, so that children in the localities enter secondary school (if they complete primary) a few years later than normal. For example, in the 12-13 year age group in ENCASEH, 22% were in 5th grade, 34% in 6th grade, and only 12% were in the first year of secondary school.

The other interesting result in Table 4 is that the estimated program effects are larger for girls than for boys, especially at older ages. Recall that PROGRESA gives larger educational subsidies for girls than boys at the secondary school level.

We analyze *spill-over* effects by repeating the estimates in Table 4 for non-eligible children only. These results are presented in Table 5. The only significant spill-over effects are found in the youngest age groups (10-11 and 11-12), where 5 of the 6 coefficients are significant at the 10% level or better. The estimated spill-over effect is especially large for girls in the 11-12 age group: the difference in continuation rates is 9.5 percentage points higher for non-eligible girls living in PROGRESA localities relative to those living in control localities.

Table 6 presents community level program effects estimated over eligible children only, and as can be expected, these effects are all positive and highly statistically significant.⁷ The largest program effects are estimated for children in the 13-14 year age group, where continuation rates are 10 percentage points higher in PROGRESA localities relative to controls.

Table A6 in the appendix presents full results for all variables for the 12-13 year age group. These show that continuation rates are actually higher in communities with a larger proportion of indigenous families (this is especially true for non-beneficiary girls). The other important determinant of community level school continuation rates is whether the community has a telesecondary school. The presence of such a school raises school continuation rates by 12-20 percentage points, with larger effects for girls.

Nutritional Surveillance Rates

Table 7 presents the OLS regression results for differences in mean nutrition surveillance rates. Columns 1 and 2 of this table report the results for poor children, and these show that mean surveillance rates among poor children in PROGRESA localities increased by 12.3 percentage points between March and October 1998, relative to poor children in control localities. One year after program implementation, the mean rate in PROGRESA localities was 12.1 percentage points higher than the rate in control localities (column 2).

We measure spill over by the extent to which non-eligible households in PROGRESA communities changed their health care behaviour over this time period. Columns 3 and 4 present regression results for our model using mean changes in the surveillance rates of non-eligible children only. In column 3, which estimates the change in surveillance rates after 6 months of the program, the difference in mean rates for non-eligible children between control and treatment localities is not statistically significant (t-statistic is 0.76). However, one year after the program, the mean surveillance rate of non-eligible children in PROGRESA localities had

⁷ The only non-significant difference is for boys in the 14-15 year age group.

increased, and there is now a statistically significant difference in mean (changes in) rates among treatment and control localities. In particular, the mean increase in surveillance rates among non-eligible children in PROGRESA localities was 6.8 percentage points higher than the change among this group of children in treatment localities. This result is consistent with the existence of a significant spill-over effect of PROGRESA on the health care behaviour of non-beneficiary households. Moreover, the results indicate that this spill over effect takes time to manifest itself.

Descriptive Analysis of Price Changes

Table 8 provides a comparison of prices changes for the 10 common products in the ENCASEH and ENCEL98O surveys. Among PROGRESA localities there was only one statistically significant price increase during this 12 month period, and that was for beans, but this increase was also found in control localities. There were actually 3 significant price *decreases* among PROGRESA localities during this period (rice, eggs, and oil), and two of these were also found in control localities (rice and eggs). The overall composite price of these 10 items, shown in the last line of Table 8, indicates a small overall decline in prices in both PROGRESA and control localities.

Table 9 compares price changes between March and October for a set of 33 different items that were reported in the two ENCEL surveys.⁸ For convenience we have highlighted in bold all the statistically significant increases in price over this period. For PROGRESA localities, there are 7 statistically significant price increases (jitomate, potatoes, oranges, carrots, tortillas, beans, sweets, and sugar). However in all cases except two (oranges and tortillas) there was a similar statistically significant increase in the control localities as well. There are also 6 significant declines in prices in PROGRESA localities (onion, pork, eggs, manteca de cerdo, tuna, and aguardiente) so that the overall effect is a decline in the composite price of these goods (see last line of Table 9). This decline in the composite price is also found among control localities, although the decline is not as great.

Multivariate Analysis of Price Changes

We formally test for significant differences in these price changes as a whole, by constructing the proportional change in the price of each commodity for which we have two sample data points. The proportional increase in price is defined as $(\text{Price}_{\text{period 2}} - \text{Price}_{\text{period 1}}) / (\text{Price}_{\text{period 1}})$, and is constructed in order to compare price changes among different commodities, some of whose initial price will be much higher than others. Based on this definition, positive values indicate price increases and negative values price declines. We construct this proportional change for three different survey rounds: ENCEL99M and ENCEL98M (approximately one year apart), ENCEL99M and ENCEL980 (8 months apart, but 6 months after program implementation), and ENCEL980 and ENCEL98M (6 months apart).

