
MEMORANDUM

TO: Rebecca Goldsmith and Lola Hermosillo

FROM: Larissa Campuzano, Randall Blair, Lorenzo Moreno, Seth Morgan **DATE:** 5/30/2013
ESVED2-29-rev

SUBJECT: Impact Evaluation of the Scholarship Intervention for
Secondary Schools: Interim Results, 2010 to 2011

This memorandum presents interim results regarding the impact of FOMILENIO's secondary school scholarship intervention on applicants' enrollment, grade completion, and continuation in secondary school. In Sections A, B, and C, we describe the scholarship intervention, its implementation, and the evaluation design used to determine the intervention's impact, respectively. In Section D, we present the evaluation's outcome indicators and data sources, and in Section E we discuss the impact estimation method. In Sections F and G, we discuss the study sample and present impacts of FOMILENIO scholarships, respectively. In Section H, we present supplemental and subgroup analyses of the intervention's impact. In Sections I and J, we offer conclusions and next steps.

Key Findings

Impact of the scholarship offer. Using a randomized evaluation design (and an intent-to-treat approach), we calculated the impact of *the offer* of a \$400 annual secondary school scholarship on applicants' outcomes, regardless of whether they accepted the scholarship. Under this design, we found that the offer of FOMILENIO scholarships had a positive impact on scholarship applicants' enrollment, grade completion, and progression in secondary school:

- Applicants who were offered scholarships were 8 percentage points more likely to enroll in 10th grade in 2010 than students who were not offered scholarships (95 percent versus 87 percent among students not offered scholarships; statistically significant at the 5 percent level).
- Applicants who were offered scholarships were 6 percentage points more likely to complete 10th grade than students who were not offered scholarships (85 percent versus 79 percent among students not offered scholarships; statistically significant at the 5 percent level).¹

¹ Students were determined to have completed 10th grade if they reported attending the full 10th grade school year, regardless of whether they passed the grade. In other words, these students did not drop out of school during 10th grade. In contrast, students who passed 10th grade are those who fulfilled the necessary academic requirements to advance to 11th grade.

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- Applicants who were offered scholarships were 8 percentage points more likely to enroll in 11th grade in 2011 than students who were not offered scholarships (84 percent versus 76 percent among students not offered scholarships; statistically significant at the 5 percent level).
- The positive impact of the scholarship offer was much larger for males than females for key educational outcomes. Males who were offered scholarships were between 14 and 16 percentage points more likely to enroll in 10th grade, complete 10th grade, and enroll in 11th grade than males not offered scholarships, whereas no statistically significant impacts of scholarships were detected among females for these outcomes. These larger impacts for males are in part due to the relatively high educational attainment of females regardless of the scholarship. Notably, 83 percent of the females offered the scholarship enrolled in 11th grade compared to 81 percent of the females not offered the scholarship. In contrast, 84 percent of the males offered the scholarship enrolled in 11th grade compared to only 69 percent of males not offered the scholarship.

Impact among intervention participants. Seventy-nine percent of applicants who were offered scholarships accepted them (and are thus defined as participants).² Interestingly, participants were somewhat different from students who declined the scholarship (or non-participants). At baseline, on average, participants were 1.2 years younger, had higher annual income at baseline, and were more likely to live in urban areas than non-participants. Using a treatment-on-the-treated approach, we estimated the impact of scholarships on these participants. We found that the scholarship had a positive effect on those students who accepted it; this impact was larger in magnitude than estimates of the impact of the scholarship offer (discussed above):

- Students who accepted the scholarship were 11 percentage points more likely to enroll in 10th grade and 9 percentage points more likely to complete 10th grade. They were also 10 percentage points more likely to enroll in 11th grade.

Impact on economic outcomes and expectations. The interim results presented in this study pertain to the first year and a half of intervention implementation, when most scholarship applicants attended the first two years of secondary school. The relevant outcomes for this interim analysis are therefore educational outcomes such as enrollment and completion. But we

² In contrast, 21 percent of eligible applicants who were offered scholarships declined this offer. The most common reasons provided by these eligible applicants for their decision to decline the scholarship included rejection from FOMILENIO, enrollment in another school, and lack of interest in the program for which the scholarship was provided. It is unclear why rejection from FOMILENIO was often cited by eligible applicants.

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also studied several additional outcomes and identified the following findings during the same period:

- Students who were offered scholarships worked on average fewer hours per week, but had larger average reported incomes (a difference almost equivalent to the scholarship amount) and consumption levels than students who were not offered scholarships.
- The scholarship offer improved students' expectations of attending a post-secondary technical institution, but did not affect expectations of graduating from secondary school, attending a university, or working after graduation.

Policy Implications and Recommendations for Future Scholarship Interventions

The main policy implication of this analysis is that a \$400 annual scholarship can generate increased secondary school enrollment, grade completion, and continuation rates in El Salvador's Northern Zone, primarily among male scholarship applicants. The availability of a \$400 scholarship appears to play a substantial role in males' decision to enroll and progress in secondary school, whereas females appear to enroll and progress regardless of the scholarship offer. Notably, FOMILENIO scholarships appeared to have a positive effect on males' educational outcomes of sufficient magnitude to fully close a 10 percentage point gender gap in 10th grade completion and 11th grade enrollment.

Given FOMILENIO scholarships' large impact among males—and negligible impact among females—stakeholders could consider giving some preference to male applicants for future secondary school scholarship interventions. In educational contexts in which males underperform compared to females, as appears to be the case in El Salvador, targeting males with scholarships could facilitate gender parity in educational attainment.³ Targeting males could also increase the scholarship's rate of return, or the ability of the \$400 annual scholarship to motivate students to enter and complete secondary school, which could in turn result in long-term labor market gains of much larger magnitude than the cost of the scholarship.

A qualitative study conducted by MCC in 2010 found that students generally reported that the scholarship amount was not enough to cover their school expenses.⁴ In light of this finding, future scholarship interventions could determine scholarship amounts according to students'

³ UNESCO. 2011. Informe de Seguimiento de la EPT en el Mundo 2011. Panorámica Regional: América Latina y el Caribe.

⁴ Zanin, M., 2010. FOMILENIO/MCC Human Development Student Impact Evaluation Survey of the Formal Education Activity.

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actual travel and food expenses, so that students who live further from schools would receive larger monthly scholarship payments. Such an approach could potentially increase acceptance rates among applicants who face sizable constraints to education, particularly rural students. Perhaps more importantly, it would constitute a fairer allocation of scholarship payments by reducing the probability that students who live near schools are overly compensated for their expenses, while students who live further away are undercompensated for these expenses.

A. DESCRIPTION OF THE INTERVENTION

The Human Development Project is one of three large-scale projects financed under the 2006 compact between the Millennium Challenge Corporation (MCC) and the Government of El Salvador.⁵ The project is composed of two activities: (1) The Education and Training Activity, which invested nearly \$28 million (U.S. dollars) to expand the quality of, and access to, vocational and technical education and training in El Salvador's Northern Zone; and (2) the Community Development Activity, which invested over \$67 million to increase the coverage of water supply, sanitation facilities, electricity, and community infrastructure in the Northern Zone.

Budgeted at \$19.8 million over five years (from 2007 to 2012), the largest of the three sub-activities of the Education and Training Activity is the Formal Technical Education Sub-Activity. The goal of this sub-activity is to strengthen technical and vocational educational institutions in the Northern Zone, "so that more youth can gain marketable skills and thereby increase their opportunities for employment and income generation."⁶ As with other sub-activities of the Education and Training Activity, the Formal Technical Education Sub-Activity was designed to directly address human development constraints in the Northern Zone, particularly youths' limited educational attainment. According to the compact, "The average number of years of formal education in the Northern Zone stands at 3.7 years, compared to 5.6 years in the rest of the country." By improving schools and offering scholarships, the sub-activity financed efforts to increase youths' access to high-quality technical education in the region, thus increasing their achievement levels, secondary (and post-secondary) school graduation rates, and prospects for gainful employment. Updated in 2011, the MCC-FOMILENIO monitoring and evaluation plan cites goals of a 71 percent secondary school graduation rate, a 66 percent

⁵ The other two projects funded by the compact are the Productive Development Project (with a budget of \$87 million), and the Connectivity Project (with a budget of \$234 million). The Productive Development Project funds material and technical assistance to agricultural producers and artisans in the Northern Zone, and the Connectivity Project funds the construction of a transnational highway and tertiary roads linking 57 municipal capitals in El Salvador.

⁶ Schedule 1-3 to Annex I, Human Development Project, Compact between MCC and the Government of El Salvador.

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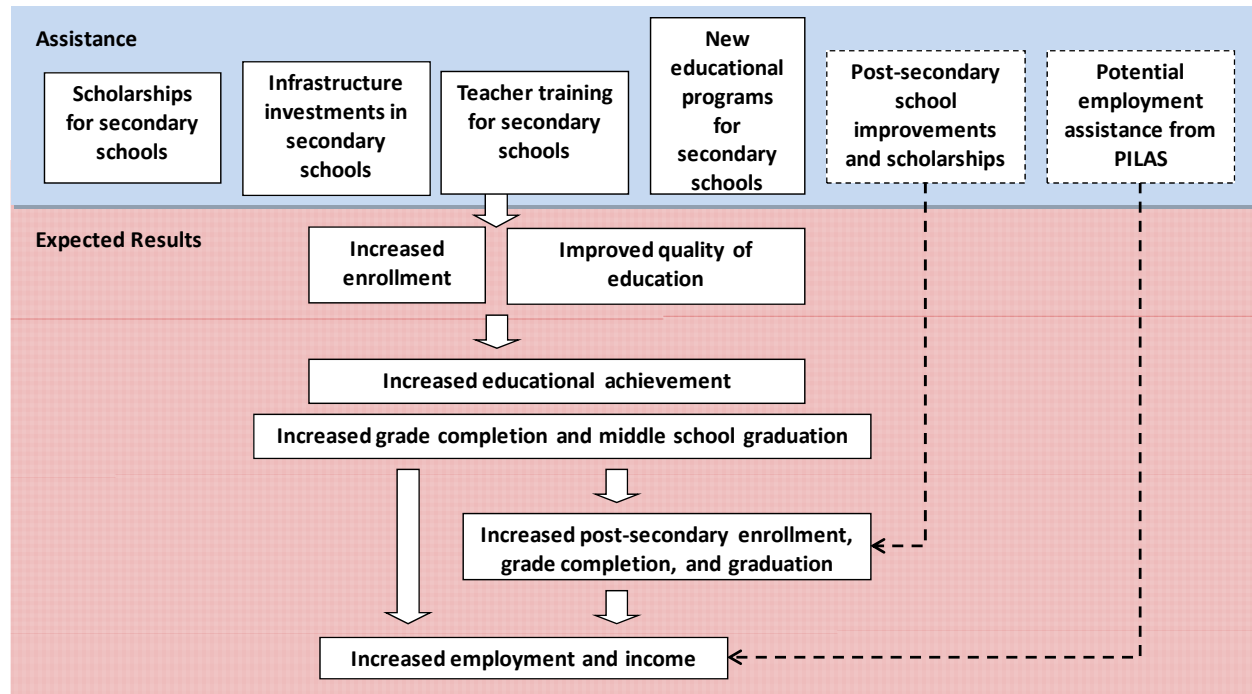
employment rate among these graduates, and 42 percent increase in these graduates' income as a result of the sub-activity's investments.

