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Abstract

Using administrative data from the urban Mexican Oportunidades program, this paper analyzes why poor households choose less education for their children, even when offered financial compensation for school attendance. Each school year, half of recipients forgo income for which they are eligible by failing to send children to school. Using a random effects probit and fractional response model, the analysis provides strong evidence that the poorest households, those with more dependents and high school students, recipients with limited education, and those living in large urban areas are less likely to have their children attend school and thus receive partial payments.

Key words: cash transfers, conditionality, school attendance, Oportunidades, Mexico

JEL classification: I21; I32; J24

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1. Introduction

By providing cash for school enrollment and regular attendance, conditional cash transfer (CCT) programs pay beneficiary households to send their children to school with the aim of promoting human capital formation and interrupting the intergenerational transmission of poverty. The argument for providing such transfers is that it helps poor families to overcome the direct and indirect (opportunity) costs of schooling and provides the liquidity necessary to pay such costs. The empirical evidence suggests that CCT programs have generally been successful at increasing education outcomes[1], and as a result have continued to expand to new countries and in their coverage within countries.

Since CCT programs target poor households, the expectation is that recipients will meet program conditions on school enrollment and attendance. Yet, recipient households often fail to meet these conditions and therefore do not receive full payment. In fact, in the Mexican Oportunidades program each school year about half of urban recipients forgo some of the income for which they are eligible. During the 2002-2007 period, the 1.4 million urban recipients of Oportunidades did not collect nearly 10 billion pesos.[2] Not only does this limit the income of the recipient population, which by definition is poor, but also indicates that some students are not receiving the education services being provided to them.

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The objective of this paper is to analyze the school attendance decision of urban CCT recipients in order to understand why these poor households choose less education for their children, even when they are offered financial compensation for this choice. A primary concern is whether it is the poorest students who fail to meet program conditions because the transfers are insufficient to overcome the cost of education, and consequently get less education reducing the benefits of the program, and failing to achieve a key program objective. Alternatively, it may be those students in households who are relatively better off that fail to meet conditions due to higher opportunity costs, and thus the lower payment serves as a way to minimize benefits going to the marginally poor.

Of course, a host of other factors including the household's demographic characteristics, school supply side factors, particularly school quality, program administrative factors or even macroeconomic conditions may influence schooling decisions. Impacts of programs are heterogeneous and, while there is a tendency in the evaluation literature to focus on average treatment effects, sub-groups vary in the benefits they receive from the program (Djebbari and Smith, 2008). Analyzing receipt of transfers, and correspondingly school attendance decisions, helps to understand which factors are key sources of this variation.

A number of papers have analyzed the heterogeneity of impact of CCT programs on schooling outcomes. For example, Schultz (2004) finds that the enrollment impact of Oportunidades is greatest for girls entering junior secondary school although Behrman, Sengupta and Todd (2005) find that, if anything, overall school attainment gains are greater for boys. A few studies find that the poorest households benefit most from cash transfers. Using data from Honduras, Glewwe and Olinto (2003) find that schooling impacts appear to be greater for poorer households while Oosterbeck Ponce and Schady (2008) argue that cash transfers impact the

poorest quintile, and not the second poorest quintile, probably due to credit constraints faced by the poor. Along similar lines, Filmer and Schady (2008) find that a Cambodia scholarship program targeting girls provides greatest benefits for the most disadvantages girls—those with low socioeconomic status, with parents who have low levels of education, and those most distant from schools.

In this study, we build on this literature by looking at a range of factors influencing schooling decisions, particularly focusing on if the poorest children are less likely to attend school and receive the associated educational benefit. To analyze schooling decisions among CCT recipients, this paper utilizes Oportunidades' administrative data on education payment eligibility and actual payment receipt in urban areas, and implements a random effects probit model as well as a fractional response model. Other studies have examined the impact of CCT programs on enrollment and attendance and a number of studies have examined schooling decisions in developing countries, including those noted above. But this is the only study we are aware of that uses data on transfers received to analyze why poor households would fail to invest in education even when they are provided with funds to make such an investment.

The paper proceeds as follows. Section 2 provides a brief background on CCT programs, including Oportunidades, and particularly the education component of the programs. In Section 3, a conceptual framework is presented. Section 4 describes the construction of the data set, followed by a discussion of the econometric methods employed for analyzing the data in Section 5. The empirical results are presented in Section 6. The final section concludes with a summary of the main findings and a discussion of the implications of the analysis.

2. Background

Conditional cash transfer programs, such as Oportunidades, generally include both health and education components. In order for beneficiary households to receive the full cash transfers for which they are eligible, they have to fulfill a set of conditions linked to each component. For Oportunidades, health conditions include registering the family at their assigned health center, attending scheduled health-related appointments for all members of the household, and being present at monthly health education sessions. Education conditions include registering any eligible household member for school and supporting their regular school attendance.[3]

Payments to beneficiaries are provided on a bimonthly basis. Failure to meet conditions linked to the health component or failing to follow certain administrative requirements leads to the beneficiary being dropped from the program and the permanent suspension of payments.[4] On the other hand, failure to meet education conditions leads to reduced payment, not removal from the program.[5] Since our interest in this paper is the payments provided through the education scholarship, and the receipt of partial payment, we focus on this component of the program.

The education component consists of two types of financial support: 1) education scholarships; and 2) school supplies. The scholarships are given during the ten months of the school year and the size of the scholarship increases as the grade attended gets higher. For intermediate school and high school, the scholarships are greater for girls than for boys. Elementary school scholarship recipients receive a cash transfer at the beginning of the school year and the second semester for school supplies or they get a package of the necessary supplies. Intermediate and high school scholarship recipients collect a one-time yearly cash transfer for school supplies, which is given during the first semester of the school year. There is a system of

caps put in place that limits the total cash support a beneficiary family can receive from scholarships depending on the composition of the students registered for school.

Generally, if a student fails to meet conditions for a given month, the student's family does not receive any payment for that student for that month. Since payments are bimonthly, this means beneficiaries can get full payments for an individual student for attendance in both months, half payment for attendance in one of two months, and no payment for failing to attend in both months. In all cases, the scholarship is linked to the individual and does not influence payments for other students in the household. Thus, a household may receive a reduced bimonthly payment for the education component of the transfer if one or more students in the household failed to comply with conditions in any given month. If the students in the household fully comply with conditions in the subsequent bimonthly period, payment is restored to the full eligibility amount. The total household payment in any bimonthly period is directly linked to the school attendance decisions made for eligible children.

While the rationale for using CCTs and the administrative requirements of the program in rural and urban Mexico are the same, there were differences in implementation and take-up that are worth noting. Unlike the rural program where a census of target communities was conducted to identify households that met the eligibility criteria, in urban areas program offices were set up and advertised. Households that considered themselves eligible could apply for the program during a two-month window. Although in rural areas there were very high participation rates, only about 60% of urban households who were eligible applied for the program and about one third of nonparticipating but eligible, urban households report not being aware of the program (Behrman et al, 2010).

3. Conceptual framework

For each month they are in the program, households eligible for education transfers have to decide whether or not their children attend school at a sufficient level (at least 85% of the time) so as to obtain the transfer payment. This schooling decision is similar to those made by most poor households with the addition of this short-term monetary benefit for attendance. In this section, we consider household decision making with respect to schooling and how the addition of transfers may affect that decision.

Households invest in education both as a consumption good, which is valued for its own sake, and as an investment in human capital (Gertler and Glewwe 1992). At the core of the human capital view of education is the idea that additional schooling is an investment of current time and money for enhanced future earnings (Mincer 1958; Schultz 1961; Becker 1964). Numerous studies across individuals, households, farms, and firms have documented the strong empirical relationship between educational attainment of individuals or groups and their productivity and performance in the market and nonmarket (home) realms (Schultz 1988). Moreover, empirical studies have confirmed that more educated men and women receive higher earnings than the less educated in a wide range of activities (Psacharopoulos 1983; Jamison and Lau 1982). The power of the human capital approach then rests on the notion that individuals or households respond to these rates of return within an investment context (Freeman 1987).

A household then faces a trade-off between the long-term benefits of education investment in terms of the utility gained from being educated and the financial returns to education versus the short-term costs of education. Costs include the *direct costs* associated with sending a child to school, such as the costs of school fees, supplies, uniforms, and transportation, as well as the *indirect costs* or opportunity costs, in terms of loss of potential income or potential household

benefit if a child works at home instead of going to school. Given this trade-off, even without the transfer, the expectation is that beneficiary households would invest to a certain degree in education to obtain these returns. An education transfer such as those provided by CCT programs is expected to further increase the optimal level of schooling investment by lowering the net short-term direct and indirect costs associated with education.

However, even if households are aware of the returns to education, poorer households facing liquidity constraints are likely to find schooling costs burdensome and may thus decide on less schooling for their children. For example, Jacoby (1994) finds that children start withdrawing from school earlier in households that appear to be borrowing constrained. Along with lowering the costs of education, cash transfers may also help households overcome liquidity constraints, inducing greater investment in education. Of course, this depends on the size of the transfer and the degree to which it overcomes such constraints.

In general, policies designed to relax these resource constraints are expected to have a beneficial impact on the education outcomes of poor households. Overall, ample empirical evidence suggests that Oportunidades has successfully done so although the studies have tended to focus on rural areas. For instance, Skoufias, Parker, Behrman et al. (2001) find that the program significantly increased school attendance for both boys and girls, while at the same time significantly reduced their participation in work activities. Behrman, Sengupta, and Todd (2005) also provide evidence that participation in the program is associated with higher enrollment rates, less grade repetition and better grade progression, lower dropout rates, and higher school re-entry rates among dropouts. Further evidence on the success of the program in promoting human capital accumulation among poor households is provided by Schultz (2004) and Rawlings and Rubio (2005). Even with the differences in program targeting in urban areas, the evidence does

suggest that like rural areas the urban program had an impact on schooling outcomes (Behrman et al; 2010; Parker, Todd and Wolpin, 2006). Other empirical studies have demonstrated that, in general, there is a close link between school fees, education subsidies and the demand for education.[6]

Even though CCT programs eliminate some of the direct costs associated with schooling, the programs do not necessarily fully compensate families that have very high direct costs due to transportation and transaction costs. Neither do the programs necessarily counteract higher opportunity costs likely to be present in urban areas. For example, poorer households with several students may face higher transportation costs and transaction costs for sending their children to school. Similarly, households with very young siblings may also face a higher opportunity costs if there is no one in the house to help care for these youngsters, especially if parents work part-time or full-time. Thus, while programs induce a shift toward greater education on average, there may still be beneficiary households that face sufficiently high direct and indirect costs to the degree that school attendance is not worthwhile and for these households forgoing the transfer, or part of the transfer, is optimal given the constraints they face.