⁸ While the ENCASEH and ENCEL980 were done at the same time of year, the two ENCEL surveys occurred at different times in the agricultural cycle. This may have a supply related effect on price differences between the two ENCEL surveys.

Table 10 presents t-tests for differences in the mean change in all prices between various survey rounds. There are approximately 4300 comparisons (observations) for each of the paired surveys. Column 1 presents the mean difference in differences for prices between May 1999 and March 1998. The mean percentage change in prices is slightly higher in control localities (5.7%) relative to treatment localities (3.2%), and this difference is not statistically significant. The mean difference in price changes between May 1999 and October 1998 are also not statistically different (column 2 of Table 10). However, the mean differences reported in column 3, measuring price changes over the first 6 months of the program, are statistically different, with mean prices rising more in control localities (18.1%) relative to treatment localities (11.3%). Hence using this methodology, we still do not find any evidence of inflationary pressure in PROGRESA localities relative to controls.

Following the approach used for the analysis of poverty, inequality, school transition, and nutrition surveillance, we test for difference in differences in proportional price changes using OLS regressions with the standard set of control variables. For the price analysis, we also use a dummy variable indicating whether the locality has a Diconsa store, and we hypothesize that the presence of such a store may have a stabilizing effect on prices in the community. We also include the dummy variables for the presence of natural disasters (drought or plagas) as these will affect agricultural production and could thus influence prices.

Table 11 presents the regression results for the determinants of changes in mean prices between treatment and control localities over the various survey rounds, controlling for the other intervening factors that may also affect price differences. Column 1 presents the results for changes between May 1999 and March 1998, and the coefficient of the dummy variable indicating a treatment locality is negative but not statistically different from 0. In this regression, the only two variables that are statistically significant are distance to the municipal capital, and whether or not the locality suffered a drought. The presence of a drought leads to a 7.9 percentage point decline in the change in mean price, while the change in mean price declines the further away is the locality from the municipal head. This latter effect seems to be counter-intuitive, as we would expect that more isolated communities to be more vulnerable to price changes due to PROGRESA, due to the absence of competing markets nearby. However, beneficiaries in isolated communities tend to travel to the municipal head to collect their payment, and as a result, are likely to spend their money there, as opposed to back in their own locality.

The second column of Table 11 presents results for the determinants of mean price changes between May 1999 and October 1998. Neither the coefficient of the variable indicating treatment community, nor any other coefficient, is statistically significant in this regression. In column 3 however, which compares price changes between October and March 1998, there are several statistically significant determinants of price changes. In this regression, the coefficient for the treatment locality indicator is significant and negative, and shows that the price increase in PROGRESA communities was 7.7 percentage points *lower* than in control communities.⁹ The second significant variable is median per capita consumption of the locality in March, where the negative coefficient indicates that poorer localities had lower price changes relative to richer ones.

⁹ Note that this is almost exactly the same result that was found using the t-test for difference in mean changes in Table 10, column 3.

Finally, the variable indicating distance to the municipality head is once again statistically significant and negative, indicating that more isolated communities (i.e., those that are farther away from the municipal capital) had lower mean increases in prices.

We had hypothesized that the presence of a Diconsa store would have a stabilizing affect on price movements in the community. In column 3, the sign of the coefficient for the variable indicating presence of a Diconsa store is indeed negative, and significant at 10%.

Other specifications of the regression model shown in Table 11 were experimented with to try and uncover any possible determinants of changes in prices. For example, we tried non-linear terms for distance to municipal capital, as well distance to the nearest state highway. We also interacted the Diconsa variable with the treatment variable to see if the effect of Diconsa was only valid in PROGRESA localities. However, none of these specifications yielded any statistically significant effects.

The overall conclusion from the comparison of prices is that there has not been a steep increase in prices among PROGRESA localities relative to control localities, indicating no inflationary effects of the program. One reason for this result is that PROGRESA beneficiaries often spend their money outside the local community (for example, in the municipal capital), especially in cases where beneficiaries must travel outside the community to receive their cash transfer. Another reason may be the important role played by the Diconsa stores in maintaining a relatively constant supply of basic items at a fixed price.¹⁰

4. MAIN CONCLUSIONS

The analysis of survey data from PROGRESA'S evaluation sample indicate some clear community level differences between control and treatment localities. First, although relative poverty has risen between the two survey periods (March and October), the relative increase in PROGRESA localities is significantly less than in non-PROGRESA communities. This is also true for higher order poverty measures (gap and severity). While relative poverty rose during this period, inequality declined, and this decline was greater in PROGRESA localities compared to controls. This greater decline in inequality is robust to alternative inequality indicators which exclude the top 1% of households in the sample.

The analysis of school continuation rates reveals positive and significant spill-over effects for children in younger age groups (10-12), especially among non-beneficiary girls age 11-12. The continuation rate of this group is nearly 10 percentage points higher than their counterparts living in non-PROGRESA communities.