By 2012, the Formal Technical Education Sub-Activity was scheduled to spend \$3.8 million in scholarships for students enrolled in secondary and post-secondary technical schools in the Northern Zone. According to preliminary budgets, the sub-activity would also provide \$9 million to improve 20 technical secondary schools in the Northern Zone with infrastructure investments and additional teacher training programs. In addition, the sub-activity was scheduled to invest \$7 million to strengthen the Chalatenango Technical Institute (known as ITCHA for its initials in Spanish), an existing post-secondary institute in the Northern Zone. As part of the ITCHA intervention, two new technical degree programs would be established at ITCHA as well as its four linked secondary schools under the Gradual Educational Model of Technical and Technological Learning (known as MEGATEC for its initials in Spanish) implemented by MINED. In addition, the Formal Technical Education Sub-activity would finance a labor insertion program known as PILAS (Programa de Inserción Laboral Sostenible) to help recent technical school graduates (and non-formal education program participants) obtain employment.

Figure 1 provides a summary of how scholarships, school improvements, teacher training sessions, new technical programs, improvements at ITCHA, and PILAS were intended to generate improved employment outcomes among secondary school students. Secondary school scholarships, infrastructure improvements, and new technical degrees would motivate students to enroll in secondary school programs—particularly technical programs. In addition, teacher training sessions would improve the quality of technical and general education in secondary schools, as well as students' achievement levels. Increased enrollment and better instruction would generate a higher number of secondary school graduates, as well as increased employment and income among graduates. Furthermore, post-secondary scholarships and ITCHA improvements would increase enrollment and completion of post-secondary technical education. Potential employment assistance from PILAS could also support recent secondary school and post-secondary school graduates in finding salaried employment or starting their own business.

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Figure 1. Logic Model of Secondary school Components of Formal Technical Education Sub-Activity



Source: CIDE and FOMILENIO operations manuals.

The Salvadoran Ministry of Education (MINED) was designated as the principal implementing entity for the Formal Technical Education Sub-Activity. In addition, the Millennium Fund (known as FOMILENIO in Spanish) was established as the entity responsible for the oversight and management of the sub-activity (as well as all other activities and sub-activities outlined in the compact). The International Consortium for Educational Development (known as CIDE for its initials in French) was the primary entity contracted to provide technical support for the sub-activity, including designing FOMILENIO's scholarship intervention, developing architectural plans for school improvements, designing new curricula, and training all teachers at the ITCHA and the 20 secondary schools receiving assistance.

CIDE was responsible for the initial design of the scholarship intervention. Submitted in May 2008, CIDE's proposal recommended an amount of at most \$500 per year for secondary school scholarships. The final scholarship amount approved by MINED and FOMILENIO was \$400 per year for secondary school students.⁷ Because general secondary school programs are

⁷ To provide some context on the scholarship amount, we should note that the Encuesta de Hogares de Propósitos Múltiples (EHMP) conducted by DIGESTYC reports that the monthly household income in the Northern Zone was almost \$400 in 2009.

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two years in length (10th and 11th grade) and technical secondary school programs are three years in length (10th through 12th grade), general secondary school students could renew their scholarships for the subsequent school year and technical secondary school students could renew their scholarships for two subsequent school years. According to original plans, scholarships would be offered to students at all 20 secondary schools that received infrastructure improvements and teacher training under the sub-activity.⁸

According to original plans, secondary school scholarships would be awarded based on financial need, but they would also have an academic performance requirement. During the initial stage, CIDE proposed basic eligibility requirements for scholarships, which MINED and FOMILENIO approved. The final eligibility requirements for secondary school scholarships were the following: applicants must be a resident of the Northern Zone; be a Salvadoran citizen; have limited economic resources (a household income of less than three times the minimum wage of around \$6 a day); have completed a year of primary education in the previous three years; have passed 9th grade with a minimum of a 6 grade point average (out of 10 points), be interested in studying one of the selected degrees offered by eligible secondary schools, and meet the requirements set by the school in which they planned to enroll. Secondary school scholarships would be awarded in the first year (10th grade) and could be renewed in additional years if students were in good academic standing.

B. IMPLEMENTATION OF THE SCHOLARSHIP INTERVENTION FOR SECONDARY SCHOOL

In early 2009, FOMILENIO hired the Entrepreneurial Foundation for Educational Development (known as FEPADE for its initials in Spanish) to administer the pilot round of 150 secondary school scholarships during 2009 and conduct outreach to potential applicants for the 2010 school year. Also in 2009, FOMILENIO and MINED formed a scholarship committee to manage secondary school and post-secondary scholarship allocations. FOMILENIO's original plan was to grant 1,000 scholarships to first-year secondary school students in 2010. In deciding how these scholarships would be distributed, the committee first determined that scholarships would be offered to students in 17 of the 20 secondary schools in the Northern Zone that were undergoing improvements financed by FOMILENIO. Within these secondary schools, FOMILENIO also selected the educational programs in which the scholarships would be offered

⁸ As stated earlier, the scholarship program included scholarships for secondary schools (which are the focus of this study) and scholarships for post-secondary technical programs. CIDE also designed the post-secondary scholarship program. Although post-secondary scholarships are not discussed in detail in this memo, it should be mentioned that these scholarships were administered to ITCHA students from 2009 to 2011. Post-secondary scholarships were \$1,500 a year, and could be renewed for the second year of post-secondary study.

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and the number of scholarships to offer in each program.⁹ Table A.1 in the appendix lists the schools, educational programs, and number of scholarships planned to be offered in 2010.

To promote scholarships for the 2010 school year, in 2009, FEPADE staff visited all 162 primary schools that feed into the selected 17 secondary schools. Students finishing elementary school in 2009 were required to apply for the scholarship intervention before October 2009. As part of the application process, students completed an application form and provided supporting documentation. In the application form, students identified the secondary school and program of study that they were planning to attend in 2010 (among those that were eligible for the scholarship). FEPADE received 1,841 scholarship applications and reviewed them to assess each applicant's eligibility. According to FEPADE's review, 1,521 applicants were deemed eligible to receive a scholarship. Because there were more eligible applicants than the 1,000 available scholarships, random assignment of scholarships was feasible.

After verifying applicants' eligibility, FEPADE provided Mathematica with a complete list of eligible students, organized by educational program and participating secondary school. In the schools and programs in which there was over-demand (more eligible applicants than scholarships available), students were randomly assigned to the treatment group, which was offered a scholarship, or to the control group, which was not offered a scholarship. After randomization in December 2009, FEPADE contacted students assigned to the treatment group to offer them the scholarship. When FEPADE contacted the students in late December or early January to offer them the scholarships for the 2010 school year (beginning in January 2010), some students did not accept the offer (in Section F we provide more details on the sample of scholarship participants). In an effort to assign these declined scholarships to other eligible students, Mathematica staff allowed FEPADE staff to offer scholarships to some students in the study's control group. As a result of these efforts, FOMILENIO had awarded 921 scholarships to first-year secondary school students by February 2010. (Additional details regarding this process are described below in Section C.)

Secondary school scholarships offer a total of \$400 per year to defray the costs of materials, transportation, and food. In January of 2010, students received the first scholarship payment and a packet of school supplies the total value of the packet and payment was \$90. The second

⁹ As stated earlier, secondary schools in El Salvador offer two types of programs: general and technical programs. Some schools only offer one program (either general or technical) and others offer both programs. Students who choose the general program complete their secondary school education in two years (grades 10 and 11). Students who choose the technical program complete their secondary school education in three years (grades 10, 11 and 12). Students in technical programs must select their program among the technical options offered by the school. Some of the technical options offered by secondary schools are tourism, civil engineering, commerce, secretarial skills, agriculture, mechanics, etc.

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scholarship payment was delayed until April because FEPADE was in the process of establishing bank accounts for each student. In April, payments for February, March, and April were made for a total of \$90. Students received monthly payments of \$30 from May to October 2010—with the exception of July, when the payment was \$70. During the school year, students would meet regularly with FEPADE staff to discuss payments and their progress in school, and to resolve any difficulties related to school or their scholarships. If a scholarship recipient failed to make a minimum passing grade of 6.5 in all their courses during a grading period, FEPADE staff would ask the student to sign a letter committing to improved scholastic performance. If students failed a class for the year, they could lose their scholarship.

Under the FOMILENIO scholarship intervention, all students received \$30 a month regardless of their family income, cost of transportation, and distance from school. However, scholarship recipients who lived near school reported spending less on transportation and food than scholarship recipients who lived relatively far from school. According to survey data collected by the Ministry of the Economy's Office of Statistics and Census (known as DIGESTYC), students offered the scholarship with a commute of less than 25 minutes reported eating lunch at school one day per month and spending \$13 on food and \$6 on transportation per month, on average. In contrast, scholarship recipients who traveled more than 25 minutes to school reported eating lunch at school 2.5 days a month and spending \$24 on food and \$21 in transportation a month, on average. As such, the FOMILENIO scholarship defrayed only a portion of the average costs incurred by scholarship recipients who lived more than 25 minutes from school. Corroborating these findings, a qualitative study conducted by MCC found that most students reported that the scholarship amount was not enough to cover their school expenses (Zanin, 2010). According to the study, interviewed scholarship recipients reported that they needed on average \$46 a month—in addition to the scholarship's \$30 monthly payment—to cover all school-related expenses.

As a counterpart contribution, MINED agreed to finance and administer 50 percent of scholarships that would be renewed in 2011 for second-year secondary school students and, starting in 2012, 100 percent of the scholarships that would be renewed for third-year secondary school students. However, MINED payments were delayed in 2011 by at least 6 months due to bureaucratic complications. The first payment of FOMILENIO scholarships financed by MINED occurred on July 2011. The FOMILENIO scholarships administered by FEPADE were paid on schedule. For the 2012 school year, MINED is experiencing similar delays and students have not received any scholarships payments as of May 2012.