Beyond the direct and indirect costs associated with schooling, other factors have been found to influence a family's educational decisions and these will result in differences in how households respond to the availability of transfers for school attendance. The demographic structure of the households, including size, composition and number of school age children, can potentially influence schooling decisions. Parents (or society) may have a preference to educate boys over girls (or vice versa) and some studies show that parents' willingness to pay for education varies by gender (Gertler and Glewwe 1992). School quality is also a key factor (Behrman and Birdsall 1983). For example, school quality has been found to influence

enrollment in private schools in Pakistan (Alderman, Orazem, and Paterno 2001) and on primary schooling demand in Madagascar (Glick and Sahn 2006).

An additional consideration in analyzing the schooling decisions of CCT beneficiaries relates to the program administration. In an analysis of the dropouts from urban Oportunidades, González-Flores, Heracleous and Winters (2012) find that 7-8 percent of beneficiaries completely drop out of the program each year and of those one-quarter are for administrative as opposed to behavioral reasons. Although this is often part of a continuous targeting procedure, at times it is related to administrative problems that may be location specific, particularly in larger urban areas. This suggests that administrative factors of the program itself may also influence the schooling decisions of beneficiary households.

4. Data

The primary data for this study is the Oportunidades administrative data. Since the focus is on the urban Oportunidades program, only households that live in urban areas—defined by the Mexican government as localities with 15,000 inhabitants or more—are included in the data set. Within urban areas, the government incorporated recipients in two waves—one in 2002 and the next in 2004—and the sample was stratified to ensure the proportion of households incorporated in each period reflected the proportion in the actual program. Furthermore, since all the states and the Federal District are included in the program, the sample was stratified by state and the Federal District to ensure proportional geographic representation of the population. With this stratification, beneficiary households were randomly selected from the list of beneficiaries referred to as the *padron.*[7] The data set consists of 19,649 beneficiary households of which 12,456 (63 percent) were incorporated in 2002 and 7,193 households (37 percent) in 2004. However, given the focus of this paper on the education component only households that had

eligible children to receive a scholarship at any given time while in the program were included in the final sample. The final data set thus consists of 13,716 households of which 9,049 (66 percent) were incorporated in 2002 and 4,667 (34 percent) were incorporated in 2004.

Because information is available on each beneficiary household for the entire time they had eligible children in school and up until all children graduated or until the household dropped out, there are multiple observations for each household. The Mexican school year goes from September through June.[8] Since there are five bimonthly periods per school year and data is available through the end of 2007, there is a maximum of 32 time periods for those that *(i)* started the program in 2002, *(ii)* had eligible children registered in school, and *(iii)* did not drop out of the program. This means that our sample is an unbalanced panel of 13,716 beneficiary households. The number of observations for each household varies from 1 to 32, with a total number of observations of 270,668.

A primary source of information on beneficiaries comes from the questionnaire administered to households to determine their eligibility (referred to as the ENCASURB). The questionnaire obtains data on a range of characteristics of the main beneficiary as well as all the members of the household prior to their incorporation into the program. This information is used to calculate the "puntaje", which is the score used to determine eligibility in the program. Along with responses to questions, the administrative data also includes the calculated *puntaje* as well as the locality marginality index used for geographic targeting of the program, and other variables related to the characteristics of the community. All of these variables are from the initiation of the program and, as such, represent beneficiary baseline characteristics.

The next three sets of data come from Oportunidades' administrative data and are related specifically to the education component. The first contains information on all households that

had children registered in school and were eligible for scholarships during the period of focus. It includes information for each student in the household, the school, level and grade attended and the year and months attended. The second dataset includes records of all the cash transfers given to a household broken down by component—food, energy, support to elders, and education—with separate information for scholarships and school supplies. The third dataset provides information on each student in the household that received school supplies instead of cash for school supplies, as well as when these provisions were made so the value of these supplies could be determined. By combining information from these sources, we are able to determine for each school period (bimonthly periods) the number of students in a household, their gender, level and grade attended, as well as their record of school attendance. It is also possible to calculate how much money a household was eligible to receive for the education component for each school period, as well as how much they actually received.

Along with the administrative data, we also have information on the quality of education - student-teacher ratio and expenses per student - which are available for each of the schools that beneficiary students attend and for each of the school years studied. Additional information related to quality of health, and macroeconomic variables have also been obtained from other Mexican government agencies. In particular information about the health care provider for each household as well as a variable for assigned beds per 10,000 people is used to proxy the quality of health care provided in each state. Moreover, we have knowledge of the paying institution—Bansefi, Telecom or Bancomer—through which beneficiary households receive their bimonthly payments. Some of these sets of outside data are available at either the municipality or state level, and in many cases over time, and thus can be matched with the expanded dataset. The final

data set, thus, includes a combination of time-invariant data (from the baseline) and time-variant data.

To begin the description of the data, we first examine the level of compliance with the conditions of the education component. Recall that the level of compliance determines if a student's family is entitled to a full or partial scholarship, or no scholarship for that student for any given bimonthly school period. Only 24 percent of recipients fully complied with the education conditions during their time in the program although nearly two-thirds of recipients (64 percent) obtained three-quarters or more of their expected scholarship. On the other hand, 2.7 percent of households obtained less than 25 percent of their expected scholarship for the entire time they had eligible children in school and remained in the program. While the vast majority of beneficiary households consistently obtained a large fraction of their expected scholarship, nearly one-third (36 percent) received less than half of what they were eligible to receive.

Although the subsequent analyses are done for each bimonthly period of the school year, the following descriptions are for the different school cycles observed in this paper—that is, from 2002-2003 to 2006-2007. Figure 1 shows compliance levels by school year. Looking at the trends, three patterns emerge. First, the percentage of households with zero compliance starts very small (2.8 percent) but increases overtime every year until it reaches a high of 8.2 percent in 2006-2007. Second, the percentage of households with full compliance decreases over time for the first three years, it then increases a year after the second cohort was incorporated to 50.3 percent, and then full compliance decreases once again. Lastly, the percentage of households with partial compliance is inversely related to full compliance. These patterns seem to indicate that, on average, the levels of full compliance are higher during the early years of the urban expansion and seem to decrease the longer households remain in the program. Conversely, the

levels of zero compliance are very low during the early years of the urban expansion but they increase the longer households remain in the program. On the same graph, we also plot the percentage of high school students in each school cycle. There is an upward trend in this series starting from about 9% in 2002 and reaching 28.5% in 2006, indicating a possible link between zero compliance rates and kids being older and thus in higher grades.

[FIGURE 1 HERE]

Overall, in the six school years considered, an average of 52 percent of households with eligible children registered in school fully complied with the education co-responsibilities, for an entire school year and received 100 percent of their expected scholarship. On average, only 7 percent of households failed to comply completely for at least one entire school year and lost at least one full school cycle worth of scholarship(s). Lastly, on average, 42 percent of households partially complied at least once for an entire school year and received a fraction of their scholarship.

Since information is available on the level of compliance, or share of payment received, for every bimonthly payment period, this can be analyzed for each period. As shall be noted below, however, the analysis suggests that results are driven largely by the decision not to comply (not to receive full payment) or to fully comply (to receive full payment) rather than the level of compliance (fractional amount). As such, the dependent variable in much of our subsequent analyses takes the value of one if a household receives the full scholarship for the bimonthly period and zero otherwise. In the sample, 66.2 percent of the household-bimonthly period observations received 100 percent of the scholarships and 33.8 percent received less than 100 percent of which only 12 percent received no payment. Of the 13,716 households in our sample, 99.2 percent had received 100 percent of the scholarship in at least one bimonthly period, while

76.3 percent received 0 percent at least once. Further, conditional on a household ever receiving 100 percent of the scholarship, 69.5 percent of its observations have 100 percent. Also, conditional on a household ever getting 0 percent, 40.7 percent of its observations have 0 percent. This indicates that the value of full payment is more stable in our sample than the value of 0 percent.

Table 1 provides summary statistics of the characteristics of Oportunidades beneficiaries included in the sample. The variables included in the table are those that are used in subsequent analysis and are linked to the conceptual framework discussed in Section 2. Summary statistics are included for the whole sample of households as well as broken down by those who received full payment versus those that received zero or partial payment over the entire period they were in the sample. Tests of the differences in the means between the two groups are also provided. The data clearly shows significant differences between the two groups.

[TABLE 1 HERE]

The first set of variables show household demographic structure including the breakdown of students within the household and key characteristics of the main recipient or *titular*[9]. The types of students in the household are likely to determine the opportunity costs to the household of attending school. Further, as noted previously, demographic factors generally tend to influence household schooling decisions.

Household characteristics determine the opportunity costs of the household as a whole as well as the resources available to the household. While the education of the main recipient may lead to a greater value placed on education, if they work outside the home they may require support in the house by older children in their absence. Further if the family has a member who has previously migrated, it may indicate labor constraints.

A key concern of the program is that poorer households may face greater costs of education and therefore be less likely to obtain the benefits of the program. The public assistance measure indicates a household that is poor enough to receive other forms of assistance beyond Oportunidades. The *puntaje* is the index of poverty used to target the program and is linked to demographic factors and limited assets with the higher the *puntaje* the greater the poverty.

School quality is measured by two variables: the student-teacher ratio and school expenses. Information for both variables comes from the Mexican Secretary of Education for all schools that are part of Oportunidades. The data is by school year for 2002 to 2007 and is at the school level (unique value for each school). Since the data is at the school level, a weighted variable is created for the household, depending on the composition of the students in the households, and the number of children attending each school at the different levels. There are on average 26 students per teacher and average schooling costs are around 1,800 pesos per year per student.