The data also indicate important spill over effects in terms of the health care behaviour of non-beneficiary households. Estimates of mean changes in nutrition surveillance rates for pre-school children show that 6 months after the program, there was no difference in mean changes in surveillance rates among non-program

¹⁰ There is no difference in the distribution of Diconsa stores among treatment and control localities.

children in treatment and control localities. However, one year after program inception, the increase in mean rates of surveillance was nearly 7 percentage points higher among non-beneficiary children in PROGRESA localities, compared to this same group in treatment localities. These results indicate not only the strong presence of possible spill over effects of PROGRESA, but also that these effects take some time to manifest themselves.

Finally, PROGRESA does not appear to have caused inflationary pressure on prices of basic foods in the locality. The comparison of prices between the two ENCEL surveys, as well as between ENCASEH97 and ENCEL98O reveals virtually identical price movements for basic commodities among treatment and control localities. This result is confirmed within a multivariate context, where determinants of the difference in differences in price movements across various survey rounds indicated no significant increase in prices in PROGRESA localities relative to controls. On the contrary, the results show that between March and October 1998, prices actually increased by less in treatment localities relative to controls.

REFERENCES

Deaton, Angus. 1997. *The analysis of household surveys*. Washington, DC: Johns Hopkins University Press for the World Bank.

PROGRESA. 1999. *Evaluación de Resultados del Programa de Educación, Salud, y Alimentación: Primeros Avances* (various chapters). Mexico City, Mexico: Secretaría de Desarrollo Social.

FIGURES

Figure 1-- Change in Consumption by Decile between March and October

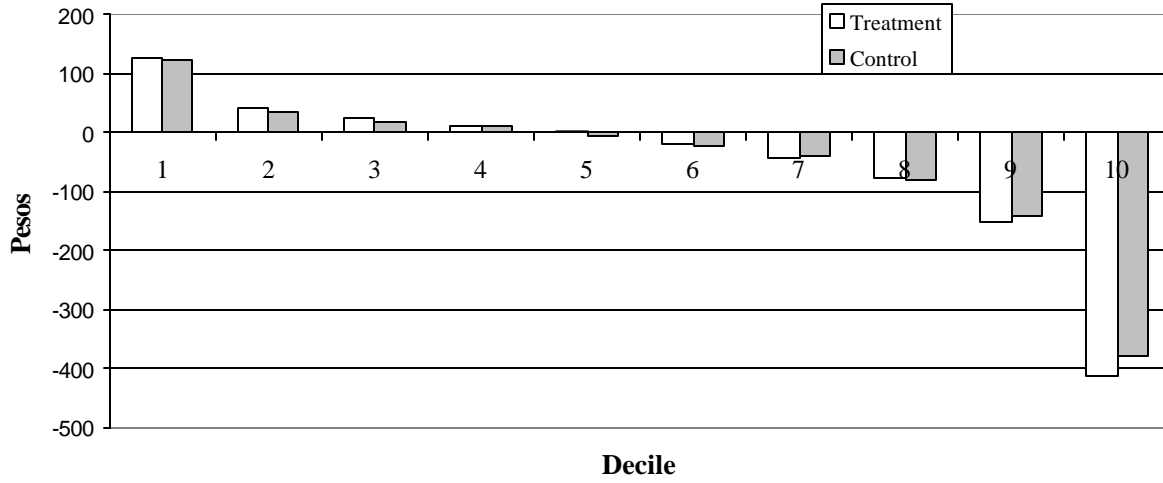
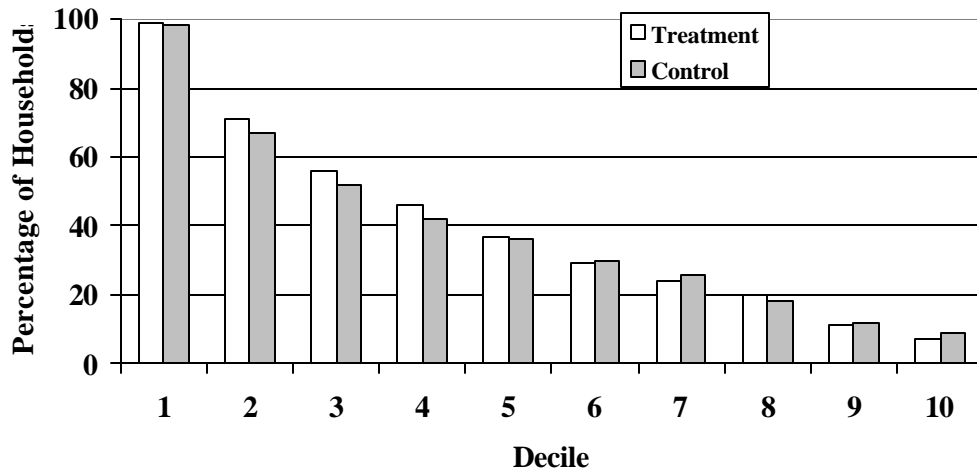