In 2011 and 2012, FOMILENIO granted two more rounds of scholarships for first-year secondary school students who had finished 9th grade. Table 1 summarizes the number of scholarships that FOMILENIO granted to first-year secondary school students from 2009 to 2012. As mentioned previously, FOMILENIO granted 150 scholarships in 3 schools during 2009. In 2010, the intervention started functioning at scale and 921 scholarships were granted in 17 schools. In 2011 and 2012, FOMILENIO granted 1,197 and 1,141 secondary school scholarships, respectively, to students in 17 schools.

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Table 1. Scholarships Granted by FOMILENIO to First-Year Secondary school Students

	2009	2010	2011	2012
Number of scholarships	150	921	1,197	1,141
Number of schools	3	17	17	17

Source: FOMILENIO administrative data for 2009-2012.

This evaluation of the secondary school scholarship intervention focuses on the student cohort that began secondary school in 2010. Therefore, implementation of the scholarship intervention for the 2011 and 2012 cohorts will not be discussed. However, we should note that FEPADE modified the application process in 2010 to address the problem of generalized scholarship rejection. The new application process required that students apply for the scholarship directly in the secondary school in which they were interested in enrolling. This process mandated that students become familiar with schools' application requirements and helped reveal student preferences more clearly. Once this new application process was in place, the scholarship intervention was not oversubscribed. As a result there were no future rounds of random assignment. The next section describes the evaluation design and the sub-sample of applicants upon which our evaluation is based.

C. EVALUATION DESIGN

MCC contracted Mathematica in 2007 to design and conduct evaluations of the Formal Technical Education Sub-Activity of the Human Development Project. Given MCC's goal of evaluating interventions with the most rigorous methods available, Mathematica researched the three interventions under this sub-activity (strengthening 20 technical secondary schools, scholarships, and ITCHA improvements) and determined that a rigorous evaluation of FOMILENIO's secondary school scholarship intervention was feasible.¹⁰ Developed and refined by Mathematica, MCC, FOMILENIO, and other stakeholders, the evaluation of the secondary school scholarship intervention uses a random assignment design, which allows us to assess the impact of scholarships on students' educational and labor outcomes in a rigorous manner. This design provides MCC and other stakeholders with unbiased estimates of the overall effectiveness of the scholarship intervention.

1. Research Question

¹⁰ The program targeted to strengthening 20 secondary schools will be evaluated under a comparison group design, and is discussed in a separate memo. The improvement of ITCHA has been evaluated with a case study design released in a separate report.

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The purpose of the impact evaluation is to determine whether or not students that were offered the FOMILENIO scholarship are better off than they would have been without the scholarship offer. Specifically, the evaluation answers the following question: What is the impact of the offer of FOMILENIO's scholarships on students' education and labor market outcomes, including secondary school enrollment, grade completion, graduation, employment, and income?

2. Evaluation Design

The most rigorous impact evaluation design available for determining the effectiveness of the scholarship activity randomly assigns scholarships among the pool of applicants who have met the selection criteria (that is, *eligible* applicants). Random assignment is logistically feasible and ethical in cases of *oversubscription*—that is, when the number of eligible applicants exceeds the number of scholarships available. As we learned in December 2009, there were more applicants to the scholarship intervention in 2010 than scholarships available for some schools and educational programs (see Table A.1). This oversubscription of scholarships allowed us to proceed with random assignment of scholarships among eligible applicants within each school and educational program that was oversubscribed. In total, there was oversubscription in 15 educational programs in 12 of the 17 schools selected for the scholarship intervention. As a result, randomization of scholarships was possible for the 15 schools and programs that were oversubscribed, which had a total of 1,160 eligible applicants.

3. Student Assignment Process

In December 2009, FEPADE sent Mathematica a list of eligible applicants in each school and educational program that had more eligible applicants than available scholarships. Mathematica used these lists to develop a computer program that randomized eligible applicants within school and program into three groups: the treatment group (scholarships); the control group (no scholarships); and the non-research group (students on a waiting list who could replace students in the treatment group if they did not accepted the scholarship).¹¹

On December 11, 2009, the random assignment of scholarships was conducted in a public event organized by FOMILENIO and MCC. Out of a total of 1,160 eligible applicants, 636 students were randomly assigned to be offered scholarships (treatment group); 449 students were randomly assigned to not receive a scholarship offer (control group); and 75 students were placed on a waiting list for scholarships (non-research group).

¹¹ Random assignment used school and educational programs as strata. Within each school and educational program, the computer program assigned a random number to each student. The students with the highest numbers were assigned to the treatment group until scholarships were no longer available; the next five highest numbers were placed on the waiting list; and the rest of the students (those with lower random numbers) were placed in the control group.

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In late January 2010, Mathematica staff learned that not all the students assigned to the treatment group had accepted the scholarship. Initial calculations indicated an acceptance rate of approximately 70 percent.¹² As a result, FEPADE had a substantial number of unclaimed scholarships for the 2010 school year, but a lack of eligible candidates outside of the control group. To raise the number of claimed scholarships, Mathematica agreed that 100 students from the control group could receive scholarships for the 2010 school year; these students were reallocated to the non-research group (and thus do not form part of the study sample). To maintain the integrity of the random assignment process, these control students were selected for scholarships according to their random number from the original randomization procedure.¹³ This reallocation of students from the control group to the non-research group respected the random allocation but reduced the size of the study sample, which in turn reduced the study's statistical power. However, it met the more pressing need to award the majority of available scholarships for the academic year.

Another issue encountered during this time was that, before Mathematica reassigned students from the control group, scholarships were awarded to at least 36 students in the control group in one school, Instituto Dr. Francisco Martínez Suárez. To avoid biased estimates due to contamination of the control group, all treatment and control students from this school were excluded from the evaluation. All treatment and control students were also excluded from another school, Instituto Carolina, due to the large imbalance of intervention students (43) compared to control students (2) at the school. Dropping these schools from the research sample further diminished the study's statistical power, but did not affect the study's validity because random assignment was done within schools.¹⁴

¹² FEPADE informed Mathematica and MCC that there were several reasons for the low acceptance rate. In some cases, eligible applicants did not follow through with their intent of enrolling in 10th grade on time. By the time they tried to enroll, schools no longer had slots for them. Others decided to enroll in schools that were not selected for scholarships.

¹³ The treatment group and the wait-list group were not affected by these changes in January 2010. However, in some schools or programs, the composition of the original control group changed. Among the original controls, those students with the highest random numbers were placed in a non-research group that was offered a scholarship at that time, and students with the lowest random numbers were kept in the control group and were not offered a scholarship. This decreased the sample size of the study, but in a way that did not violate the randomness of the process.

¹⁴ The reduction in statistical power due to all of the changes increased the minimum detectable difference to 7 percentage points on the graduation rate outcome under the original sample size to 8 percentage points under the revised sample size (assuming an initial graduation rate of 75 percent).

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As a result of these changes, the final evaluation sample frame is 751 students enrolled in 12 educational programs in 10 schools: 515 of these students are in the treatment group and 236 students are in the control group (see Table A.2).

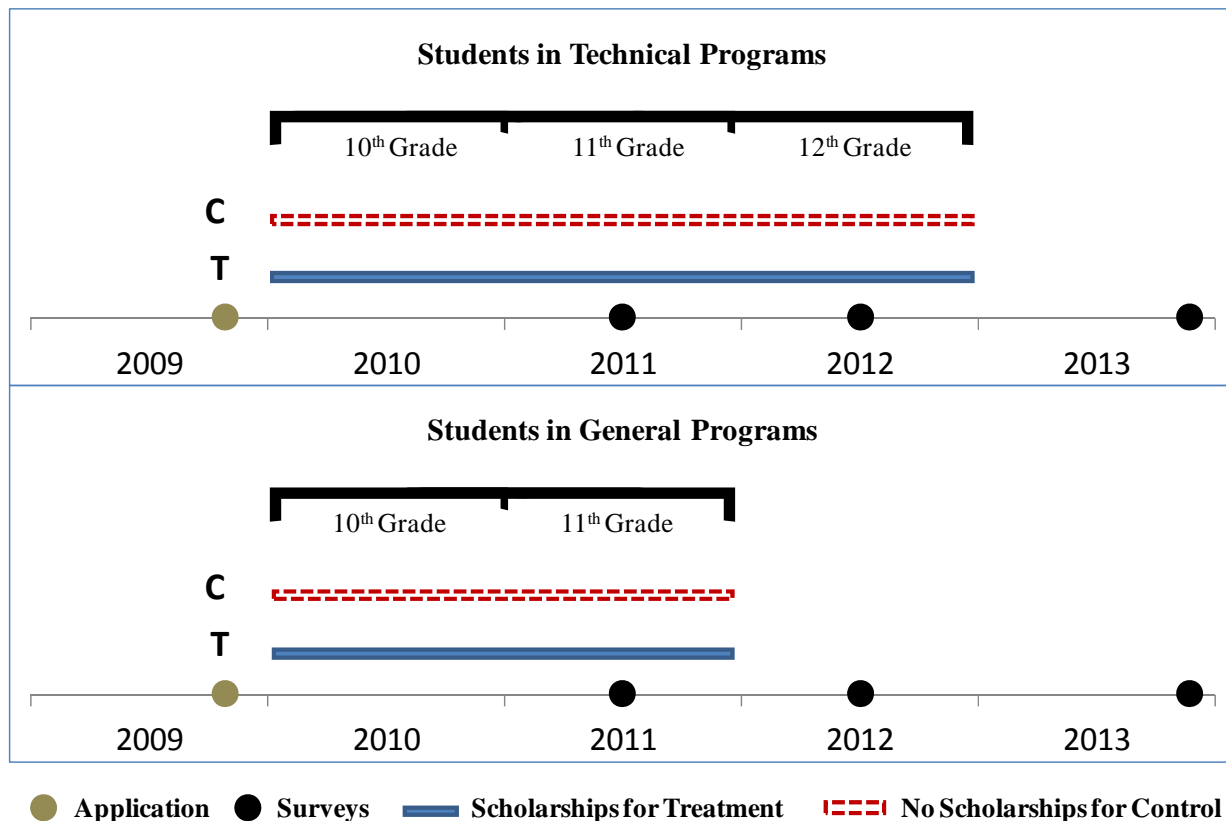
D. OUTCOME MEASURES AND DATA SOURCES

The original design for the scholarships evaluation assumed that student-level administrative data would be available from MINED, which would allow us to obtain the educational outcomes of interest during the timeframe in which students would attend secondary school. However, MINED staff informed us that their original plan of collecting student-level data had not been executed due to administrative changes at the ministry. MCC, MINED, and Mathematica then agreed to conduct an in-person survey to obtain these data. Conducting this survey allowed us to obtain data on students who were not in the educational system and facilitated data collection on other key outcomes such as income and employment. Mathematica staff designed the survey instrument to accurately capture students' education and labor market outcomes, as well as their school-related expenses, income, and consumption. In 2011, FOMILENIO contracted DIGESTYC to conduct this survey. In July 2011, data collectors administered the first follow-up survey to students in the study sample.