A number of administrative factors are also included as controls and because the variables are of interest in themselves. Administrative procedures can influence how households interact with the program and whether they remain in the program. The method of payment varies by recipient as does the healthcare provider for the health component of the program. Transfer payments for all components of the program are carried out through specialized paying institutions that provide payment at Oportunidades service centers, at their own establishments, or by way of deposits in personalized bank accounts. Three public institutions (Bansefi, Telecomm and Banrural) as well as one private bank (Bancomer) provide the payments. For the urban program, Banrural is rarely used and Bansefi is the most common provider.

High school students must attend public health lectures eight times throughout the year. Failing to do so, results in a lower July payment for the household. Characteristics of the health

care provider and the health care system may then influence payment receipt. Partial recipients are assigned to SSA (Secretary of Health) for the health care provider, while a smaller percentage is assigned to IMSS (Mexican Institute of Social Security). Beyond the programs health administration, the quality of health care can also influence program interaction and this is proxied by the number of beds per 10,000 inhabitants in the state.

In terms of community characteristics, the marginality of the community from which the recipient came and the size of the overall municipality are included. In a more marginal community, the expectation is that there will be a great critical mass of recipients which may have an effect on recipient behavior and administration of the program. The size of the urban environment in which the recipient lives may have an effect on the opportunity and direct costs to meeting program conditions, as well as on the administration of the program.

Finally, a set of controls are included for macroeconomic conditions that can alter the context in which households are making schooling decisions since they influence the opportunity costs of attending school.[10] Macro controls include food inflation, since food prices are expected to be important for this poor segment of society, unemployment rates and unskilled wages measured at a daily rate.

5. The empirical approach

To investigate the factors that influence beneficiary households' schooling decisions, we implement non-linear panel methods as well as techniques for estimating fractional response variables. The choice of methods is mainly driven by the nature of available data. As noted in section 4, the analysis uses a random sample of beneficiary households that entered the Oportunidades program in two cohorts (2002 and 2004). Households are observed for the first time when they have children who are eligible for the educational benefits. These households are

followed until the end of 2007, or until they drop out of the program, or until they no longer have eligible children for the education benefits. The number of observations per household therefore varies due to a combination of entry and exit dates, which gives rise to an unbalanced panel data set.

The dependent variable of interest (y) is defined as the amount of education scholarships beneficiary households receive in each bimonthly period, as a percentage of the amount for which they are eligible. It is thus a proportion, defined and observed only in the standard unit interval, i.e. $0 \leq y \leq 1$. The data set also exhibits a large number of the dependent variable at each corner with approximately 66 percent at one and 12 percent at zero. The bounded nature of this variable, as well as the non-trivial number of observations at the boundaries raises interesting estimation and inference issues. In particular, the linear regression model is deemed inappropriate since it may give rise to predicted values outside the unit interval. Other alternatives include, modeling the log odds ratio instead, or using the beta distribution to model the fractional dependent variable. Both, however, are inappropriate when a significant number of observations take the extreme values of zero or one, as in the case of this study.

To address these issues, we consider three different dependent variables and each one requires a different econometric approach; namely a random effects probit model, an ordered probit model and a fractional response model. The fractional response model might seem the most logical choice of the three given the fractional nature of the data. However, since the panel is unbalanced taking advantage of the panel nature of the data by using a fractional model—that is, using fixed or random effects to control for unobservables—is to the best of our knowledge not possible with the currently available estimation methods. An alternative is a random effects probit in which whether a household does not receive full payment is analyzed. Although this

takes advantage of the panel nature of the data by controlling for unobserved differences between households, information is lost by collapsing all fractional payments into zero. Therefore, an ordered probit model in which three options, no payment, partial payment and full payment, was also explored. In the end, the results of the three models were consistent and showed that the results are driven largely by the transition from full payment to non-full payment. In the interest of space, only two of the methods, the random effects probit and fractional model, are described in detail below and presented in the results section. The results of the ordered probit were consistent with these models and, as would be expected, represented an intermediate result.

(a) Random effects probit model

A popular model for binary outcomes with panel data is the unobserved-effects probit model. The benefit of this model is that it controls for unobservable differences between households that may bias the coefficients estimated through an analysis that does not control for such effects. The dependent variable of interest in this case is defined as y_{it} =1 if household receives the full payment and zero otherwise. The model for the probability that a household receives a full payment (which reflects the household's decision of how much education they choose for their children) is represented by equation (1), below:

$$\Pr(y_{it} = 1/ X_i, \mathrm{Z_{it}}, \mathrm{c_i}) = \Phi(\beta_0 + \beta_1 X_i + \gamma \mathrm{Z_{it}} + \delta_1 S + \delta_2 D + \alpha T + \mathrm{c_i}), \quad i = 1,...,N, t = 1,...,T_i \tag{1}$$

The index i denotes a beneficiary household and t indicates the bimonthly period. For each household we observe T_i observations. The set of time-invariant variables, $\boldsymbol{X}_i$ represents baseline recipient, household and community characteristics and $\boldsymbol{Z}_{it}$ is vector of time-varying variables, including school quality, paying institution, health variables and macroeconomic variables. State fixed effects and date-of-entry effects are also included and represented by S and D respectively. Finally, T includes time variables such as time dummies for the different periods to control for

aggregate time effects common to all households, as well as a cubic time polynomial for the length of time households had students in school. Finally c_i represents unobserved household specific errors, which are normally distributed as follows: $c_i \sim N(0, \sigma_c^2)$. Under the assumptions of strict exogeneity, conditional serial independence, independence between c_i and the regressors and $c_i \sim N(0, \sigma_c^2)$, the model parameters are identified and consistently estimated by full maximum likelihood estimation.[11]

The fact that the model controls for observable heterogeneity by using a wide range of household characteristics, such as family size, dependency ratio, gender, age, and education of the recipient, renders the random effects assumption of independence between the regressors and the household effects more plausible. Controlling for macroeconomic shocks and the urban environment may make the strict exogeneity assumption more plausible as well.

(b) Fractional response model

In order to fully explore the information in the dependent variable, methods designed for fractional response variables are also applied. In many economic settings, the dependent variable of interest occurs as a fraction or percentage. Examples include 401(k) contributions, firm market shares, proportion of exports in total sales, Nielsen television ratings and in this case fraction of educational scholarship received. Over the last decade, researchers have developed a number of ways to tackle the functional form issues raised by fractional data. In a seminal paper, Papke and Wooldridge (1996) proposed a Quasi Maximum Likelihood (QML) estimation method for fractional dependent variables in a cross-sectional setting. The method is based on the Bernoulli likelihood function and gives rise to a QML estimator that is consistent and asymptotically normal provided that the conditional mean is correctly specified.

The response variable of interest is now the percentage of the educational scholarship that a household receives in a bimonthly period, y_{it} ,$0 \leq y_{it} \leq 1$. Instead of a probability, the conditional expectation is modeled and the model can be presented as follows:

$$E(y_{it} / X_i , \mathrm{Z_{it}}) = \Phi(\beta_0 + \beta_1 X_i + \gamma \mathrm{Z_{it}} + \delta_1 S + \delta_2 D + \alpha T), \quad i = 1,...,N, t = 1,...,T_i \tag{2}$$

To estimate this model, a pooled fractional estimator suggested by Papke and Wooldridge (2008) is used. The standard errors are adjusted in this case for arbitrary serial dependence across *t* and heteroskedasticity. The problem with this pooled estimator is that it ignores the unobserved household specific effects and can thus lead to potentially inconsistent estimates. For this reason, both this and the random effects probit model are reported.

6. Analyses of schooling decisions

Table 2 presents the estimates of the marginal effects based on the random effects probit estimator while Table 3 presents the results of the pooled fractional response estimator. In both tables, Model 1 represents a base specification with all the key variables included while Models 2 and 3 include interaction terms discussed in detail below. For Model 1, the significance and direction of the estimated marginal effects in both estimators are almost identical, but the magnitudes are different. This, however, is not surprising since one approach models a binary variable whereas the other models a fractional variable. It is also worth pointing out that the random effects estimator produces a reasonably large estimate of rho, roughly (0.515), which casts some doubt on methods that ignore unobserved heterogeneity. Since the random effects probit utilizes the panel nature and our data exhibits a large number of observations, the discussion focuses on these results.

[TABLE 2 HERE]

To begin, we examine the variables related to household demographics. Those with a higher dependency ratio and a larger household size are found to be less likely to receive full payment. The results may reflect the fact that households with more dependents require older children to mind the younger ones and the difficulty, noted above, of managing children's education when there are many children in the household. These households also face greater health requirements that they must fulfill to stay in the program. In an effort to meet the health requirements, they may sacrifice some education for their children, which does not disqualify them from the program, but only reduces payment. These results correspond to those found for the composition of the students in the household. In particular, the number of students attending school, the percentage of students attending junior high school, and the percentage attending high school have statistically significant negative impacts on the probability of receiving 100 percent of the education scholarship. Therefore, the greater the number of eligible students, the higher the likelihood that one of them might not attend school, thus lowering the probability of receiving the full transfer amount. This indicates a difficulty in maintaining full attendance for families with multiple students. Additionally, the further along in school the students are the more likely the students will fail to attend. This is probably because these older students have greater employment opportunities or more responsibilities at home.

[TABLE 3 HERE]

The percentage of female students in the family has a positive and significant impact on the probability of receiving the full payment, which implies that males are less likely to attend school. This may be the result of the higher scholarship payments for female students, but may also reflect greater opportunity costs for males of staying in school. The higher the percentage of students attending an indigenous or a special needs school, the lower the probability of full

payment. This may be due to transportation cost and difficulties involved in getting the indigenous or special needs students to school.

The results indicate that beneficiary households with single, male recipients are less likely to receive full payment. In fact, recipients who are single have a 5 percent lower probability of getting full payment than married recipients, indicating their ability to maintain the school attendance of their children is more limited. Since recipient age enters the model in a quadratic form, to compute the relevant total marginal effect the partial derivative are evaluated with respect to age, which involves the coefficient of both age and age squared and is evaluated at the mean of the other covariates. Even though individually the variables are not significant, the joint test indicates that they are jointly significant. The total marginal effect is found to be -0.00302 and is statistically significant at 1 percent. This indicates that older beneficiaries have a harder time getting children to remain in school although considering the range of age values the marginal effect does not translate into a large effect. Indigenous households appear to be 4 percent more likely to receive full payment. This is in contrast to the result suggesting that indigenous and special needs schools reduced the likelihood of full payment. This previous result indicates there may be an issue with the schools themselves or the particular families that send their children there rather than being indigenous.