Figure 2 -- Percentage of Households Without Decline in Consumption



TABLES

Table 1— Estimates of Changes in Poverty in Control and Treatment Localities

	10% Line		25% Line	
	(1)	(2)	(3)	(4)
PROGRESA Locality	-2.173 (2.26)		-3.884 (2.69)	
Pesos per Eligible Family (\$)		-0.010 (1.21)		-0.031 (2.63)
R-squared	0.11	0.10	0.17	0.17
Mean Change in all Localities	0.34		7.70	

OLS regression coefficients. Absolute value of t-statistics in parentheses. 506 observations.

Table 2— Estimates of Changes in Poverty Measures

	Poverty Gap		Sq. Poverty Gap	
	(1)	(2)	(3)	(4)
PROGRESA Locality	-2.597 (2.74)		-2.022 (2.28)	
Pesos per Eligible Family		-0.016 (2.07)		-0.010 (1.41)
R-squared	0.13	0.12	0.13	0.13
Mean Change in all Localities	2.17		0.63	

OLS regression coefficients..Absolute value of t-statistics in parentheses 506 observations.

Table 3— Estimates of Changes in Inequality in Treatment and Control Localities

	Coeff. of Variation		Std. Dev. Of Log	
	(1)	(2)	(3)	(4)
PROGRESA Locality	-5.012 (1.59)		-12.767 (2.41)	
Pesos per Eligible Family		-0.063 (2.42)		-0.074 (1.69)
R-squared	0.06	0.06	0.10	0.09
Mean Change in all Localities	-6.77		-8.41	

OLS Regression coefficients. Absolute value of t-statistics in parentheses. 506 observations

Table 4— Difference in Community Level School Continuation Rates by Age and Sex

	(1)	(2)	(3)	(4)	(5)
Age Group:	10-11	11-12	12-13	13-14	14-15
All	0.035 (3.50)	0.057 (3.32)	0.073 (3.62)	0.074 (3.39)	0.052 (2.27)
Boys	0.032 (2.66)	0.036 (1.82)	0.065 (2.69)	0.085 (3.21)	0.039 (1.37)
Girls	0.033 (2.41)	0.066 (3.01)	0.071 (2.70)	0.091 (3.12)	0.064 (2.24)

Numbers are OLS regression coefficient estimates for dummy variable indicating PROGRESA community. This coefficient measures the difference in mean continuation rates between PROGRESA and control localities (a positive value means the rate is higher in PROGRESA locality). Absolute value of t-statistics in parentheses below coefficients.

Table 5— Difference in Community Level School Continuation Rates by Age: Non-Eligible Children Only (Spill-Over)

	(1)	(2)	(3)	(4)	(5)
Age Group:	10-11	11-12	12-13	13-14	14-15
All	0.043 (1.74)	0.080 (2.34)	0.015 (0.40)	0.010 (0.24)	0.046 (1.02)
Boys	0.047 (1.83)	0.061 (1.66)	0.023 (0.52)	0.052 (1.00)	0.078 (1.30)
Girls	0.053 (1.44)	0.095 (2.06)	0.034 (0.68)	-0.039 (0.71)	0.014 (0.26)

Numbers are OLS regression coefficient estimates for dummy variable indicating PROGRESA community. This coefficient measures the difference in mean continuation rates between PROGRESA and control localities (a positive value means the rate is higher in PROGRESA locality). Absolute value of t-statistics in parentheses below coefficients.

Table 6— Difference in Community Level School Continuation Rates by Age: Program Eligible Children Only

Age Group:	(1)	(2)	(3)	(4)	(5)
	10-11	11-12	12-13	13-14	14-15
All	0.037	0.061	0.088	0.105	0.053
	(3.41)	(3.36)	(4.22)	(4.44)	(2.14)
Boys	0.036	0.042	0.072	0.103	0.030
	(2.60)	(2.08)	(2.80)	(3.59)	(0.98)
Girls	0.033	0.066	0.075	0.104	0.079
	(2.20)	(2.84)	(2.67)	(3.33)	(2.53)

Numbers are OLS regression coefficient estimates for dummy variable indicating PROGRESA community. This coefficient measures the difference in mean continuation rates between PROGRESA and control localities (a positive value means the rate is higher in PROGRESA locality). Absolute value of t-statistics in parentheses below coefficients.