Complete data collection plans for the scholarship study include a first follow-up data collection (conducted in July 2011, approximately one and a half years after the scholarships were awarded); a second follow-up data collection (planned for July 2012, approximately two and half years after the scholarships were awarded); and a third round of data collection, which will occur in December 2013, one year after students in technical programs should have completed secondary school (See Figure 2). As illustrated in Figure 2, students who started general secondary school programs in 2010 will have graduated by 2012 data collection, whereas students who started technical secondary school programs in 2010 will be enrolled in their third and final year of studies.

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Figure 2. Scholarship and Data Collection Timeline, 2009-2013



The current analysis assesses the impact of the scholarships on students' outcomes approximately one and a half years after students were offered scholarships. Data from the scholarship application form completed in 2009 is used as a baseline, whereas data from the student follow-up survey conducted in July 2011 provide key outcome measures. The number of randomized students and survey respondents are summarized in Table 2, in addition to survey response rates. As shown, the student survey had a response rate of almost 93 percent overall, almost 93 percent for the treatment group and almost 94 percent for the control group. The analysis sample for this evaluation includes all survey respondents, and baseline data from the application form is available for all students in the study.

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Table 2. Number of Randomized Students and Response Rates for First Follow-up Survey

	Research Sample	Treatment	Control
Number of students randomized	751	515	236
Number of completed interviews	698	477	221
Response rate (%)	92.9	92.6	93.6

Source: Mathematica administrative data and first follow-up survey.

This evaluation uses student survey data to construct three types of outcome measures: (1) educational outcomes such as enrollment, grade completion, continuation in school, and academic achievement; (2) labor market outcomes such as employment and income, and (3) students' expectations after graduation. Educational outcomes are the main interest of this interim report, as students in the analysis sample should have attended the first year of secondary school in 2010 and the second year of secondary school in 2011, when the follow-up survey was conducted. Although important, labor market outcomes are considered additional at this point because most students in the sample were attending secondary school at follow-up data collection. These labor market outcomes will become more important in future rounds of the survey, when students will have finished their secondary school education. Table 3 provides a definition of all outcomes measured in this interim analysis.

Table 3. Definitions of Main and Additional Outcomes, Scholarship Impact Evaluation

Measure	Definition
Main Outcomes	
Enrolled in grade 10 in 2010	Binary measure in which a student is considered to have enrolled in grade 10 (first year of secondary school) if she/he reported being enrolled in that grade in 2010.
Completed grade 10 in 2010	Binary measure in which a student is considered to have completed grade 10 (first year of secondary school) if she/he reported having attended the full year in 2010.
Passed grade 10 in 2010	Binary measure in which a student is considered to have passed grade 10 (first year of secondary school) if she/he reported having passed the grade. Note that students who completed grade 10 could either pass the grade, in which case they are able to enroll in grade 11, or fail the grade, in which case they cannot enroll in grade 11 because they do not meet academic requirements.
Enrolled in grade 11 in 2011	Binary measure in which a student is considered to have enrolled in grade 11 if she/he reported being enrolled in grade 11 (second year of secondary school) in 2011.
Repeated grade 10 in 2011	Binary measure in which a student is considered to have repeated grade 10 if she/he reported repeating grade 10 (first year of secondary school) in 2011.
Additional Outcomes	
Employed	Binary measure in which a student is considered employed if she/he reported being employed either part- or full-time.
Employed full time	Binary measure in which a student is considered to have full-time employment if she/he reported being employed full-time.

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Measure	Definition
Hours worked weekly	Number of hours the student reported working on a weekly basis.
Student total annual income	The sum of student-reported annual income from his/her main job, secondary activities such as second job or sales, and other sources such as scholarships, remittances, and transfers from parents.
Consumption	The sum of student-reported expenses on lunch and transportation to school, other school-related activities, food, clothes and shoes, phone, internet, and other common items.
Planned to graduate from secondary school	Binary measure of whether the student responded that he/she planned to graduate from secondary school.
Planned to continue post-secondary education at a university	Binary measure of whether the student responded that he/she planned to continue post-secondary education at a university.
Planned to continue post-secondary education at a technical or vocational institution	Binary measure of whether the student responded that he/she planned to continue post-secondary education at a technical or vocational higher education institution.
Planned to work after secondary school	Binary measure of whether the student planned to work after secondary school.

E. ESTIMATING IMPACTS

The impact analysis relies on a regression specification that compares outcomes of students who were offered a scholarship (treatment group) with outcomes of students who were not offered a scholarship (control group), controlling for idiosyncratic differences between the two groups. The basic model can be expressed as follows:

$$(1) y_{is} = \alpha + \beta x_{is} + \lambda T_s + \eta_s + \varepsilon_{is}$$

where y_{is} is the outcome of interest for student i in educational program or school s ; x_{is} is a vector of baseline characteristics of student i in educational program or school s (baseline data comes from application forms and includes variables such as household income, household size, grades, urban, age, and gender); T_{is} is an indicator equal to one if student i in program or school s was assigned to the treatment group and zero if he or she was assigned to the control group; η_s is a program-school-specific indicator variable to account for the fact that randomization was done within programs and schools (this fixed effect also allow us to control for differences across school or programs); and ε_{is} is a random error term for student i in school s . The parameter estimate for λ is the estimated impact of the scholarships on the outcome of interest. In addition, all the impact estimates are weighted to account for differential assignment probability within strata and for non-response.

In this memo, we produce two types of impact estimates: intent-to-treat (ITT) estimates and treatment-on-the-treated (TOT) estimates. The impact estimation presented above is based on an intent-to-treat (ITT) approach. ITT estimates capture the impact of the offer of FOMILENIO

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scholarships, regardless of whether students accepted the scholarship. The ITT estimates compare the entire sample of students in the treatment group to the entire sample of students in the control group.¹⁵ However, another important question among stakeholders is the effect of FOMILENIO scholarships on students who actually received them. This was especially important for this evaluation, given that only 79 percent of treatment students in the analysis sample accepted the scholarship. To answer this question, we calculate TOT estimates, which can be interpreted as the effect of scholarships on students who accepted them. To calculate TOT estimates, we use an instrumental variable (IV) approach in which the assignment to treatment is used as the instrument for participation.¹⁶

We also conduct subgroup analyses by gender given that MCC has identified females as a subgroup of interest. For this subgroup analysis, we use a similar regression model to the one presented in equation 1 with one addition: an interaction of treatment and female, which is the product of the treatment indicator with the female indicator. The coefficient of this interaction represents the difference between the impact of scholarships on males and the impact of scholarships on females.

F. STUDY SAMPLE

As described before, the sample used for this evaluation is a sub-sample of students who applied for a FOMILENIO scholarship to initiate their first grade of secondary school during the 2010 school year, who were deemed eligible, applied to the schools or programs that were oversubscribed, and were not excluded from the study due to reallocation of the control group. The evaluation sample includes 751 students: 515 of these students were randomly assigned to the treatment group and offered scholarships, and 236 of these students were assigned to the control group. These students applied to 12 educational programs in 10 of the 17 schools selected for scholarships.

¹⁵ Students assigned to the non-research group are not part of the research study. However, the number of students in each stratum was accounted for when calculating differential probability weights.

¹⁶ First, random assignment status and other baseline characteristics are used to predict participation in the program. Then, we use the predicted participation and baseline characteristics to estimate the effects of the scholarship on each outcome of interest. Angrist et al. (1996) describe this method in detail. We also conducted sensitivity analyses using Bloom's (1984) approach. Additional TOT estimates were obtained by dividing ITT estimates by the participation rate of the treatment group, minus the participation rate of the control group. The instrumental variable approach and the Bloom adjustment yielded nearly identical impact estimates.

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1. Baseline Equivalence

Information from the application forms is available for the full research sample of 751 students. However, because we are interested in verifying that treatment and control groups were equivalent at baseline, the analysis sample includes only students who responded to the follow-up survey (698 students). We examine the baseline characteristics of follow-up survey respondents because we are interested in verifying that our analysis sample does not generate biased estimates.¹⁷ In Table 4, we present the characteristics of students in our analysis sample at the time they applied for the scholarship. Using statistical tests, we verified that treatment and control groups in the analysis sample were equivalent at baseline. No statistical differences were found between the treatment and control groups on the characteristics for which data is available. We should note that household income measures may be underreported because students generally do not have strong knowledge of their parents' full income. Even if household income is underreported, however, the measure could convey income differences across treatment and control groups as long as these groups do not have systematic differences in the way they underreport this income.¹⁸

Table 4. Baseline Characteristics of Students in the Analysis Sample (Averages Unless Otherwise Indicated)

Characteristics	Treatment	Control	Difference	<i>p</i> -value
Age (years)	16.1	16.1	0.1	0.38
Female (%)	58	56	2	0.63
Annual household income (in USD)	1,876	1,864	12	0.89
Household size	5.6	5.5	0.1	0.46
Grade average	7.8	7.8	0.0	0.97
Annual expenditures (in USD)	1,850	1,770	80	0.37
Urban (%)	17	14	3	0.35
Sample Sizes	477	221		

Source: Data from 2009 scholarship application form (FEPADÉ's records).

Note: Means are regression adjusted using ordinary least squares to account for the stratification that was part the study design; means are weighted to account for differential assignment ratio and non-response across strata.

¹⁷ We present data for the full sample and compare it to the respondent sample in Table A.3.

¹⁸ Based on additional statistical tests, we have no reason to suspect that there are systematic treatment-control differences in underreporting household income. Furthermore, students appear to underreport household income in a consistent way across survey instruments. Estimates of household income from our follow-up survey are very similar to household income estimates constructed with data from FEPADÉ's application form.

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2. Participation in the Scholarship Intervention

For this analysis, participation in the intervention is defined as receiving at least the first scholarship payment in 2010. If a student received the first payment and later dropped out of the scholarship intervention, he or she is still considered a participant.¹⁹ As discussed before, all the applicants in the treatment group were offered a scholarship, but not all of them accepted it. Table A.4 in the appendix presents the reasons students reported they did not participate in the scholarship intervention. The most frequent answer given was that FOMILENIO did not approve the scholarship. It is unclear why students gave this answer because FEPADE staff repeatedly reported that they contacted all the students in the treatment group and informed them that they had been selected for the scholarship. Other reasons given were the following: the applicant had already enrolled in another school, the school for which the scholarship was granted was too far away from the applicant's home, the scholarship was granted for an educational program that the applicant did not want to pursue, and the applicant was not interested in continuing his or her studies.