The recipient education also enters the model in a quadratic form. The total partial effect is 0.0103 and is statistically significant at the 1 percent level. This means that households with recipients who have one more year of education have a 1 percent higher probability of receiving full payment. The average recipient has five years of education, but the majority has six years of education (completion of primary school) with over half having less than six years. Going from no years to primary school education increases the probability of full payment by around 6

percent. The result corresponds to the positive link between parental education and school attendance.

Whether the recipient works part-time or as a casual laborer does not seem to influence education payments, although the recipient being a full-time worker has a small (2 percent) marginally significant negative effect. This may be due to the need of children to cover work at home when the recipient is away at work, or on the inability of a working recipient to supervise and enforce school attendance of the children. On the other hand, those households receiving public assistance, which would be expected to be poor and not working, are more likely to receive full payment.

The next variable is the puntaje which is a measure of household wealth and allows an exploration of whether the poorest beneficiary households, in particular, fail to send their children to school and thus get lower education payments. Recall that the puntaje measures the degree of poverty so the higher the puntaje the higher the level of poverty. The puntaje is negative and significant raising concerns that poorer households are less likely to have their children attend school and are less likely to receive full payments.[12] The puntaje ranges from 0.69 (the cut-off for eligibility) up to around 4 and over this range the probability of receiving full payment drops by 4 percent.

Given the particular concern over the ability of poorer households to keep children attending school and receiving full education payments, we explore whether greater demographic pressure on these households increases the chances they will not receive full payment. To do this, Model 2 in Tables 2 and 3 include interactions between the puntaje and the demographic characteristics of the students in the household. Note that the results on other variables in Model 2 remain largely the same as in Model 1. The results are mixed. Having more students slightly increases

the probability of getting full payment for poorer households relative to the rest of the population. Additionally, for the poorest households having a higher share of female students in the household leads to a slightly lower probability of getting full payment. This suggests either there is greater pressure among the poor for female students to not attend school, or alternatively relatively greater pressure for male students to attend. The results for the share of students in junior high school and high school are most problematic as they suggest that the probability of full payment and full attendance is even lower for the poorest households with students at these levels of schooling. This indicates the opportunity costs of going to high school become too high for these very poor households.

A further alternative specification (not shown) was estimated to control for the number of kids under 5 years old in the household since it might be expected to influence the ability of the household to comply with the education component of the program. The results indicate the families with more kids under 5 seem to have a higher probability of receiving full payment. However, the coefficient on an interaction term with puntaje indicates that in poorest households, the presence of kids under 5 lowers the probability of full payment suggesting child care constraints are greatest among the poorest households.

Looking at school quality indicators, the student-teacher ratio has a positive and statistically significant, but economically small effect on the probability of full payment. The student-teacher ratio was expected to have a negative effect since it suggests more students to deal with and, therefore, potentially lower quality schools (poorer school supply). This positive impact, though not expected, might instead reflect the fact that higher attendance leading to higher student-teacher ratio may be linked to better quality schools (higher school demand).

Administrative variables are included as controls since they are expected to influence on households' schooling choice. Those households receiving payments through Telecom and Bancomer are found to be less likely to receive full payments and there appears to be something about the Bansefi recipients that make them more likely to get full payment. The results suggest the health provider (SSA or IMSS) does not influence payment although the number of beds per 10,000 people has a positive effect. The number of beds per 10,000 people is an indicator of health care quality and thus indicates the higher the quality the more likely students will receive full payment.

Because the environment in which a household lives influences the costs of attending school and administering the program, the location of a household may have an impact on schooling attendance. The regressions include variables for the level of community marginality and the size of the urban environment in which the household lives. The most striking result is the apparent negative effects of being in larger urban areas. The effect is particularly large for urban centers of more than 1 million households where the probability of receiving full payment is 12 percent lower relative to the smallest urban communities. This suggests that urbanization is reducing the ability of the children of beneficiary households to attend school.

To explore whether certain types of households are more likely to receive less payment in these highly urban areas, we explored models with interactions between large urban areas and the education demographics as well as the puntaje. The results (not shown) did not suggest that the pressure to not attend was any greater on poorer households (with a higher puntaje) or on households with more students, more female students, or more students in junior high school or high school. This implies that the urban environment is affecting nearly all students in the same

manner. This could be due to generally further distances to attend school, greater transportation costs, higher opportunity costs or issues with administration of the program in these areas.

To investigate the extent to which macroeconomic shocks influence the amount of schooling chosen by beneficiary households, the growth in food inflation, growth in unemployment and growth in unskilled wages are included in the model. Increases in food inflation have a negative impact on the probability of receiving a full education scholarship suggesting that during higher inflation periods households in the program cut back on education. Increases in unemployment (growth in unemployment) on the other hand, increase the probability of receiving the full education amount as expected. In a similar way, increases in unskilled wages have a positive impact on the probability of full payment. This might indicate that short-term changes in wages enable households to meet program conditions and choose to accept the education scholarships for all eligible children in the household.

The final set of variables captures the length of time a household has been receiving education scholarships which we include in the model using a nonlinear specification. The total partial effect evaluated at the mean of other variables is -0.0152 and is highly statistically significant. Figure 2 shows the influence of time in the program on the probability of receiving a full scholarship. The shape of the curve suggests that in the first bimonthly periods some households do not meet conditions, but once they realize payment will be reduced most households increase attendance and receive full payment. This may be because households are exploring if the conditions will be enforced and payments reduced. However, after the first year (about 6 bimonthly periods) there is an increasing tendency to fail to meet conditions and to receive lower payments. This may reflect the fact that over time the opportunity costs of sending children to school increases as they get further into their education. Toward the end of the time in

the program, there is a slight increase in the probability of receiving full payment probably due to the fact some households completely drop from the program and that those that remain are more likely to attend.

[FIGURE 2 HERE]

Given the results for large urban areas show lower probabilities of full payment, we want to explore if the duration in the program has greater effects for these areas—that is, in highly urban areas is the lower payment effect even greater the longer households remain in the program? To do this, Model 3 in Tables 2 and 3 include interactions between the time in the program and being in a large urban setting. As can be seen in the tables, the estimates on the interaction terms are significant. Given the nonlinear nature of the interactions, the results are reported in Figure 3. These suggest that in general large urban areas have a lower probability of getting a full payment, but the results are partially driven by lower initial probabilities of getting full payment (by 10 percent). Participants in urban areas appear to be more likely to test whether the program conditions will be enforced and even after that are more likely to forego full payment.

[FIGURE 3 HERE]

As a check on whether cash or in-kind support is provided a specification (not shown) with a dummy variable is included to control for the fact that some households received school supplies instead of cash for purchasing school supplies. The dummy variable for receiving school supplies is significant and has a positive impact on the probability of full payment. The directions and significance of the main effects discussed remain largely the same.

Finally, a robustness check is performed focusing on the sample of households that never dropped out of the Oportunidades program during the period under consideration, so as to

partially control for the attrition in the dataset. The main effects presented in the annex (Table A1 and A2) remain largely the same as those in Table 2 and 3.

7. Conclusions

Conditional cash transfer programs pay cash to poor households under the condition that they enroll their children in school and regularly attend school. The justification for such a payment is the idea that liquidity constraints limit the ability of the poor to afford education for their children as well as the fact that the opportunity cost of receiving an education are often high for poor households. Providing cash linked to schooling outcomes should help overcome both of these constraints and induce greater school attendance. However, using administrative data from the Mexican Oportunidades CCT program, this paper shows that recipient households often fail to meet education conditions and therefore do not receive full payment. In fact, the data shows that one-third of bimonthly education payments to households are less than the eligibility amount showing that one-third of the time at least one child in the households is failing to regularly attend school. The data also show that in any given school year only about one-half of families fully comply with school attendance conditions and receive all the transfers for which they are eligible.

The analysis of education transfer payments shows that the poorest households—as defined by the puntaje index—are less likely to receive the full payment for which they are eligible. This is clearly illustrated qualitatively in Figure 4, which splits the data into quintiles using the puntaje index: the poorest quintile has the smallest percentage of households receiving a full-scholarship and the largest percentage of households receiving only partial payments. On the other hand, the least poor quintile has the largest share of households receiving a full scholarship. Further, recipients with no education are less likely to receive full payments compared to those

with primary school. Conditionality is inducing the marginally poor to invest more in education than the poorest households. These results run in contrast to those found for the health component of the program where the marginally poor are less likely to meet conditions and more likely to be dropped from the program (Álvarez, Devoto and Winters, 2008; González-Flores, Heracleous and Winters, 2012). The poorest households may face a trade-off in meeting the conditions of the health versus education components of the program. Failure to meet health conditions leads to expulsion while failure to meet education conditions leads to lower payment. Faced with this trade-off, recipients may choose to adhere to health conditions first and education payments second to ensure they remain in the program.

The result for the poorest recipients is found to be even stronger in households with students in junior and senior high school, precisely where the pressure to not attend school is the greatest. It may be that the poorest households are finding it difficult to maintain investment in schooling as the opportunity costs for teen laborers increases. Alternatively, parents may find it difficult to maintain their teenage kids in school, particularly since the transfers go to parents not children. Given this is a key target population, the reasons for lower schooling investment should be examined more carefully.

A key factor in failing to meet program education conditions is the demographic composition of the household. The more students, the larger the family and the greater the dependency ratio, the less likely the household will comply. Further, the greater the number of female students the more likely the household will comply, except for the poorest households. Finally, the more students at higher levels of education particularly high school the less likely the household will comply. The analysis also points to lack of parental support leading to a lower chance of full payment. Households with single and male recipients and those who work full time are less

likely to get full payment. At present, the impact of the program on school attendance appears to be relatively lower for these particular groups. Taken together, the analysis points toward the need to carefully consider household composition in designing and administering the program. Special attention may need to be paid to larger families, particularly the poorest, where the pressure to not attend school may be greater.