Table 7— Difference in Community Level Surveillance Rates by Eligibility Status

Sample: Comparison:	Poor		Non-Poor	
	Round 1-2	Round 1-3	Round 1-2	Round 1-3
	(1)	(2)	(3)	(4)
Treatment Locality	14.255	12.108	2.307	6.846
	(5.47)	(5.04)	(0.76)	(2.15)
Median consumption in March	-0.063	-0.028	0.021	0.044
	(2.85)	(1.35)	(0.71)	(1.39)
Proportion of hholds indigenus	-10.992	-14.040	1.116	-2.779
	(1.50)	(2.08)	(0.12)	(0.30)
Proportion beneficiaries	-2.769	3.922	1.351	11.535
	(0.42)	(0.64)	(0.15)	(1.18)
Population of locality	0.004	0.002	0.001	-0.005
	(0.50)	(0.23)	(0.15)	(0.54)
Distance to municipal capital	0.000	0.000	-0.001	0.000
	(1.12)	(0.74)	(1.94)	(1.70)
Distance to nearest clinic	0.000	0.001	0.000	0.000
	(0.01)	(1.14)	(0.03)	(0.51)
Constant	11.777	4.030	-0.864	-10.359
	(1.56)	(0.58)	(0.09)	(1.03)
Observations	493	492	401	398
R-squared	0.08	0.07	0.01	0.03
F-Statistic	5.97	4.92	0.79	1.72

Bolded coefficients are significant at 5%.

Table 8— Price Comparison Between Encaseh and Encel980

Product	PROGRESA Locality				Control Locality			
	Encaseh	Encel	Difference ¹	T-test ²	Encaseh	Encel	Difference ¹	T-test ²
Bean (kg)	2.95	3.68	-0.72	* 0.00	2.9	3.72	-0.82	* 0.00
Rice (kg)	2.54	2.27	0.27	* 0.00	2.56	2.28	0.28	* 0.01
Sugar (kg)	1.99	2.02	-0.03	0.53	2.03	1.94	0.09	0.08
Milk (litre)	2.30	2.09	0.22	0.11	2.09	2.01	0.09	0.53
Eggs (kg)	3.94	3.52	0.42	* 0.00	3.87	3.37	0.51	* 0.00
Chicken (kg)	7.81	7.44	0.37	0.69	7.14	6.87	0.27	0.84
Oil (litre)	3.66	3.44	0.22	* 0.00	3.60	3.45	0.15	0.10
Tin of tuna (174 grms.)	2.26	2.28	-0.02	0.75	2.26	2.19	0.07	0.39
Tin of sardine (425 grms.)	2.29	2.29	0.00	0.97	2.31	2.31	0.00	0.99
Packet of crackers (185 grms)	0.91	0.87	0.04	0.25	0.86	0.9	-0.04	0.29
Cost of basket	30.66	29.9	0.76	---	29.62	29.03	0.59	---

Prices are in 1994 pesos. 1/ Negative difference indicates increase in price. 2/ Paired t-test for difference in prices between two surveys. * Indicates difference at 5 percent level of significance.

Table 9— Price Comparison Between March and October (Encel)

Products	PROGRESA Locality				Control Locality			
	March	October	Difference ¹	T-test ²	March	October	Difference ¹	T-test ²
Kilogram of jitomate	1.77	3.59	-1.82	* 0.000	1.87	3.62	-1.76	* 0.000
Kilogram of onion	4.44	2.30	2.14	* 0.000	3.97	2.37	1.59	* 0.000
Kilogram of potatoe	2.02	2.49	-0.47	* 0.000	1.94	2.48	-0.53	* 0.000
Kilogram of carrots	1.29	1.26	0.03	0.689	1.28	1.66	-0.38	0.204
Kilogram of oranges	0.73	1.18	-0.45	* 0.000	0.87	1.04	-0.18	0.305
Kilogram of bananas	1.14	1.19	-0.05	0.398	1.17	1.24	-0.06	0.391
Kilogram of apples	3.20	3.22	-0.02	0.941	3.02	3.39	-0.37	0.077
Kilogram of lemons	1.45	1.49	-0.03	0.860	1.43	1.79	-0.36	0.059
Head of lettuce	0.92	1.08	-0.15	0.300	0.86	1.20	-0.34	0.118
Kilogram of pasta nixtamal	0.92	1.08	-0.16	0.160	0.91	1.04	-0.12	0.430
Piece of white bread	0.27	0.26	0.00	0.983	0.30	0.26	0.04	0.391
White bread loaf- small (Bimbo)	2.15	2.12	0.03	0.890	1.94	1.90	0.04	0.917
Kilogram of wheat flour	1.42	1.37	0.05	0.293	1.53	1.36	0.18	* 0.008
Soup noodles 200 grms packet	0.73	0.77	-0.04	0.116	0.70	0.76	-0.06	0.142
Kilogram of rice	2.35	2.32	0.03	0.502	2.31	2.28	0.04	0.508
Kilogram of maize tortillas	1.05	1.29	-0.24	* 0.038	0.98	1.17	-0.19	0.118
Corn Flakes 400 grms	3.11	3.13	-0.02	0.943	3.09	3.44	-0.36	0.552
Kilogram of chicken	8.14	7.65	0.5	0.147	8.32	7.35	0.97	0.112
Kilogram of pork meat	10.33	8.87	1.46	* 0.001	10.73	8.20	2.53	* 0.004
Kilogram of red meat (beef)	11.84	9.40	2.43	0.173	12.19	11.68	0.51	0.725
Crackers 185 grms	0.95	0.90	0.06	0.306	0.93	0.92	0.01	0.947
Tin of vegetable cooking oil	3.50	3.43	0.06	0.107	3.48	3.43	0.06	0.210
Kilogram of beans	3.13	3.81	-0.68	* 0.000	3.08	3.73	-0.65	* 0.000
Kilogram of eggs	3.70	3.50	0.19	* 0.028	3.40	3.46	-0.06	0.657
Litre of milk	2.05	2.03	0.03	0.710	1.83	2.02	-0.19	0.148
Kilogram of lard	4.31	3.71	0.60	* 0.000	4.43	3.61	0.83	* 0.000
Bag of small cakes (gansitos)	0.52	0.71	-0.19	* 0.000	0.47	0.74	-0.26	* 0.000
Litre of soft drink	1.85	1.93	-0.08	0.236	1.93	1.90	0.03	0.727
Tin of sardines 425 grms	2.26	2.26	0.00	0.983	2.22	2.29	-0.07	0.175
Tin of tuna 174 grms	2.33	2.22	0.11	* 0.001	2.31	2.26	0.05	0.111
Litre of tequila	3.69	3.10	0.59	* 0.025	3.86	3.76	0.10	0.832
Small jar of dissolvable coffee	4.07	3.63	0.44	0.051	3.94	3.84	0.10	0.632
Kilogram of sugar	1.90	2.00	-0.09	* 0.001	1.90	1.96	-0.06	* 0.024
Cost of basket	93.53	89.28	4.25	---	93.18	92.13	1.06	---