Table 5 presents the number of students in the analysis sample for the main results and the number of participants in the FOMILENIO scholarship intervention. As illustrated, almost 79 percent of the students in the treatment group received at least the first scholarship payment and 1.4 percent of students in the control group received at least the first scholarship payment.²⁰ We use this participation information to conduct our treatment-on-the-treated analysis, which compares the outcomes of students who participated in the scholarship intervention to those who did not. The impact obtained from this analysis can be interpreted as the effect of receiving a FOMILENIO scholarship, as opposed to the effect of receiving the scholarship offer (under our primary intent-to-treat approach).

¹⁹ At the end of 2010, 34 students who had received at least the first scholarship payment dropped out of school and their scholarship was not renewed for the second year. However, they are still considered participants according to our definition of program participation. Some of the reasons students gave for dropping out of school, and hence dropping out of the scholarship program, were economic problems, family problems, health problems, lack of interest in studying, getting married, getting pregnant, and migration.

²⁰ The rates of participation among all the students in the original sample (regardless of whether they responded to the survey in July 2011) are 76 percent for the treatment group and 1.3 percent for the control group.

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Table 5. Students in the Analysis Sample who Received a FOMILENIO Scholarship (Participation)

	Treatment	Control
Number of students in the analysis sample	477	221
Number of students who received at least one scholarship payment	375	3
Participation rate (%)	78.9	1.4

Source: FEPADE administrative records.

Note: For the purpose of this evaluation, participation in the scholarship intervention is defined as receiving at least one scholarship payment in 2010.

It should be noted that FOMILENIO was not the only institution providing scholarships for secondary school students in the Northern Zone during the study period. In our survey sample, fifteen students (eight in the treatment group and seven in the control group) reported a scholarship from another institution such as Padrino-FEPADE, FUNDEMAR, the European Union, and Plan International. The median value of these scholarships was \$239 per year.

G. IMPACTS OF SCHOLARSHIPS

In this section, we first present the impact of FOMILENIO scholarships on educational outcomes such as enrollment in secondary school in 2010, completion of the 2010 school year, and progression to the next grade in 2011. Next, we present the impact of scholarships on students' employment and income. Lastly, we present scholarship impacts on additional outcomes, such as students' expectations after completing secondary school.

1. Impacts on Educational Outcomes

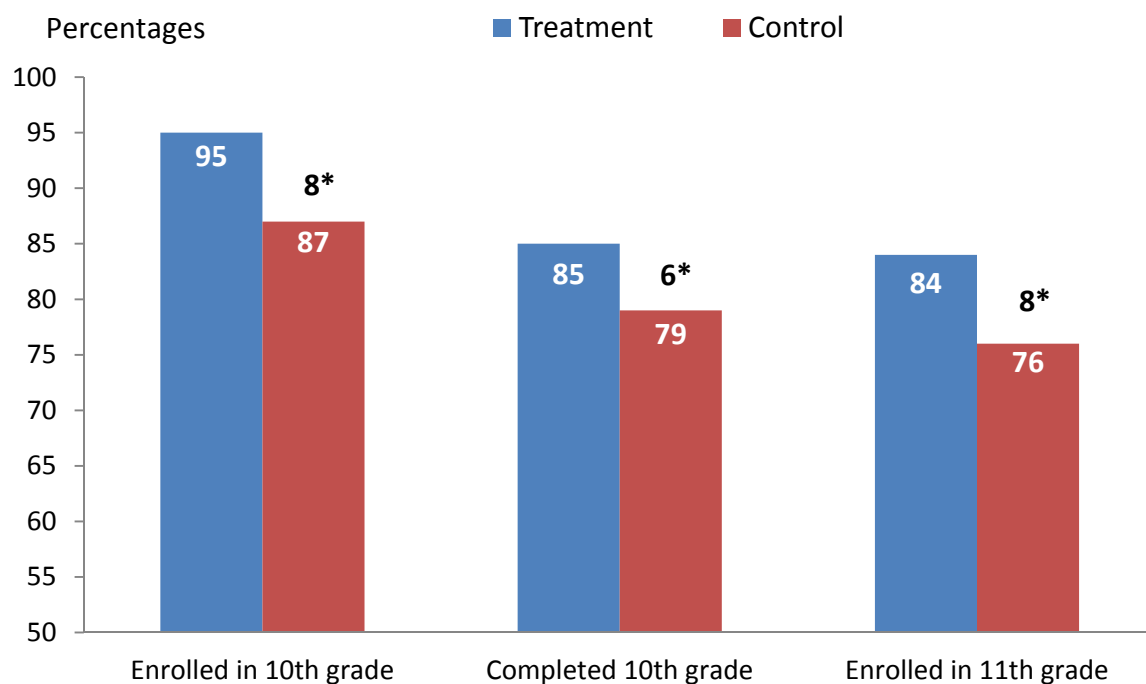
Figure 3 and Table 6 present the results of an intent-to-treat estimation approach that compares treatment and control groups, regardless of their participation in the scholarship intervention. As such, they illustrate the impact of the *offer* of the scholarship on key educational outcomes.

We find positive impacts of scholarships on enrollment, grade completion, and grade progression in school. Ninety-five percent of students who were offered scholarships enrolled in 10th grade, compared to eighty-seven percent of students who were not offered scholarships (statistically significant difference of 8 percentage points; Figure 3 and Table 6). Although we find no statistically significant treatment-control differences in enrollment in general programs, students who were offered the scholarship were 14 percentage points more likely to enroll in technical programs (statistically significant at the 5 percent level). This finding is not surprising given that the majority of the scholarships were granted for technical educational programs. Students offered the scholarship were also more likely to complete the 10th grade in 2010 (85 percent in the treatment group versus 79 percent in the control group). In addition, students offered the scholarship were 6 percentage points more likely to pass the 10th grade than students

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that were not offered the scholarship (83 percent in the treatment group versus 79 percent in the control group) and this difference is statistically significant at the 5 percent level (not shown in Figure 3). We also find that students who were offered the scholarship were 8 percentage points more likely to enroll in 11th grade in 2011 than students who were not offered the scholarship (84 percent in the treatment group versus 76 percent in the control group).

Figure 3. Impact of FOMILENIO Scholarships on Students' Enrollment and Grade Completion



Source: Student follow-up survey conducted in July 2011.

Notes: Estimates reflect adjusted follow-up means after controlling for baseline characteristics.

*Treatment-control difference statistically different from zero at the 5 percent level.

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Table 6. Impact of FOMILENIO Scholarships on Students' Educational Outcomes (Percentages)

Outcome	Treatment	Control	Difference	p-value
Enrolled in 10 th grade in 2010	95	87	8	0.00
Enrolled in a general program	21	27	-6	0.09
Enrolled in a technical program	75	61	14	0.00
Completed 10 th grade	85	79	6	0.04
Passed 10 th grade	83	77	6	0.04
Enrolled in 11 th grade in 2011	84	76	8	0.02
Repeated 10 th grade in 2011	1	2	-1	0.50
Sample Sizes	477	221		

Source: Student follow-up survey administered in July 2011.

Note: Means are regression adjusted using ordinary least squares to account for baseline characteristics and the study design. Data are weighted to account for differential assignment ratio and non-response across strata. Some numbers may not add up due to rounding.

2. Impacts on Labor Market Outcomes and Income

The ultimate goal of FOMILENIO scholarships is to increase student income and employment upon the completion of secondary school. However, while students attend secondary school, scholarships could affect their labor market behavior. A potential result of the scholarships could be reduced employment among scholarship recipients during the years in which they attend secondary school. To assess these secondary effects, we estimated the impact of the offer of a FOMILENIO scholarship on key labor market outcomes.

We find statistically significant effects of scholarships on the number of hours worked, income, and consumption, but not on employment. We find no statistically significant differences between treatment and control groups in the percent of students employed, or the percent of students who reported working full-time jobs (Table 7). However, we find that on average, students who were offered a scholarship work almost two hours less per week than students who were not offered the scholarship (statistically significant at the 5 percent level). Hence, scholarships appeared to reduce the amount of time that students worked, primarily while they were enrolled in school. We also find that on average, the total annual income of students who were offered FOMILENIO scholarship is \$200 higher than the total income of students who were not offered scholarships (statistically significant at the 5 percent level). Furthermore, students who were offered scholarships reported spending on average \$57 more per year than students who were not offered scholarships (statistically significant at the 5 percent level).

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Table 7. Impact of FOMILENIO Scholarships on Students' Employment and Income (Averages Unless Otherwise Indicated)

Outcome	Treatment	Control	Difference	p-value
Employed (%)	19	23	-4	0.22
Employed full time (%)	3	7	-4	0.06
Hours worked weekly	3.4	5.3	-2.0	0.04
Student total annual income (in USD)	840	636	204	0.00
Student annual consumption (in USD)	390	332	57	0.03
Sample Sizes	477	221		

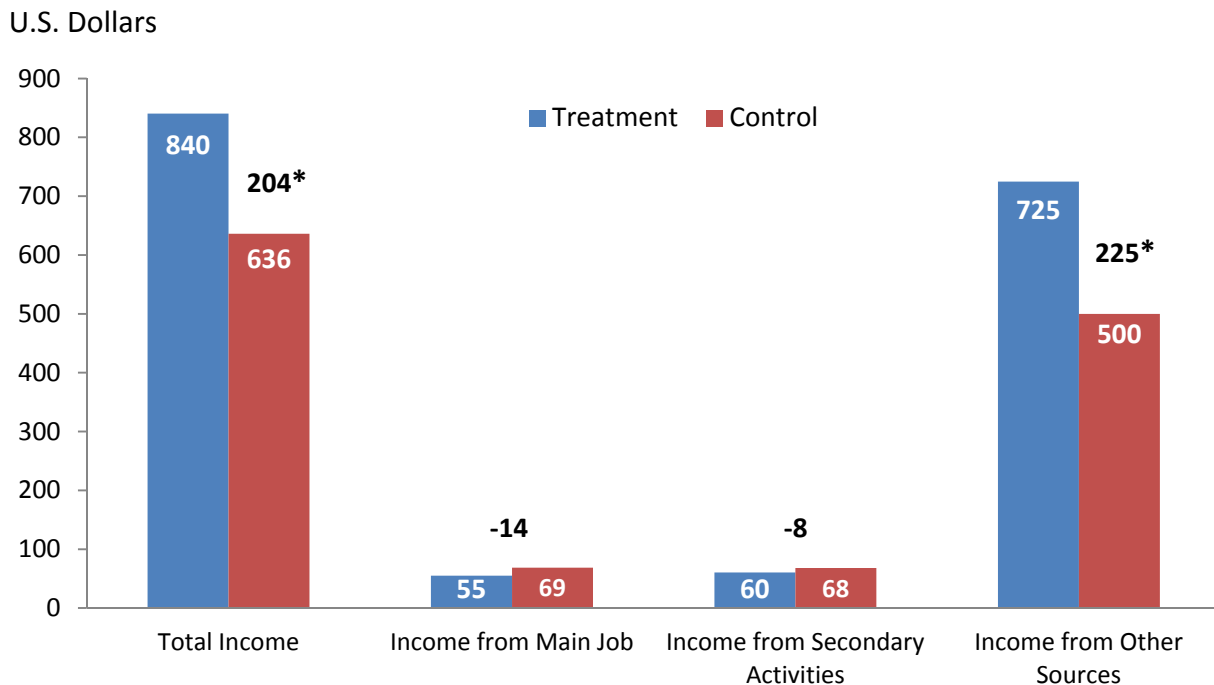
Source: Student follow-up survey administered in July 2011.