There are substantial problems with the program in heavily populated urban areas as they are more than 10 percent less likely to get full payment. In general, school attendance in dense urban areas is much less than in smaller urban environments. The limited results on interaction terms suggest that there are some characteristics of large urban areas that are leading to this effect. Further information should be gathered to determine why this would be the case and if it is related to transport costs, higher opportunity costs or administrative factors. Depending on the reason, the program should address the issue.

Overall, the analysis provides strong evidence that even when provided with cash incentives designed to induce school attendance, some poor households fail to do so. While the amount of schooling chosen appears to be influenced by the incentives provided to enroll and attend school, a particular price or payment for education may be insufficient to constantly and consistently induce students to attend. From period to period, the incentives to attend vary with certain factors creating greater pressure to miss school and fail to receive full payment. Further analysis should explore how this failure to consistently attend influences long-term investment in human capital.

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[1] See Rawlings and Rubio (2005) for a review of the impacts of CCT programs.

[2] This is an average of around 1.5 billion pesos per year, which is approximately US$140 million per year or $100 per year per recipient. This is equivalent to approximately one quarter of the recipients' total eligibility.

[3] Eligible members are any household member under the age of 18 who has not completed elementary or intermediate school, and all young men/women under the age of 20 who have not completed high school. While families are assigned to a health center, they can choose the school(s) where to register their children as long as the school(s) has been approved by the Secretary of Education.

[4] Information on the health component and its beneficiaries being dropped from the program can be found in Álvarez, Devoto and Winters (2008) for rural areas and González-Flores, Heracleous and Winters (2012) for urban areas.

[5] The education scholarships for elementary and intermediate schools are dependent on children attending school regularly (at least 85 percent attendance), while high school students must show continued "permanence" in school, defined at the local level, and are also responsible for attending eight health related workshops during the school year. If the student does not attend all workshops, s/he will not receive her/his scholarship for the month of July.

[6] Evidence from Pakistan indicates that lowering private school fees or distance to schools increases private school enrollments, even for the poorest households who also use private schools extensively. (Alderman, Orazem, and Paterno 2001). Similarly, data from rural Peru finds that the monetary costs of schools (fees and other costs) have a substantial influence on parents' decisions regarding school attendance and continuation (Ilon and Mook 1991). A related study of Uganda's program of "Universal Primary Education", which dispensed with fees for primary enrollment in 1997, found the program was associated with a dramatic increase in primary school attendance (Deininger 2003). Evidence from northern India also points to a positive relation between child work and schooling costs, and to a negative relationship between school enrollment and schooling costs, which implies that children's work and school attendance are substitutes (Hazarika, and Bedi 2006). The analysis of a targeted enrollment subsidy on children's labor participation and school enrollments in Bangladesh finds that the subsidy increased schooling by far more than it reduced child labor, suggesting that the substitution effect helped protect current incomes from the higher school attendance induced by the subsidy (Ravallion and Wodon 2000).

[7] Nearly two million urban households were added to the program in 2002 and 2004 and the sample is representative of this population.

[8] Except for high school students who also attend school in July.

[9] The household's main recipient or *titular*, generally, is the principal female of the household, who must be at least 15 years of age, needs to live permanently in the house, and must be the main person responsible for the preparation of meals and for the care of children living in the house. The logic of focusing on the mother of the children is the widespread evidence that women, on average, are more likely to spend on the health and education of their children.

[10] Food inflation and unemployment were obtained from the Bank of Mexico (Central Bank) and wage information from the Secretary of Labor and Social Welfare.

[11] The random effects probit estimator of Stata was used to obtain the results in Table 2. The estimator uses adaptive quadrature to compute the log likelihood and its derivatives and the stability of our estimates was confirmed by using different quadrature points (16, 20 and 24). The reported results are based on 30 quadrature points.

[12] Tests were done to see if the relationship between the puntaje and the probability of full payment was nonlinear but this specification did not indicate any nonlinearities in the relationship existed.

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Table 1: Descriptive Statistics

	Full Sample	0 or Partial Payment	Full Payment	Pr(|T| > |t|)
Household demographics				
Household Size	5.3	5.5	4.7	0.000 ***
Dependency Ratio	1.65	1.71	1.44	0.000 ***
No. of Students in Household	1.90	2.05	1.42	0.000 ***
% Female Students	50.4%	50.0%	51.9%	0.018 *
% Students in Elementary	57.2%	50.2%	79.9%	0.000 ***
% Students in Jr. High School	26.9%	30.3%	16.0%	0.000 ***
% Students in High School	15.9%	19.5%	4.1%	0.000 ***
% of Students Special Schools	1.2%	1.1%	1.5%	0.085
Recipient: Male	0.7%	0.8%	0.6%	0.332
Single	27.5%	28.5%	24.2%	0.000 ***
Age	35.3	36.3	32.4	0.000 ***
Indigenous	6.9%	6.9%	6.7%	0.566
Household socioeconomic characteristics				
Recipient: Yrs. Education	5.1	4.9	5.6	0.000 ***
No Outside Work	66.3%	65.0%	70.2%	0.663
Casual Work	12.3%	12.5%	11.6%	0.519
Works Part-time	3.4%	3.6%	2.8%	0.699
Works Full-time	18.0%	18.8%	15.4%	0.000 ***
HH with Migrant	1.2%	1.2%	1.2%	0.888
Other Public Assistance	25.3%	26.0%	23.3%	0.002 ***
Puntaje	1.75	1.78	1.67	0.000 ***
School indicators				
Student Teacher Ratio (Avg. / HH)	25.9	25.1	28.4	0.000 ***
School Expenses (Avg. / HH)	1816	1985	1271	0.000 ***
Administrative and community factors				
Paying Institution: Bansefi	68.5%	69.1%	66.7%	0.006 **
Telecom	22.4%	21.9%	24.0%	0.005 **
Bancomer	9.1%	9.0%	9.3%	0.449
Health provider: IMSS	17.5%	15.8%	18.4%	0.000 ***
SSA	82.5%	84.2%	81.6%	0.000 ***
Assigned Beds / 10K	7.03	7.19	6.94	0.000 ***
Very Low Marginality	49.0%	51.1%	42.2%	0.000 ***
Low Marginality	42.7%	41.4%	46.7%	0.000 ***
Medium/High Marginality	8.3%	7.5%	11.1%	0.000 ***
15 K to 20 K inhabitants	6.0%	7.5%	6.4%	0.004 **
20 K to 50 K inhabitants	17.8%	16.4%	22.1%	0.000 ***
50 K to 100 K inhabitants	15.1%	14.9%	15.8%	0.233
100 K to 500 K inhabitants	38.4%	39.2%	35.8%	0.001 **
500 K to 1 million inhabitants	17.4%	18.1%	15.2%	0.000 ***
1 milion or > inhabitants	4.9%	5.3%	3.7%	0.000 ***
Macroeconomic controls				
Food Inflation (Index 2002, Q2)	114.7	114.4	115.5	0.000 ***
Unemployment	3.2	3.2	3.1	0.000 ***
Unskilled Wages (per day)	44.5	44.4	44.5	0.016 *
Observations	13716	10469	3247	

* Significant at 5% level; ** at 1% level; and *** at 0.1% level

Table 2: Binary models		**Model 1**		**Model 2**		**Model 3**	
		mfx	p-value	mfx	p-value	mfx	p-value
Household	Household Size	-0.0190***	(0.000)	-0.0195***	(0.000)	-0.0195***	(0.000)
demographics	Dependency Ratio	-0.0182***	(0.000)	-0.0181***	(0.000)	-0.0181***	(0.000)
	No. of Students	-0.121***	(0.000)	-0.146***	(0.000)	-0.146***	(0.000)
	% Female Students	0.0560***	(0.000)	0.102***	(0.000)	0.102***	(0.000)
	% Students in Jr. H.S.	-0.106***	(0.000)	-0.0534***	(0.000)	-0.0528***	(0.000)
	% Students in H.S.	-0.460***	(0.000)	-0.257***	(0.000)	-0.257***	(0.000)
	% of Students Special School	-0.0840***	(0.000)	-0.0879***	(0.000)	-0.0883***	(0.000)
	Recipient: Male	-0.0777	(0.061)	-0.0763	(0.066)	-0.0761	(0.067)
	Single	-0.0551***	(0.000)	-0.0567***	(0.000)	-0.0567***	(0.000)
	Age	-0.00347	(0.100)	-0.00358	(0.090)	-0.00356	(0.092)
	Age squared	0.00000374	(0.879)	0.00000401	(0.870)	0.00000386	(0.875)
	Indigenous	0.0418***	(0.001)	0.0413***	(0.001)	0.0413***	(0.001)
Household	Recipient: Yrs. Education	0.00944***	(0.000)	0.00965***	(0.000)	0.00966***	(0.000)
socioeconomic	Yrs. Education ^2	0.000154	(0.490)	0.000144	(0.521)	0.000143	(0.524)
	Casual Work	-0.0136	(0.213)	-0.0139	(0.202)	-0.0139	(0.203)
	Part Time Work	0.00379	(0.832)	0.00411	(0.818)	0.00401	(0.822)
	Full Time Work	-0.0223*	(0.028)	-0.0223*	(0.028)	-0.0224*	(0.027)
	HH with Migrant	0.0284	(0.290)	0.0302	(0.259)	0.0303	(0.256)
	Public Assistance	0.0438***	(0.000)	0.0432***	(0.000)	0.0432***	(0.000)
	Puntaje	-0.0141**	(0.006)	-0.00986	(0.255)	-0.00968	(0.264)
	Puntaje x No. of Students	***N/A***		0.0141***	(0.000)	0.0141***	(0.000)
	Puntaje x (% Female Stu)	***N/A***		-0.0264**	(0.003)	-0.0265**	(0.003)
	Puntaje x (% Jr. H.S.)	***N/A***		-0.0301***	(0.000)	-0.0303***	(0.000)
	Puntaje x (% H.S.)	***N/A***		-0.127***	(0.000)	-0.127***	(0.000)
School	Student Teacher Ratio	0.000714**	(0.010)	0.000739**	(0.008)	0.000751**	(0.007)
indicators	School Expenses	0.000579	(0.161)	0.000607	(0.143)	0.000603	(0.146)
Administrative	Telecom vs Bansefi	-0.0181**	(0.003)	-0.0180**	(0.004)	-0.0185**	(0.003)
& community	Bancomer vs Bansefi	-0.0233***	(0.001)	-0.0216**	(0.002)	-0.0227***	(0.001)
factors	SSA vs IMSS	-0.00886	(0.115)	-0.00949	(0.092)	-0.00952	(0.091)
	Assigned Beds / 10 K	0.0468*	(0.018)	0.0466*	(0.018)	0.0466*	(0.018)
	Low Marginality	0.0282**	(0.006)	0.0279**	(0.006)	0.0280**	(0.006)
	High Marginality	0.0237	(0.145)	0.0247	(0.128)	0.0247	(0.128)
	20 K to 50 K	-0.0127	(0.420)	-0.0120	(0.448)	-0.0119	(0.451)
	50 K to 100 K	-0.0338	(0.054)	-0.0336	(0.055)	-0.0338	(0.054)
	100 K to 500 K	-0.0498**	(0.003)	-0.0485**	(0.004)	-0.0488**	(0.004)
	500 K to 1 million	-0.0283	(0.146)	-0.0268	(0.169)	-0.0270	(0.164)
	1 million or >	-0.124***	(0.000)	-0.122***	(0.000)	-0.236***	(0.000)
Macro controls	Chg. food inflation (log)	-0.00284*	(0.024)	-0.00289*	(0.021)	-0.00298*	(0.018)
	Chg. unemployment (log)	0.00794**	(0.002)	0.00797**	(0.002)	0.00798**	(0.002)
	Chg. wages unskilled (log)	0.0206***	(0.000)	0.0217***	(0.000)	0.0218***	(0.000)
	2002 cohorts	-0.0240	(0.068)	-0.0217	(0.101)	-0.0206	(0.120)
Duration	Time in School	0.0367***	(0.000)	0.0361***	(0.000)	0.0351***	(0.000)
	Time in School ^2	-0.00347***	(0.000)	-0.00344***	(0.000)	-0.00339***	(0.000)
	Time in School ^3	0.0000708***	(0.000)	0.0000704***	(0.000)	0.0000698***	(0.000)
Time * Com	Time * Largest Comms.	***N/A***		***N/A***		0.0432***	(0.000)
	Time ^2 * Largest Comms.	***N/A***		***N/A***		-0.00532***	(0.000)
	Time ^3 * Largest Comms.	***N/A***		***N/A***		0.000193***	(0.000)
Fixed Effects	Calendar Time F.E.	***Yes***		***Yes***		***Yes***	
	State F.E.	***Yes***		***Yes***		***Yes***	
Marginal effects		N	270675		270675		270675
p-values in (parentheses)		N_g	13716		13716		13716
* Significant at 5% level		ll	-116954.0		-116839.2		-116826.8
** at 1%		chi2	27696.4		27816.5		27840.3
*** at 0.1%		sigma_u	1.032		1.032		1.032
		rho	0.516		0.516		0.516