1/ A negative difference indicates price increase. 2/ Paired t-test for difference between the two surveys. * Indicates difference significant at 5 percent level.

Table 10—T-Test for Difference in Mean Price Changes over Various Survey Rounds

	<u>Encel99M - Encel98M</u>	<u>Encel99M - Encel98O</u>	<u>Encel98O - Encel98M</u>
	(1)	(2)	(3)
Mean – Treatment	0.032	0.002	0.113
Mean – Control	0.057	-0.020	0.181
T-test for difference	0.89	-1.43	2.38
P-value of t statistic	0.37	0.15	0.02

Price changes are measured in proportionate terms in order to be comparable across different products.

Table 11—Determinants of Changes in Prices Between Various Survey Rounds (OLS Coefficients)

	<u>Encel99M - Encel98M</u>	<u>Encel99M - Encel98O</u>	<u>Encel98O - Encel98M</u>
	(1)	(2)	(3)
Treatment Locality	-0.031 (1.02)	0.022 (1.22)	-0.077 (2.32)
Median consumption in March	0.000 (0.80)	0.000 (0.07)	-0.001 (2.70)
Proportion of households indigenous	0.091 (0.96)	-0.062 (1.30)	0.083 (0.81)
Proportion beneficiaries	0.010 (0.14)	0.022 (0.42)	-0.049 (0.76)
Population	0.000 (0.84)	0.000 (1.11)	0.000 (1.82)
Distance to municipal head	-0.005 (2.45)	0.000 (0.07)	-0.005 (2.31)
1 if have Diconsa	-0.023 (0.89)	0.009 (0.49)	-0.050 (1.82)
1 if suffered drought	-0.079 (2.01)	-0.004 (0.17)	0.004 (0.14)
1 if suffered plagas	0.022 (0.73)	0.010 (0.54)	-0.031 (1.02)
Observations	4580	4718	4130
R-squared	0.00	0.00	0.01
F-Statistic	1.25	0.48	1.60

Robust t-statistics in parentheses. Statistically significant (at 5%) coefficients in bold.

APPENDIX TABLES

Table A1— Full Regression Results for Determinants of Change in Poverty

	10% Line		25% Line	
	(1)	(2)	(3)	(4)
Treatment Locality	-2.173 (2.26)		-3.884 (2.69)	
Transfers per eligible family (pesos)		-0.010 (1.21)		-0.031 (2.63)
Median consumption in March	0.037 (4.86)	0.037 (4.87)	0.070 (6.18)	0.070 (6.22)
Proportion of hholds indigenou	0.260 (0.10)	0.203 (0.07)	18.576 (4.54)	18.083 (4.41)
Proportion beneficiaries	-2.706 (1.11)	-2.925 (1.20)	11.296 (3.09)	10.806 (2.96)
Population of locality	-0.008 (3.02)	-0.008 (2.89)	-0.006 (1.47)	-0.005 (1.35)
Distance to municipal capital	-0.072 (0.92)	-0.072 (0.91)	-0.031 (0.26)	-0.047 (0.40)
Drought	1.805 (1.67)	1.653 (1.51)	3.881 (2.40)	3.323 (2.03)
Plagas	1.905 (1.82)	1.974 (1.88)	2.384 (1.52)	2.641 (1.68)
Constant	-2.353 (0.87)	-3.103 (1.14)	-11.904 (2.93)	-12.021 (2.96)
Observations	506	506	506	506
R-squared	0.11	0.10	0.17	0.17