Note: Means are regression adjusted using ordinary least squares to account for baseline characteristics and the study design. Data are weighted to account for differential assignment ratio and non-response across strata.

Figure 4 summarizes the impact of scholarships on students' total income and its components. When we disaggregate total income into these components, we find that the statistically significant difference of \$204 in total income between treatment and control students is largely due to substantial differences in income from other sources—or sources outside main and secondary income sources. Income from other sources is on average \$225 more for students who were offered the scholarship than for students who were not offered the scholarship. This treatment-control difference appears to reflect the amount of the FOMILENIO scholarship. Although the scholarship was \$400, there are many reasons why the impact is not exactly \$400. First, actual payments to students were \$310 at the time of the follow-up survey because a portion of the \$400 scholarship is a school packet valued in \$90. Second, a portion of treatment students did not accept the scholarship, and thus did not report it as income. Most importantly, control students may have found other scholarships or procured other sources of income, such as allowance or remittances.

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Figure 4. Impact of FOMILENIO Scholarships on Students' Annual Income



Source: Student survey conducted in July 2011.

Note: Estimates reflect adjusted means after controlling for baseline characteristics.

*Treatment-control difference statistically different from zero at the 5 percent level.

3. Impacts on Expectations after Secondary school

Scholarships are intended to affect educational outcomes and ultimately labor market outcomes following students' graduation. In addition, scholarships could also affect intermediate outcomes such as students' expectations regarding future studies and employment. Next, we estimate the impact of the offer of a scholarship on students' plans for graduation and post-secondary education.

We find positive effects of scholarships on students' expectations of attending a post-secondary technical institution, but not on expectations of graduating from secondary school, attending a university, or working after graduation. We find no significant treatment-control difference in the percent of respondents who planned to graduate from secondary school or work after secondary school (Table 8). We also found no treatment-control difference in the percent of respondents who planned to attend a university. However, students who were offered the scholarship were five percentage points more likely to plan to attend a vocational or technical post-secondary institution than students who were not offered the scholarship (statistically significant at the 5 percent level). This finding seems to be driven by students who attended the

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four secondary schools that are linked to the ITCHA (and are part of our analysis sample). If they maintain good academic standing, these students are guaranteed acceptance at this technical post-secondary institution as well as a post-secondary scholarship. As such, higher expectations of continuing vocational or higher technical education could be attributed in part to these students' expectation of acceptance at ITCHA and a future post-secondary scholarship, in addition to their current secondary school scholarship.²¹

Table 8. Impact of FOMILENIO Scholarships on Students' Expectations for Graduation and Post-Secondary Education (Percentages)

	Treatment	Control	Difference	p-value
Planned to graduate from secondary school	86	82	4	0.20
Planned to continue to university	26	26	0	0.97
Planned to continue in vocational or higher technical education	13	8	5	0.04
Planned to work after secondary school	44	46	-2	0.70
Sample Sizes	477	221		

Source: Student survey administered in July 2011.

Note: Means are regression adjusted using ordinary least squares to account for baseline characteristics and the study design. Data are weighted to account for differential assignment ratio and non-response across strata.

H. SUPPLEMENTAL ANALYSES

1. Comparison of Intent-to-Treat and Treatment-on-the-Treated Estimates

The impact estimates discussed in the previous section compared treatment and control groups regardless of whether students actually received FOMILENIO scholarships. However, in our analysis sample, 79 percent of the students who were offered scholarships accepted them and received the first payment (and can thus be defined as participants). Because stakeholders are also interested in measuring the effect of scholarships on students who actually received them, we present treatment-on-the-treated (TOT) results in this section. First, we compare the baseline characteristics of participants and non-participants in the treatment group (Table 9). This

²¹ We conducted additional analyses that confirmed that this effect is driven by students in the secondary schools that are linked to ITCHA. A regression with an interaction of treatment and linked schools found significant effects of scholarships on planning to attend a post-secondary technical institution for students in these four schools. No statistically significant effect was found for this outcome among students outside of these four schools.

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comparison is important because participants already differ from non-participants in their decision to accept the scholarship. As such, it is important to understand if participants and non-participants differ on other observable characteristics. On average, students who received at least the first scholarship payment (participants) were younger, had higher income, and were more likely to live in urban areas than students who were offered a scholarship but did not accept it (non-participants). On average, participants were about 1.2 years younger than non-participants (statistically significant at the 1 percent level). In addition, participants had higher average baseline annual household income than non-participants (a difference of \$444) and higher annual expenses (a difference of \$324), and both differences are statistically significant at the 5 percent level. Finally, a higher percentage of participants than non-participants reported living in urban areas, and this difference is statistically significant at the 5 percent level. Through statistical methods, our TOT impact estimates control for these baseline characteristics.

Table 9. Baseline Characteristics of Participants and Non-Participants in the Treatment Group (Averages Unless Otherwise Indicated)

	Participants	Non-Participants	Difference	p-value
Age (years)	16.0	17.2	-1.2	0.01
Female (%)	57	63	-6	0.30
Annual household income (in USD)	2,028	1,584	444	0.00
Household size	5.6	5.9	-0.3	0.26
Grades	7.9	7.7	0.2	0.17
Annual expenditures (in USD)	1,932	1,608	324	0.01
Urban (%)	18	9	10	0.02
Sample Size	375	102		

Source: Data from scholarship application form (FEPADE's records).

Note: Means are regression adjusted using ordinary least squares to account for the stratification that was part of the study design; means are weighted to account for differential assignment ratio and non-response across strata.

Table 10 presents the main findings under both the ITT and TOT approaches. As mentioned before, ITT estimates can be interpreted as the effect of the offer of the scholarship, regardless of whether the scholarship was accepted, and TOT estimates can be interpreted as the effect of scholarships on those who accepted them. Both approaches account for baseline characteristics of students in the study sample.

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Table 10. Comparison of Intent-to-Treat (ITT) and Treatment-on-the-Treated (TOT) Impacts of FOMILENIO Scholarships (Percentages Unless Otherwise Indicated)

Outcome	Impact (ITT)	Impact (TOT)
Enrolled in 10 th grade in 2010	8*	11*
Enrolled in general program	-6	-7
Enrolled in technical program	14*	18*
Completed 10 th grade	6*	9*
Passed 10 th grade	6*	9*
Enrolled in 11 th grade in 2011	8*	10*
Repeating 10 th grade in 2011	-1	-1
Employed	-4	-5
Employed full-time	-4	-5
Hours worked weekly (average)	-2.0*	-2.6*
Student total annual income (in USD)	204*	269*
Annual consumption (in USD)	57*	76*
Planned to graduate from secondary school	4	5
Planned to continue post-secondary education at a university	0	0
Planned to continue post-secondary education at a vocational or technical institution	5*	7*
Planned to work after secondary school	-2	-2

Source: Student follow-up survey administered in July 2011.

Note: ITT impacts use ordinary least squares to account for baseline characteristics and the study design. TOT impacts use an instrumental variable specification where treatment is used as an instrument for participation and we account for baseline characteristics. In both estimations results are weighted to account for differential assignment ratio and non-response across strata.

*Impact (either ITT or TOT) statistically different from zero at the five percent level.

We obtain similar results under both ITT and TOT approaches and, as expected, the impacts under the TOT approach are larger. Using either approach, we find positive and significant effects of the scholarships on most educational outcomes. Under a TOT approach, students who received the scholarship were 11 percentage points more likely to enroll in 10th grade than students who did not receive the scholarship. In addition, students who received the scholarship were 9 percentage points more likely to complete and pass 10th grade than students who did not receive the scholarship. Furthermore, students who received FOMILENIO scholarships enrolled in 11th grade at higher rates than students who did not receive a scholarship.

Under a TOT approach, we do not find any statistically significant differences in employment outcomes for recipients of a scholarship versus non-recipients. However, we do find

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that students who received a scholarship worked about 2.6 less hours than students who did not receive a scholarship. As with our ITT approach, we find a positive effect of the scholarship on students' total income (\$269), and this difference is due to higher income from other sources (including scholarships). Finally, as with our ITT approach, the only statistically significant impact of the scholarship on expectations is that students who received a scholarship were 7 percentage points more likely to plan to attend a technical post-secondary institution than students who did not receive a scholarship.

2. Gender Subgroup Analysis

To assess if the intervention had a different impact on females than on male students, we estimated impacts by gender. Table 11 presents a summary of these results. We find several statistically significant differences in impacts between males and females related to educational attainment, but we do not find gender-related differences on the scholarship's impact on employment, income, or expectations. For males, the impact on 10th grade enrollment is 13 percentage points higher than the impact on 10th grade enrollment for females. In addition, the impact on 10th grade completion for males is 14 percentage points higher than the impact on 10th grade completion for females. Furthermore, the impact of scholarships on 11th grade enrollment for males is 13 percentage points higher than the impact for females.

Table 11. Impacts of FOMILENIO Scholarships, by Gender (Percentages Unless Otherwise Indicated)

Outcome	Impact for Males	Impact for Females	Difference
Enrolled in 10 th grade in 2010	16	3	-13*
Completed 10 th grade	14	0	-14*
Passed 10 th grade	14	2	-12
Enrolled in 11 th grade in 2011	15	2	-13*
Employed	-5	-3	2
Employed full-time	-7	-1	6
Hours worked weekly (average)	-3.3	-1.0	2.4
Student annual total income (in USD)	252	168	-84
Annual consumption (in USD)	63	53	-10
Planned to graduate from secondary school	10	-1	-11
Planned to continue post-secondary education in university	2	0	-2
Planned to continue post-secondary education in a vocational or technical institution	2	8	6
Planned to work after secondary school	7	-8	-15

Source: Student follow-up survey administered in July 2011.

Note: Impacts use ordinary least squares to account for the stratification that was part of the study design; means are weighted to account for differential assignment ratio and non-response across strata.

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*Statistically different from zero at the five percent level.