Table 3: Fractional models		**Fract. Model 1**		**Fract. Model 2**		**Fract. Model 3**	
		mfx	p-value	mfx	p-value	mfx	p-value
Household	Household Size	-0.0104***	(0.000)	-0.0105***	(0.000)	-0.0105***	(0.000)
demographics	Dependency Ratio	-0.00899***	(0.000)	-0.00906***	(0.000)	-0.00906***	(0.000)
	No. of Students	-0.00397	(0.067)	-0.0190***	(0.000)	-0.0190***	(0.000)
	% Female Students	0.0421***	(0.000)	0.0446**	(0.001)	0.0446**	(0.001)
	% Students in Jr. H.S.	-0.0425***	(0.000)	-0.0426**	(0.003)	-0.0424**	(0.003)
	% Students in H.S.	-0.212***	(0.000)	-0.160***	(0.000)	-0.160***	(0.000)
	% of Students Special School	-0.117***	(0.000)	-0.118***	(0.000)	-0.118***	(0.000)
	Recipient: Male	-0.0578*	(0.027)	-0.0577*	(0.027)	-0.0577*	(0.027)
	Single	-0.0286***	(0.000)	-0.0290***	(0.000)	-0.0290***	(0.000)
	Age	-0.00121	(0.394)	-0.00127	(0.372)	-0.00127	(0.372)
	Age squared	-0.0000127	(0.439)	-0.0000125	(0.446)	-0.0000125	(0.447)
	Indigenous	0.0243**	(0.001)	0.0240**	(0.002)	0.0240**	(0.002)
Household	Recipient: Yrs. Education	0.00466**	(0.005)	0.00481**	(0.004)	0.00482**	(0.004)
socioeconomic	Yrs. Education ^2.	0.000210	(0.142)	0.000199	(0.166)	0.000198	(0.168)
	Casual Work	-0.0129	(0.053)	-0.0129	(0.053)	-0.0129	(0.053)
	Part Time Work	0.0000575	(0.996)	0.000410	(0.970)	0.000379	(0.972)
	Full Time Work	-0.0125*	(0.045)	-0.0125*	(0.045)	-0.0125*	(0.045)
	HH with Migrant	0.0171	(0.285)	0.0176	(0.271)	0.0176	(0.270)
	Public Assistance	0.0182***	(0.000)	0.0179***	(0.000)	0.0179***	(0.000)
	Puntaje	-0.00974**	(0.001)	-0.0236***	(0.001)	-0.0236***	(0.001)
	Puntaje x No. of Students	***N/A***		0.00800***	(0.000)	0.00801***	(0.000)
	Puntaje x (% Female Stu)	***N/A***		-0.00132	(0.855)	-0.00135	(0.852)
	Puntaje x (% Jr. H.S.)	***N/A***		0.000377	(0.959)	0.000268	(0.971)
	Puntaje x (% H.S.)	***N/A***		-0.0341**	(0.001)	-0.0342***	(0.001)
School	Student Teacher Ratio	0.00210***	(0.000)	0.00212***	(0.000)	0.00212***	(0.000)
indicators	School Expenses	0.000872	(0.134)	0.000907	(0.121)	0.000904	(0.122)
Administrative	Telecom vs Bansefi	-0.0157*	(0.010)	-0.0158**	(0.010)	-0.0158**	(0.010)
& community	Bancomer vs Bansefi	-0.0251***	(0.001)	-0.0249***	(0.001)	-0.0254***	(0.001)
factors	SSA vs IMSS	0.00883	(0.111)	0.00892	(0.107)	0.00892	(0.106)
	Assigned Beds / 10 K	0.0170	(0.170)	0.0172	(0.165)	0.0171	(0.166)
	Low Marginality	0.0116	(0.063)	0.0114	(0.068)	0.0114	(0.068)
	High Marginality	0.00222	(0.834)	0.00287	(0.786)	0.00287	(0.786)
	20 K to 50 K	-0.0137	(0.172)	-0.0139	(0.166)	-0.0139	(0.167)
	50 K to 100 K	-0.0247*	(0.023)	-0.0247*	(0.023)	-0.0247*	(0.023)
	100 K to 500 K	-0.0352***	(0.001)	-0.0350**	(0.001)	-0.0351**	(0.001)
	500 K to 1 million	-0.0155	(0.199)	-0.0154	(0.201)	-0.0155	(0.199)
	1 million or >	-0.0724***	(0.000)	-0.0718***	(0.000)	-0.143***	(0.000)
Macro controls	Chg. food inflation (log)	-0.00113	(0.079)	-0.00113	(0.079)	-0.00116	(0.070)
	Chg. unemployment (log)	0.00435**	(0.003)	0.00432**	(0.004)	0.00432**	(0.004)
	Chg. wages unskilled (log)	0.00824	(0.096)	0.00847	(0.087)	0.00811	(0.104)
	2002 cohorts	-0.00827	(0.381)	-0.00899	(0.339)	-0.00884	(0.348)
Duration	Time in School	0.0241***	(0.000)	0.0242***	(0.000)	0.0233***	(0.000)
	Time in School ^2	-0.00221***	(0.000)	-0.00221***	(0.000)	-0.00216***	(0.000)
	Time in School ^3	0.0000448***	(0.000)	0.0000449***	(0.000)	0.0000440***	(0.000)
Time * Com	Time * Largest Comms.	***N/A***		***N/A***		0.0218*	(0.010)
	Time ^2 * Largest Comms.	***N/A***		***N/A***		-0.00236*	(0.021)
	Time ^3 * Largest Comms.	***N/A***		***N/A***		0.0000799*	(0.026)
Fixed Effects	Calendar Time F.E.	***Yes***		***Yes***		***Yes***	
	State F.E.	***Yes***		***Yes***		***Yes***	
Marginal effects		N	270675		270675		270675
p-values in (parentheses)		N_clust	13716		13716		13716
* Significant at 5% level		ll	-117944		-117874		-117867.4
** at 1%		chi2	10816.2		10825.3		10839.3
*** at 0.1%							