Absolute value of t-statistics in parentheses

Table A2— Determinants of Changes in Poverty: Truncated Sample

	10% Line		25% Line	
	(1)	(2)	(3)	(4)
Treatment Locality	-2.272 (2.93)		-4.141 (2.98)	
Transfers per eligible family (pesos)		-0.013 (2.06)		-0.033 (2.85)
Median consumption in March	0.023 (3.71)	0.023 (3.70)	0.065 (5.93)	0.065 (5.96)
Proportion of hholds indigenous	0.870 (0.39)	0.684 (0.31)	19.908 (5.06)	19.395 (4.92)
Proportion beneficiaries	-2.184 (1.11)	-2.391 (1.21)	11.314 (3.23)	10.839 (3.09)
Population of locality	-0.005 (2.39)	-0.005 (2.22)	-0.004 (1.12)	-0.004 (0.99)
Distance to municipal capital	0.046 (0.72)	0.043 (0.66)	0.050 (0.44)	0.032 (0.28)
Drought	1.870 (2.14)	1.638 (1.84)	3.446 (2.21)	2.846 (1.80)
Plagas	1.448 (1.71)	1.550 (1.82)	2.206 (1.46)	2.469 (1.63)
Constant	-1.699 (0.78)	-2.195 (1.01)	-11.810 (3.03)	-11.951 (3.06)
Observations	498	498	503	503
R-squared	0.08	0.07	0.18	0.18

Absolute value of t-statistics in parentheses

Table A3— Full Results for Determinants of Changes in Higher Order Poverty Measures

	Poverty Gap		Sq. Poverty Gap	
	(1)	(2)	(3)	(4)
Treatment Locality	-2.597 (2.74)		-2.022 (2.28)	
Transfers per eligible family (pesos)		-0.016 (2.07)		-0.010 (1.41)
Median consumption in March	0.043 (5.80)	0.043 (5.81)	0.040 (5.77)	0.040 (5.78)
Proportion of hholds indigenus	5.508 (2.05)	5.309 (1.97)	0.819 (0.33)	0.728 (0.29)
Proportion beneficiaries	0.771 (0.32)	0.476 (0.20)	-2.477 (1.10)	-2.691 (1.20)
Population of locality	-0.008 (2.93)	-0.007 (2.79)	-0.008 (3.49)	-0.008 (3.36)
Distance to municipal capital	-0.032 (0.41)	-0.037 (0.48)	-0.039 (0.53)	-0.040 (0.55)
Drought	2.545 (2.39)	2.269 (2.10)	2.354 (2.37)	2.185 (2.17)
Plagas	1.893 (1.84)	2.020 (1.95)	1.617 (1.68)	1.694 (1.75)
Constant	-4.851 (1.82)	-5.340 (2.00)	-3.428 (1.37)	-4.009 (1.60)
Observations	506	506	506	506
R-squared	0.13	0.12	0.13	0.13

Absolute value of t-statistics in parentheses

Table A4— Full Regression Results for Determinants of Changes in Inequality

	Coeff. Of Variation		Std. Dev. of Log	
	(1)	(2)	(3)	(4)
Treatment Locality	-5.012 (1.59)		-12.767 (2.41)	
Transfers per eligible family (pesos)		-0.063 (2.42)		-0.074 (1.69)
Median consumption in March	0.064 (2.58)	0.064 (2.62)	0.120 (2.90)	0.121 (2.92)
Proportion of hholds indigenous	3.914 (0.44)	2.653 (0.30)	-28.080 (1.88)	-28.901 (1.92)
Proportion beneficiaries	-15.080 (1.89)	-15.869 (1.99)	-31.206 (2.34)	-32.615 (2.43)
Population of locality	-0.013 (1.47)	-0.012 (1.43)	-0.039 (2.74)	-0.037 (2.61)
Distance to municipal capital	-0.488 (1.89)	-0.533 (2.07)	0.143 (0.33)	0.122 (0.28)
Drought	4.815 (1.36)	3.637 (1.02)	13.088 (2.21)	11.841 (1.97)
Plagas	4.077 (1.19)	4.620 (1.35)	3.188 (0.55)	3.759 (0.65)
Constant	-3.978 (0.45)	-2.177 (0.25)	-2.335 (0.16)	-5.227 (0.35)
Observations	506	506	506	506
R-squared	0.06	0.06	0.10	0.09