To better understand these impacts related to gender, Figure 5 presents the adjusted means for males' and females' educational attainment. As illustrated in the figure, we find higher impacts for males than for females in part because males in the control group have much lower educational attainment than males in the treatment group (or females in either group). In other words, females in the study sample appeared to enroll in secondary school at high rates regardless of the scholarship offer, but the offer seems to have motivated a substantial portion of males to enroll who would not have done so without such an offer. Interestingly, nearly all males offered a scholarship (99 percent of males in the treatment group) enrolled in the 10th grade. However, because males had a higher likelihood of dropping out of 10th grade than females, 10th grade completion rates and 11th grade enrollment rates were comparable between males who were offered scholarships and females in the study (regardless of whether they had been offered scholarships).²² In other words, the offer of FOMILENIO scholarships effectively closed a substantial gender gap in secondary school enrollment and grade progression. The lower educational attainment of males in secondary education is recent problem in the Central American Region, as UNESCO has reported.²³ In addition, using data from the Censo Matricular we found that, in the forty secondary schools in the Northern Zone included in our study, more females than males enrolled in secondary education from 2006 to 2010.²⁴

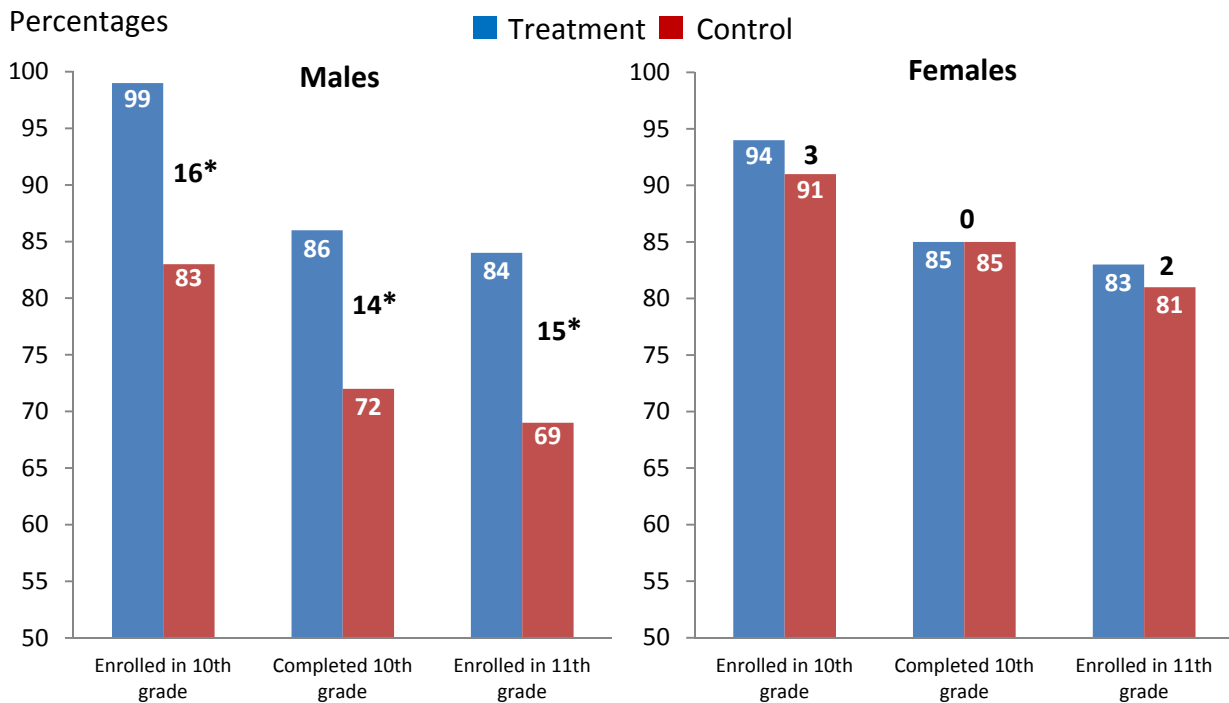
²² We did not find difference in the participation rates between females and males, see Table 8.

²³ UNESCO. 2011. Informe de Seguimiento de la EPT en el Mundo 2011. Panorámica Regional: América Latina y el Caribe.

²⁴ See Figure A.1 in "Interim results of the Impact Evaluation for the Secondary school Strengthening Program." Submitted to MCC by Larissa Campuzano, Seth Morgan, and Randall Blair on July 8, 2012.

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Figure 5. Impacts of FOMILENIO Scholarships on Student Enrollment and Grade Completion, by Gender



Source: Student follow-up survey administered in July 2011.

Note: Means are regression adjusted using ordinary least squares to account for baseline characteristics and the study design. Data are weighted to account for differential assignment ratio and non-response across strata.

*Treatment-control difference statistically different from zero at the five percent level.

3. Analysis on Conditional Outcomes

The results on educational attainment discussed up to this point present the percentage of students who attained a certain educational level, regardless of whether they attained the previous level (i.e., they are unconditional estimates). For example, when we report the percentage of students who completed 10th grade, the denominator of this percentage is the full number of students in our analysis sample, regardless of whether they enrolled in 10th grade. We focus on unconditional values in our main analysis because we want to preserve treatment and control groups formed under random assignment. Comparisons between these randomized groups generate unbiased estimates of the impact of scholarships.

Alternately, we could also report the percentage of students who completed 10th grade among those that enrolled in 10th grade (i.e., conditional on initial enrollment). However, analyzing these conditional outcomes introduces the potential for biased impacts because

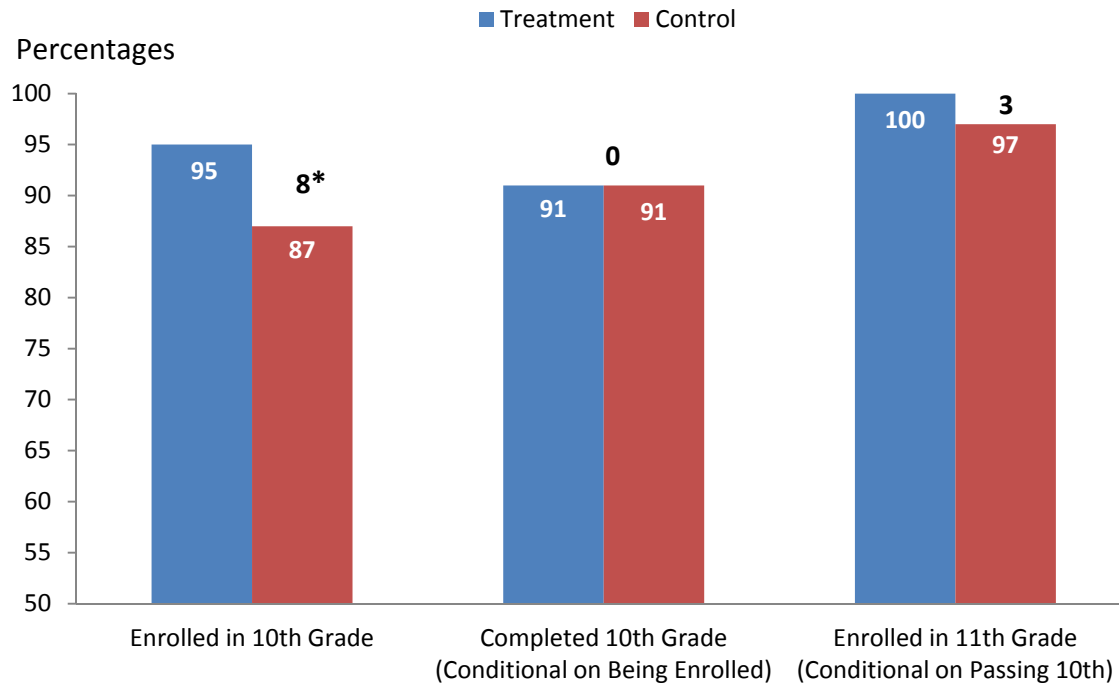
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students have selected themselves into the condition of interest. For example, suppose our study contains some relatively less motivated students who are willing to enroll in secondary school due to the \$400 scholarship. These students will enroll if they are in the treatment group, but not if they are in the control group. Once we condition our analyses on enrollment, the subsample of students in the treatment group that enrolled will include these less-motivated students, while the subsample of control students that enrolled will not. If we compare these two subsamples at follow-up, some of the differences we find between treatment and control outcomes will be due to unobserved differences in motivation and some will be due to the scholarship. Because it is impossible to disentangle these two phenomena, the impacts will be biased. Because they are of interest to stakeholders, we present some exploratory impacts of conditional educational outcomes. However, reader should interpret these results with caution.

Figure 6 summarizes mean differences between treatment and control groups based on conditional outcomes. Although impacts on conditional outcomes may be biased, they serve as an exploratory analysis of the effect of scholarships at each educational stage. As shown, scholarships have a significant effect on enrollment in 10th grade, but no apparent impact on students' 10th grade completion rates once they are enrolled. Similarly, among students who actually passed 10th grade, we find no treatment-control differences in 11th grade enrollment rates. The absence of impacts on grade completion and progression using conditional outcomes suggests that after accounting for the positive effect of scholarships on 10th grade enrollment, there is no impact of scholarships on 10th grade completion and 11th grade enrollment. When interpreting these conditional results, we should keep in mind that the distribution of unobservable characteristics between treatment and control groups likely differs. As mentioned above, it is possible that the treatment group has a larger number of less motivated students than the control group. However, because the two groups exhibit similar educational attainment by the end of 10th grade, it is possible that scholarships provide students with enough incentive to continue studying at the same rate as presumably more motivated students.

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Figure 6. Impacts of FOMILENIO Scholarships on Conditional Educational Outcomes



Source: Student follow-up survey conducted in July 2011.

Note: Estimates reflect adjusted means after controlling for baseline characteristics.

*Treatment-control difference statistically different from zero at the five percent level.

I. CONCLUSIONS

1. Summary of Findings

The offer of FOMILENIO scholarships had a positive impact on several educational outcomes. First, students who were offered scholarships were 8 percentage points more likely to enroll in the first year of secondary school than students who were not offered scholarships (95 percent enrollment versus 87 percent among non-scholarship students). Second, students who were offered scholarships completed and passed the first year of secondary school at higher rates than students who were not offered scholarships (a difference of 6 percentage points relative to 79 percent completion among non-scholarship students). Third, students who were offered scholarships enrolled in the second year of secondary school at higher rates than those who were not offered scholarships (a difference of 8 percentage points relative to 76 percent enrollment among non-scholarship students). These positive effects on educational outcomes can be attributed directly to the scholarship offer. Interestingly, scholarships had a much larger impact on males' educational outcomes than those of females (statistically significant impacts of

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between 14 and 16 percentage points for males' key educational outcomes, versus no statistically significant impacts for females).