Figure 1: Trends of Scholarships Received by School Year

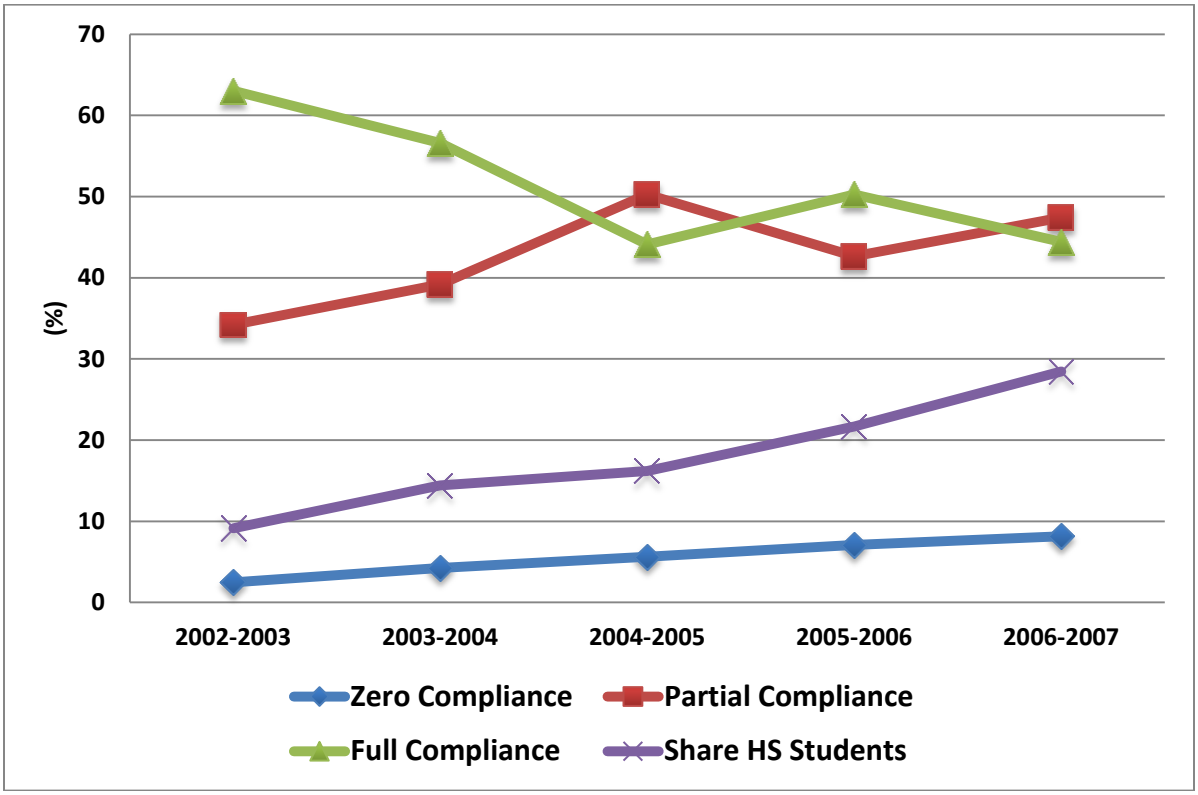


Figure 2: Probability of Full Scholarship and Duration: Full Model

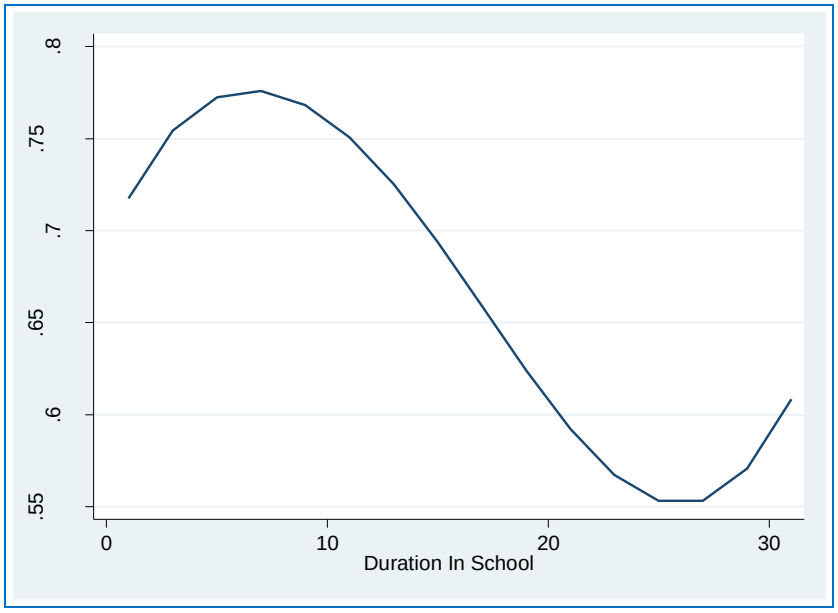


Figure 3: Duration and Large Urban Areas

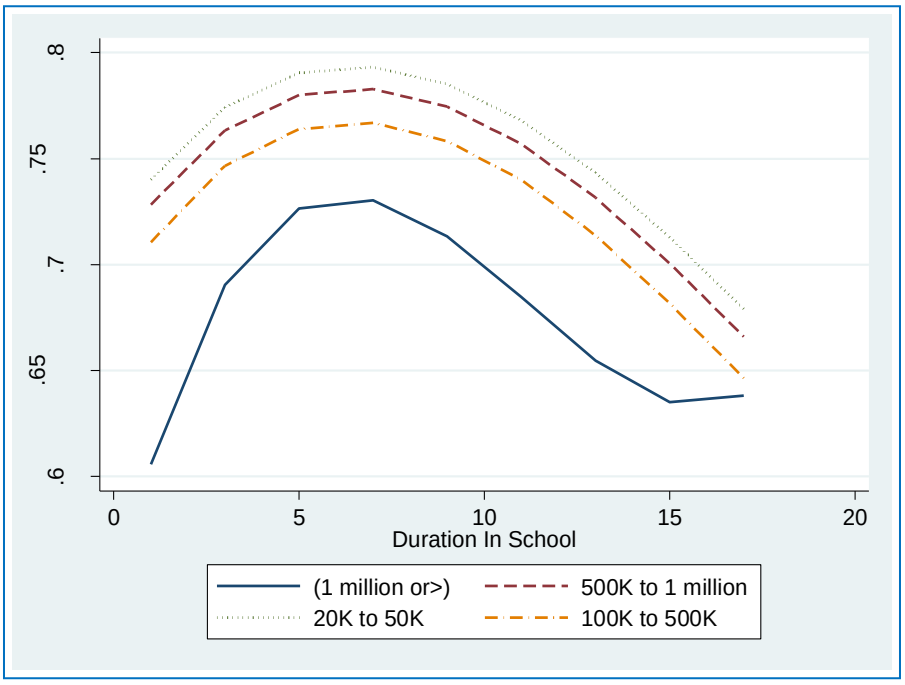
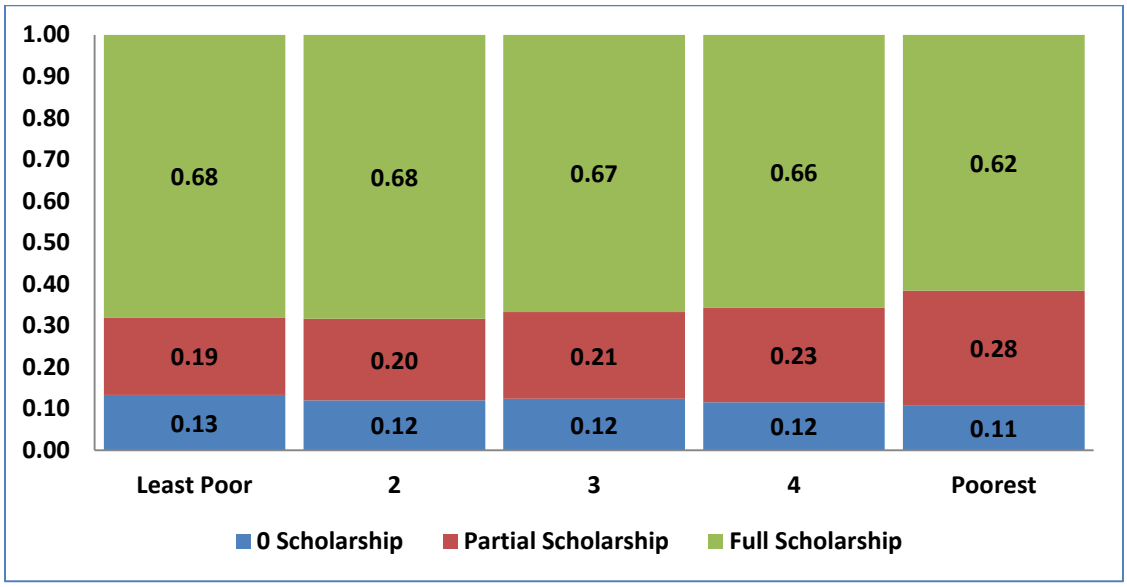