Absolute value of t-statistics in parentheses

Table A5— Determinants of Changes in Inequality: Truncated Sample

	Coeff. of Variation		Std. Dev. of Log	
	(1)	(2)	(3)	(4)
Treatment Locality	-3.470 (2.11)		-12.833 (2.28)	
Transfers per eligible family (pesos)		-0.037 (2.74)		-0.071 (1.52)
Median consumption in March	0.099 (7.06)	0.099 (7.09)	0.105 (2.20)	0.105 (2.18)
Proportion of hholds indigenous	1.809 (0.38)	1.058 (0.22)	-32.729 (2.01)	-33.779 (2.07)
Proportion beneficiaries	-2.479 (0.59)	-3.014 (0.72)	-34.011 (2.37)	-35.596 (2.47)
Population of locality	-0.015 (3.28)	-0.014 (3.22)	-0.042 (2.72)	-0.040 (2.59)
Distance to municipal capital	-0.190 (1.42)	-0.215 (1.60)	0.238 (0.52)	0.221 (0.48)
Drought	4.359 (2.36)	3.670 (1.97)	12.958 (2.05)	11.756 (1.84)
Plagas	1.580 (0.88)	1.904 (1.06)	3.326 (0.54)	3.912 (0.63)
Constant	-17.320 (3.61)	-16.555 (3.46)	3.045 (0.19)	0.260 (0.02)
Observations	505	505	505	505
R-squared	0.16	0.16	0.09	0.09

Absolute value of t-statistics in parentheses

Table A6— Full Results of School Continuation Rates: All Children Age 12-13

	All	Boys	Girls
	(1)	(2)	(3)
Treatment Locality	0.073 (3.62)	0.065 (2.69)	0.071 (2.70)
Median consumption in March	0.000 (0.80)	0.000 (0.23)	0.000 (1.96)
Proportion of hholds indigenus	0.286 (5.09)	0.362 (5.36)	0.170 (2.32)
Proportion beneficiaries	-0.101 (1.96)	-0.059 (0.94)	-0.080 (1.18)
Population 6-16 years old	0.000 (0.37)	0.000 (0.75)	0.000 (0.00)
Distance to municipal head	0.001 (0.54)	0.003 (1.39)	0.000 (0.22)
Locality has telesundaria-Encel980	0.158 (5.76)	0.130 (3.95)	0.194 (5.44)
Constant	0.634 (11.29)	0.665 (9.49)	0.535 (7.32)
Observations	503	491	490
R-squared	0.14	0.11	0.10

Absolute value of t-statistics in parentheses

Table A7— Full Results of School Continuation Rates: Non-Eligible Children Age 12-13

	All	Boys	Girls
	(1)	(2)	(3)
Treatment Locality	0.015 (0.40)	0.023 (0.52)	0.034 (0.68)
Median consumption in March	0.001 (2.63)	0.001 (1.67)	0.001 (2.94)
Proportion of hholds indigenous	0.352 (2.76)	0.175 (1.11)	0.647 (3.61)
Proportion beneficiaries	0.146 (1.10)	0.335 (2.05)	-0.057 (0.32)
Population 6-16 years old	0.000 (0.66)	0.000 (0.03)	0.000 (0.83)
Distance to municipal head	-0.001 (0.17)	0.002 (0.42)	-0.002 (0.38)
Locality has telesundaria-Encel980	0.137 (2.86)	0.124 (2.25)	0.150 (2.40)
Constant	0.431 (3.65)	0.449 (3.17)	0.354 (2.26)
Observations	322	251	245
R-squared	0.08	0.05	0.12

Absolute value of t-statistics in parentheses

Table A8— Full Results of School Continuation Rates: Eligible Children Age 12-13

	All	Boys	Girls
	(1)	(2)	(3)
Treatment Locality	0.088 (4.22)	0.072 (2.80)	0.075 (2.67)
Median consumption in March	0.000 (0.36)	0.000 (0.01)	0.000 (1.07)
Proportion of hholds indigenous	0.287 (4.95)	0.377 (5.36)	0.111 (1.42)
Proportion beneficiaries	-0.133 (2.49)	-0.088 (1.32)	-0.062 (0.86)
Population 6-16 years old	0.000 (0.89)	0.000 (0.99)	0.000 (0.20)
Distance to municipal head	0.001 (0.56)	0.003 (1.25)	0.001 (0.62)
Locality has telesundaria-Encel980	0.161 (5.70)	0.136 (3.98)	0.203 (5.36)
Constant	0.660 (11.33)	0.685 (9.28)	0.549 (7.04)
Observations	499	478	479
R-squared	0.14	0.11	0.09

Absolute value of t-statistics in parentheses.