However, we do not find that the scholarship offer affected students' employment during the interim study period. These findings are somewhat expected given that most of students in the study did not participate in the labor market in 2011 (only around 20 percent of respondents reported working at the time of the survey). Nevertheless, we do find that students who were offered the scholarships worked about two hours less per week than students who were not offered scholarships. The goal of FOMILENIO scholarships is to increase students' secondary school educational attainment so that upon their graduation, these individuals are more likely to find employment and earn a viable income. For this reason, the effects of FOMILENIO scholarships on labor market outcomes will become the main focus in future rounds of analysis, after most students have completed their secondary school studies.

When we analyze the effects of FOMILENIO scholarships on students who actually received at least one scholarship payment, we find similar but larger effects than in our analysis of students who simply received the scholarship offer. Students who received scholarships were 11 percentage points more likely to enroll in 10th grade, 9 percentage points more likely to complete or pass 10th grade, and 10 percentage points more likely to enroll in 11th grade than those students who did not receive a FOMILENIO scholarship.

We also did some exploratory analysis of the scholarship's impact on educational outcomes, conditional on 10th grade enrollment and completion. These findings should be interpreted with caution because conditional analysis foregoes the advantages of randomization and may result in biased impact estimates. Among students who actually enrolled in 10th grade and completed 10th grade, we find no treatment-control differences in 10th grade completion rates and 11th grade enrollment rates, respectively. The absence of impacts using conditional outcomes suggests that after accounting for the positive effect of scholarships on 10th grade enrollment, there is no substantial impact of scholarships on 10th grade completion and 11th grade enrollment.

2. Limitations

As in the case of any study, these impact estimates reflect the characteristics of the study population and the assistance provided. Because the study population was comprised of secondary school aged students residing in specific municipalities who expressed interest in scholarships (and met needs-based and academic requirements for these scholarships), these results cannot be generalized to the entire population of secondary school aged students in El Salvador's Northern Zone. The impact of offering a scholarship similar to the FOMILENIO scholarship to all secondary school aged students in the Northern Zone—or even all secondary school aged students in the Northern Zone who meet similar selection criteria—could be similar, smaller, or larger than the impact detected among the study population.

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In addition, the scholarship intervention was implemented in tandem with related interventions financed by FOMILENIO, particularly the secondary school strengthening intervention. Under this strengthening intervention, all 17 schools participating in the scholarship intervention received infrastructure improvements and most secondary school teachers and administrators at these schools received teacher training. Most likely, these improvements would affect students' educational outcomes independently of the effect of the scholarship intervention. However, the impacts presented in this memorandum cannot be separated statistically from the effects of secondary school improvements.

In 2010, new technical degree programs were introduced in 4 of the 17 schools in which scholarships were offered. Because these programs are linked to the newly established MEGATEC programs at the ITCHA, students who complete the programs can register directly in their second year of post-secondary education following secondary school and access ITCHA scholarships. As a result, students in the four linked secondary schools could have enhanced incentives to complete secondary school. Unfortunately, we cannot separate the impacts of the scholarship from the possible effects of these new MEGATEC programs on students' educational outcomes.

3. Policy Implications and Recommendations for Future Scholarship Interventions

The main policy implication of this analysis is that a \$400 annual scholarship can generate increased secondary school enrollment, grade completion, and continuation rates in El Salvador's Northern Zone, primarily among male scholarship applicants. The availability of a \$400 scholarship appears to play a substantial role in males' decision to enroll in secondary school, whereas females appear to enroll regardless of the scholarship offer. Notably, FOMILENIO scholarships appeared to have a positive effect on males' educational outcomes of sufficient magnitude to fully close a 10 percentage point gender gap in 10th grade completion and 11th grade enrollment.

Given FOMILENIO scholarships' large impact among males—and negligible impact among females—stakeholders could consider giving some preference to male applicants for future secondary school scholarship interventions. In educational contexts in which males underperform compared to females, as appears to be the case in El Salvador, targeting males with scholarships could facilitate gender parity in educational attainment. Targeting males could also increase the scholarship's rate of return, or the ability of the \$400 annual scholarship to motivate students to enter and complete secondary school, which could in turn result in long-term labor market gains of much larger magnitude than the cost of the scholarship.

As noted in Section B, a qualitative study conducted by MCC in 2010 found that students generally reported that the scholarship amount was not enough to cover their school expenses (Zanin, 2010). In light of this finding, future scholarship interventions could determine scholarship amounts according to students' actual travel and food expenses, so that students who live further from schools would receive larger monthly scholarship payments. Such an approach

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could potentially increase acceptance rates among applicants who face sizable constraints to education, particularly rural students. Perhaps more importantly, it would constitute a fairer allocation of scholarship payments by reducing the probability that students who live near schools are overly compensated for their expenses, while students who live further away are undercompensated for these expenses.

J. NEXT STEPS

In July 2012, DIGESTYC completed a second follow-up survey that will collect data on students' outcomes for the 2011 school year and the first part of 2012. The results from the analysis of these data are scheduled to be submitted to MCC in 2013. At the end of 2013, data collectors will complete the third follow-up survey, which will collect outcomes for students one year after they will have completed technical secondary school. Due in November 2014, the final report for the scholarship evaluation will examine the impact of scholarships on labor market outcomes one year after secondary school completion.²⁵

²⁵ The date of this final report is not yet final.

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cc: Claudia Argueta

Table A.1 Demand for Scholarships, by Educational Program and School

School	Department	Educational Program	Type of Program	Eligible Applicants	Scholarships Available	Random Assignment Possible	Eligible Applicants Without Scholarships
14 De Julio De 1875	Morazán	Customs Logistics	Technical	56	45	Yes	11
		Business (Accounting)	Technical	88	20	Yes	68
		Business (Secretarial)	Technical	33	20	Yes	13
		Auto Mechanics	Technical	76	76	No	0
School Total				253	161	Yes	92
Aguilares	San Salvador	Civil Engineering	Technical	101	45	Yes	56
Anamoros	La Unión	Diploma: Milk Processing	General	60	45	Yes	15
Benjamín Estrada Valiente	Santa Ana	Civil Engineering	Technical	69	50	Yes	19
		General Mechanics	Technical	28	28	No	0
		Electrical Engineering	Technical	27	27	No	0
School Total				124	105	Yes	19
Carolina	San Miguel	Organic and Hydroponic Agriculture	General	50	43	Yes	7
Chapeltique	San Miguel	Diploma: Agroforestry	General	74	40	Yes	34
De La Reina	Chalatenango	Diploma: Milk Processing	General	22	22	No	0
Dr. Francisco Martínez Suárez	Chalatenango	Agriculture	Technical	9	9	No	0
		Business (Accounting)	Technical	146	39	Yes	107
		Business (Secretarial)	Technical	53	39	Yes	14

Table A.1 (continued)

School	Department	Educational Program	Type of Program	Eligible Applicants	Scholarships Available	Random Assignment Possible	Eligible Applicants Without Scholarships
School Total				208	87	Yes	121
El Sauce	La Unión	Diploma: Organic and Solid Waste Management	Technical/Business	55	55	No	0
Gral. Juan Orlando Zepeda	Chalatenango	Diploma: Community Organizing	Health	50	50	No	0
Gral. Manuel José Arce	Morazán	Business	Technical/Business	28	28	No	0
Jutiapa	Cabañas	Diploma: Financial Accounting	Technical/Business	79	40	Yes	39
La Palma	Chalatenango	Diploma: Cooking	General	17	17	No	0
		Alternative Tourism	Technical	71	45	Yes	26
School Total				88	62	Yes	26
Nueva Concepción	Chalatenango	Diploma: Organic and Hydroponic Agriculture	General	52	52	No	0
Osicala	Morazán	Diploma: Community Organizing	Technical/Business	119	60	Yes	59
San Ignacio	Chalatenango	Alternative Tourism	Technical	73	45	Yes	28
Sesori	San Miguel	Diploma: Fair Trade	Technical/Business	88	60	Yes	28
Grand Total				1,524	1,000		524

Table A.2 Final Distribution of Scholarships in Schools in which Demand Exceeded the Number of Scholarships Available^a

School	Department	Educational Program	Number of Eligible Applicants	Number of Students With Scholarships (Treatment)	Number of Students Without Scholarships (Control)	Number of Students on the Waiting List	Number of Additional Control Students Released
14 De Julio De 1875	Morazán	Business (Accounting)	88	20	26	5	37
		Business (Secretarial)	33	20	8	5	0
		Customs Logistics	56	45	6	5	0
Aguilares	San Salvador	Civil Engineering	101	45	30	5	21
Anamoros	La Unión	Diploma: Milk Processing	60	45	10	5	0
Benjamin Estrada Valiente	Santa Ana	Civil Engineering	69	50	12	5	2
Chapeltique	San Miguel	Diploma: Agroforestry	74	40	24	5	5
Jutiapa	Cabañas	Diploma: Financial Accounting	79	40	28	5	6
La Palma	Chalatenango	Alternative Tourism	71	45	18	5	3
Osicala	Morazán	Community Organizing	119	60	33	5	21
San Ignacio	Chalatenango	Alternative Tourism	73	45	20	5	3
Sesori	San Miguel	Diploma: Fair Trade	88	60	21	5	2
Total			911	515	236	60	100

^aDr. Francisco Martínez Suárez and Carolina do not appear in this table due to their exclusion from the study in February 2010. Therefore, the number of eligible applicants does not match the number reported in Table A.1.

Table A.3 Characteristics of Respondents and Non-Respondents

	Respondents	Non-Respondents	Difference	p-value
Age	16.1	16.6	-0.5	0.29
Female	57	62	5	0.48
Annual Family Income	1,923	1,574	-349	0.04
Household Size	5.6	5.6	0.0	0.97
Grades	7.8	7.6	0.2	0.16
Annual Expenditures	1,847	1,643	204	0.22
Urban	16	9	6	0.23
Sample Size	698	53		

Source: Data from 2009 scholarship application form (FEPADE's records).

Table A.4 Reasons Given by Students in the Treatment Group for Declining Scholarships

FOMILENIO did not approve the scholarship	29
Enrolled in another school	10
The school was too far	9
The program of study that he/she wanted to study was not approved	9
Did not want to continue studying	6
Was working	5
The scholarship amount was not enough	4
Crime concerns	5
Did not enroll in school	3
Did not have the paperwork needed ready	3
Wanted to postpone enrollment	2
The scholarship was not given on time	2
Did not know that the scholarship was offered	2
When they notified the applicant about the scholarship, there were no openings at the school	1
Had another scholarship	1
Economic problems	1
Health problems	1
Pregnant	1
Got married	1
Did not pass 9 th grade	1

Source: Student follow-up survey conducted in July 2011.