Figure 4: Amount of Scholarships Received by Quintiles using Puntaje Index



Appendix

Table A1: Binary models		**Model 1**		**Model 2**		**Model 3**	
Sample of No Dropouts		mfx	p-value	mfx	p-value	mfx	p-value
Household	Household Size	-0.0229***	(0.000)	-0.0240***	(0.000)	-0.0241***	(0.000)
demographics	Dependency Ratio	-0.0143***	(0.001)	-0.0139**	(0.001)	-0.0139**	(0.001)
	No. kids under 5	0.0161**	(0.002)	0.0521***	(0.000)	0.0521***	(0.000)
	No. of Students	-0.122***	(0.000)	-0.150***	(0.000)	-0.149***	(0.000)
	% Female Students	0.0482***	(0.000)	0.106***	(0.000)	0.106***	(0.000)
	% Students in Jr. H.S.	-0.0818***	(0.000)	-0.0279*	(0.028)	-0.0272*	(0.032)
	% Students in H.S.	-0.425***	(0.000)	-0.226***	(0.000)	-0.225***	(0.000)
	% of Students Special School	-0.0775***	(0.000)	-0.0836***	(0.000)	-0.0837***	(0.000)
	Recipient: Male	-0.205***	(0.000)	-0.103*	(0.010)	-0.103*	(0.010)
	Single	-0.0447***	(0.000)	-0.0502***	(0.000)	-0.0502***	(0.000)
	Age	-0.00333	(0.176)	-0.00310	(0.166)	-0.00308	(0.168)
	Age squared	-0.000000463	(0.987)	-0.00000450	(0.859)	-0.00000468	(0.853)
	Indigenous	0.0197	(0.167)	0.0199	(0.152)	0.0199	(0.152)
Household	Recipient: Yrs. Education	0.0111***	(0.000)	0.0123***	(0.000)	0.0123***	(0.000)
socioeconomic	Yrs. Education ^2	0.0000379	(0.884)	-0.0000511	(0.852)	-0.0000513	(0.851)
	Casual Work	-0.0198	(0.116)	-0.0190	(0.118)	-0.0191	(0.117)
	Part Time Work	-0.0154	(0.456)	-0.0113	(0.580)	-0.0114	(0.576)
	Full Time Work	-0.0224	(0.066)	-0.0205	(0.097)	-0.0207	(0.092)
	HH with Migrant	0.0375	(0.156)	0.0386	(0.105)	0.0388	(0.102)
	Public Assistance	0.0223**	(0.006)	0.0201*	(0.011)	0.0201*	(0.011)
	Puntaje	-0.0167**	(0.003)	0.0123	(0.278)	0.0125	(0.268)
	Puntaje x No. of kids under 5	***N/A***		-0.0193***	(0.000)	-0.0193***	(0.000)
	Puntaje x No. of Students	***N/A***		0.0147***	(0.000)	0.0146***	(0.000)
	Puntaje x (% Female Stu)	***N/A***		-0.0325***	(0.001)	-0.0325***	(0.001)
	Puntaje x (% Jr. H.S.)	***N/A***		-0.0302***	(0.000)	-0.0304***	(0.000)
	Puntaje x (% H.S.)	***N/A***		-0.122***	(0.000)	-0.122***	(0.000)
School	Student Teacher Ratio	0.00115***	(0.000)	0.00114***	(0.000)	0.00115***	(0.000)
indicators	School Expenses	0.000333	(0.458)	0.000361	(0.426)	0.000364	(0.423)
Administrative	Telecom vs Bansefi	-0.0188**	(0.005)	-0.0185**	(0.006)	-0.0189**	(0.005)
& community	Bancomer vs Bansefi	-0.0173*	(0.022)	-0.0159*	(0.035)	-0.0170*	(0.024)
factors	SSA vs IMSS	-0.0186**	(0.004)	-0.0190**	(0.003)	-0.0189**	(0.003)
	Assigned Beds / 10 K	0.0221	(0.335)	0.0201	(0.386)	0.0200	(0.389)
	Supplies dummy	0.0866***	(0.000)	0.0870***	(0.000)	0.0870***	(0.000)
	Low Marginality	0.0206	(0.082)	0.0219	(0.065)	0.0219	(0.064)
	High Marginality	0.00347	(0.850)	0.00255	(0.891)	0.00248	(0.894)
	20 K to 50 K	-0.0179	(0.270)	-0.0178	(0.280)	-0.0177	(0.282)
	50 K to 100 K	-0.0275	(0.122)	-0.0239	(0.192)	-0.0240	(0.189)
	100 K to 500 K	-0.0528**	(0.003)	-0.0539**	(0.003)	-0.0542**	(0.002)
	500 K to 1 million	-0.0371	(0.084)	-0.0346	(0.112)	-0.0349	(0.109)
	1 million or >	-0.142***	(0.000)	-0.141***	(0.000)	-0.272***	(0.000)
Macro controls	Chg. food inflation (log)	-0.00190	(0.161)	-0.00195	(0.151)	-0.00286*	(0.023)
	Chg. unemployment (log)	0.00772**	(0.005)	0.00778**	(0.005)	0.00775**	(0.002)
	Chg. wages unskilled (log)	0.0266***	(0.000)	0.0275***	(0.000)	0.0225***	(0.000)
	2002 cohorts	-0.0156	(0.286)	-0.0170	(0.242)	-0.0157	(0.280)
	Time in School	0.0415***	(0.000)	0.0411***	(0.000)	0.0404***	(0.000)
	Time in School ^2	-0.00356***	(0.000)	-0.00354***	(0.000)	-0.00352***	(0.000)
	Time in School ^3	0.0000712***	(0.000)	0.0000708***	(0.000)	0.0000709***	(0.000)
Time * Com	Time * Largest Comms.	***N/A***		***N/A***		0.0425**	(0.003)
	Time ^2 * Largest Comms.	***N/A***		***N/A***		-0.00526**	(0.002)
	Time ^3 * Largest Comms.	***N/A***		***N/A***		0.000196**	(0.001)
Fixed Effects	Calendar Time F.E.	***Yes***		***Yes***		***Yes***	
	State F.E.	***Yes***		***Yes***		***Yes***	
Marginal effects		N	208277		208277		208277
p-values in (parentheses)		N_g	9190		9190		9190
* Significant at 5% level		ll	-86846.8		-86743.7		-86732.2
** at 1%		chi2			22002.8		22030.1
*** at 0.1%		sigma_u	1.025		1.024		1.024
		rho	0.512		0.512		0.512

Table A4: Fractional models		**Fract. Model 1**		**Fract. Model 2**		**Fract. Model 3**	
Sample of No Dropouts		mfx	p-value	mfx	p-value	mfx	p-value
Household	Household Size	-0.0103***	(0.000)	-0.0103***	(0.000)	-0.0103***	(0.000)
demographics	Dependency Ratio	-0.00620*	(0.026)	-0.00626*	(0.024)	-0.00626*	(0.024)
	No. kids under 5	0.00440	(0.220)	0.0229***	(0.001)	0.0229***	(0.001)
	No. of Students	-0.00968***	(0.000)	-0.0248***	(0.000)	-0.0248***	(0.000)
	% Female Students	0.0380***	(0.000)	0.0484**	(0.002)	0.0484**	(0.002)
	% Students in Jr. H.S.	-0.0250***	(0.001)	-0.0199	(0.215)	-0.0198	(0.218)
	% Students in H.S.	-0.196***	(0.000)	-0.135***	(0.000)	-0.135***	(0.000)
	% of Students Special School	-0.127***	(0.000)	-0.128***	(0.000)	-0.128***	(0.000)
	Recipient: Male	-0.0611	(0.087)	-0.0623	(0.081)	-0.0623	(0.081)
	Single	-0.0235***	(0.001)	-0.0236***	(0.001)	-0.0236***	(0.001)
	Age	-0.00122	(0.461)	-0.00111	(0.502)	-0.00111	(0.502)
	Age squared	-0.0000159	(0.399)	-0.0000170	(0.366)	-0.0000170	(0.366)
	Indigenous	0.00530**	(0.006)	0.00552**	(0.004)	0.00553**	(0.004)
Household	Recipient: Yrs. Education	0.000172	(0.312)	0.000150	(0.377)	0.000149	(0.379)
socioeconomic	Yrs. Education ^2.	0.0150	(0.071)	0.0145	(0.081)	0.0145	(0.081)
	Casual Work	-0.0144	(0.060)	-0.0139	(0.068)	-0.0139	(0.067)
	Part Time Work	-0.00944	(0.474)	-0.00840	(0.523)	-0.00843	(0.522)
	Full Time Work	-0.0104	(0.149)	-0.0101	(0.160)	-0.0101	(0.158)
	HH with Migrant	0.0209	(0.267)	0.0206	(0.278)	0.0206	(0.278)
	Public Assistance	0.00968*	(0.048)	0.00946	(0.053)	0.00946	(0.053)
	Puntaje	-0.0121***	(0.000)	-0.0114	(0.197)	-0.0114	(0.199)
	Puntaje x No. of kids under 5			-0.00909**	(0.002)	-0.00909**	(0.002)
	Puntaje x No. of Students	***N/A***		0.00775***	(0.000)	0.00776***	(0.000)
	Puntaje x (% Female Stu)	***N/A***		-0.00575	(0.483)	-0.00577	(0.482)
	Puntaje x (% Jr. H.S.)	***N/A***		-0.00243	(0.764)	-0.00250	(0.758)
	Puntaje x (% H.S.)	***N/A***		-0.0381**	(0.001)	-0.0382**	(0.001)
School	Student Teacher Ratio	0.00223***	(0.000)	0.00223***	(0.000)	0.00223***	(0.000)
indicators	School Expenses	0.000497	(0.436)	0.000572	(0.373)	0.000569	(0.376)
Administrative	Telecom vs Bansefi	-0.0173*	(0.013)	-0.0174*	(0.013)	-0.0174*	(0.013)
& community	Bancomer vs Bansefi	-0.0184*	(0.039)	-0.0178*	(0.047)	-0.0180*	(0.044)
factors	SSA vs IMSS	0.00978	(0.124)	0.00953	(0.134)	0.00955	(0.133)
	Assigned Beds / 10 K	-0.000947	(0.950)	-0.0000501	(0.997)	-0.0000713	(0.996)
	Supplies dummy	0.0712***	(0.000)	0.0711***	(0.000)	0.0711***	(0.000)
	Low Marginality	0.00804	(0.271)	0.00772	(0.290)	0.00770	(0.291)
	High Marginality	-0.00387	(0.752)	-0.00380	(0.757)	-0.00384	(0.754)
	20 K to 50 K	-0.0146	(0.205)	-0.0142	(0.216)	-0.0142	(0.217)
	50 K to 100 K	-0.0197	(0.116)	-0.0191	(0.127)	-0.0191	(0.127)
	100 K to 500 K	-0.0325**	(0.008)	-0.0319**	(0.010)	-0.0319**	(0.010)
	500 K to 1 million	-0.0152	(0.280)	-0.0152	(0.278)	-0.0153	(0.276)
	1 million or >	-0.0831***	(0.000)	-0.0821***	(0.000)	-0.143***	(0.000)
Macro controls	Chg. food inflation (log)	-0.000416	(0.538)	-0.000411	(0.543)	-0.000451	(0.505)
	Chg. unemployment (log)	0.00331*	(0.041)	0.00327*	(0.044)	0.00324*	(0.046)
	Chg. wages unskilled (log)	0.00915	(0.117)	0.00970	(0.096)	0.00937	(0.111)
	2002 cohorts	-0.00322	(0.766)	-0.00485	(0.653)	-0.00470	(0.663)
	Time in School	0.0277***	(0.000)	0.0279***	(0.000)	0.0275***	(0.000)
	Time in School ^2	-0.00237***	(0.000)	-0.00237***	(0.000)	-0.00235***	(0.000)
	Time in School ^3	0.0000471***	(0.000)	0.0000471***	(0.000)	0.0000469***	(0.000)
Time * Com	Time * Largest Comms.	***N/A***		***N/A***		0.0184	(0.073)
	Time ^2 * Largest Comms.	***N/A***		***N/A***		-0.00211	(0.070)
	Time ^3 * Largest Comms.	***N/A***		***N/A***		0.0000743	(0.060)
Fixed Effects	Calendar Time F.E.	***Yes***		***Yes***		***Yes***	
	State F.E.	***Yes***		***Yes***		***Yes***	
Marginal effects		N	208277		208277		208277
p-values in (parentheses)		N_clust	9190		9190		9190
* Significant at 5% level		ll	-86504.5		-86424.(		-86421.1
** at 1%		chi2	9371.2		9372.2		9374.9
*** at 0.1%							