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Abstract

Using a randomized trial, we evaluate the impact of a free privately-managed middle school in a poor neighborhood. The research compares over time adolescents randomly selected to enter *Liceo-Jubilar* and those that were not drawn in the lottery. Besides positive impacts on expectations, we find better educational outcomes in the treatment group relative to control subjects. The features of *Liceo-Jubilar* -autonomy of management, capacity for innovation, and adaptation to the context- contrast with the Uruguayan highly centralized and inflexible public education system. Our results shed light on new approaches to education that may contribute to improve opportunities for disadvantaged adolescents in developing countries. Unlike the experiences of charter schools in developed countries, *Liceo-Jubilar* does not have autonomy regarding the formal school curricula nor depends on public funding by any means.

Keywords: Education; Field Experiment; Poverty; Impact Evaluation
JEL: I21

1. Introduction

Public education in Uruguay is in a deep crisis. Only one in three Uruguayans aged 22 have finished high school, well below the rates in other South American countries. Repetition rates are alarmingly high, reaching 40% in public middle schools in Montevideo, the capital of the country. Half of the 15 year-old population does not reach the minimum proficiency levels in reading and math, behavior that extends to three out of four adolescents in the lowest income quintile (statistics from Ministry of Education, 2009).

The aim of this study is to evaluate the socio-academic impact of an independent middle school in Montevideo with a management and teaching-learning approach that differs substantially from that in traditional public schools. *Liceo-Jubilar* is one of the few tuition-free privately managed schools in Uruguay.[1] It is located in Casavalle, one of the poorest neighborhoods in Montevideo, with an adolescent poverty rate of almost 75% and a high school completion rate of 8% (statistics based on the 2009 Uruguayan Continuous Household Survey). *Liceo-Jubilar* offers middle school education (1st, 2nd, and 3rd grades of secondary education) to 175 students. Unlike public schools in the country, *Liceo-Jubilar* is a full time school. Students are taught the national school curriculum in the mornings, and are required to take courses beyond the national curriculum and to choose among several educational and recreational workshops in the afternoons. Students spend an average of 9 hours per day at school and the school-year is 44 weeks long, 6 weeks longer than the public-school year. The teaching-learning approach is highly personalized, based on a close interaction with families and the community and on a strict discipline. In the past years, the school's dropout and grade repetition rates were below 2%. These

[1] *Liceo-Jubilar* is financed almost entirely with private donations. Parents are required to contribute financially within their means, but these contributions are insignificant.

are very favorable outcomes when considered in the context of a repetition rate of 26% and a dropout rate of 60% in the Casavalle community (statistics based on the 2009 Uruguayan Continuous Household Survey).

In response to public schools' low academic performance, governments are increasingly turning to private providers to manage publicly financed education (Bierlein, Finn, Manno, & Vanourek, 1998). Charter schools, for example, have emerged as autonomous institutions founded by teams of teachers, parents, and nonprofits that receive public money in exchange for concrete educational outcomes (Toma, & Zimmer, 2012). They are exempt from most regulations governing the activity of public schools, what gives them a better capacity to adapt to the needs of their students (Booker, Gill, Lavertu, Witte, & Zimmer, 2012). They are also based on individual choice, promoting competition (DeSimone, Holmes, & Rupp, 2003). Critics of charter schools argue they destroy the public education system and promote segregation (West, 1997). Supporters point out that the costs of increasing social choice through the privatization of public education are minimal, and that the management of private education is inherently more efficient and effective in achieving learning (Carnoy, 1998).

Private management of public education has been implemented with relative success in countries such as Chile, Colombia, the Netherlands, New Zealand, Sweden, and the United States. While not all experiences have been successful, research shows that these schools have been particularly beneficial for students from critical socioeconomic contexts (Abdulkadiroglu, Angrist, Dynarski, Kane, & Pathak, 2009; Angrist, Bettinger, Bloom, King, & Kremer, 2002; Hoxby & Rockoff 2005; Hoxby & Murarka 2009; Hsieh & Urquiola, 2006; Dobbie & Fryer, 2009).

Unlike the experiences in other countries, *Liceo-Jubilar* does not have autonomy regarding the formal school curricula nor depends on public funding. But it emulates these other international examples in its autonomous management,

its ability to recruit and commit staff, and a personalized and contextualized approach to learning. This approach contrasts strongly with that observed in most public schools in Uruguay, which stems from a highly centralized and inflexible national system.

Our impact assessment is based on the randomization a cohorts of children who applied to enter *Liceo-Jubilar* by the end of sixth grade in 2009. The research exploits the excess of applicants over the school capacity and the fact that participants were selected randomly. The cohort (N = 101) was interviewed in October 2009 and randomized in December, three months before starting the school year. The current paper reports on the results of the first year follow-up of this cohort.

This is one of the first investigations in Uruguay, a developing country, to evaluate the impact of a school through a randomized experiment. The methodology allows for the identification of causal effects of treatment, free of methodological biases. Through this research we seek to contribute to the educational debate by shedding light on the outcomes of an innovative school that is improving the opportunities of socioeconomically disadvantaged adolescents. *Liceo-Jubilar* embodies many of the initiatives currently under discussion in Uruguay: autonomy of management, focus on the student as the axis of the system, intervention with the family and the community, and discipline.

2. Methodology

As mentioned, average dropout and repetition rates are lower in *Liceo-Jubilar* than in the neighborhood's public school system. This simple comparison of means captures not only *Liceo-Jubilar*'s treatment effect, but also differences in the baseline characteristics of the populations compared (selection bias). For example, public schools enroll students of higher socioeconomic status than *Liceo-Jubilar*, suggesting a negative selection bias. On the other hand, students

who apply to *Liceo-Jubilar* probably exceed other youth in terms of their motivation, perception of the value of education, and family support. These latter features could bias the impact estimates upwards if selection bias were not adequately addressed. While some of the variables that characterize each group can be observed with relative ease (i.e. socioeconomic background, family structure, family education and occupation), other characteristics such as parental commitment towards education or student's motivation are more difficult to observe. In this sense, the adjusted comparison of means based on regression or propensity score analysis does not completely solve the problem of selection bias.

To avoid this issue, this research exploits the facts that the number of applications for *Liceo-Jubilar* exceeded the number of places available, and that students were selected through a lottery. This allocation rule ensures that the group of students entering *Liceo-Jubilar* -the treatment group- is similar at baseline to the group of adolescents who are not drawn in the lottery -control group- (Clark Tuttle, Gleason, & Clark, 2012). Absent selection, *Liceo-Jubilar*'s impact is estimated by directly comparing the results of the treatment group and control group over time.

a) Data collection

In September 2009 *Liceo-Jubilar* opened an enrollment window inviting families of children in the last year of primary school to apply for a placement at the school. The school had 70 places available (two classes of 35 students). Applications were received from 172 students, of whom 43 were rejected because they exceeded the grade-appropriate age by 2 years or more, did not live in the neighborhood, or had a household income above the poverty threshold. Out of the remaining 129 applications, 28 students were automatically chosen to enter the school, majorly because they were siblings of current or former students. This left a remaining waiting list of 101 candidates who were randomly assigned to meet the quota of 42 places in December 2009.

Randomization was executed to achieve balance in gender, two categories of household income (high and low), and two categories of achievement in *Liceo-Jubilar*'s baseline placement test.

Before the lotteries were drawn in 2009, the research team at Universidad of Montevideo surveyed the applicants. The surveys were administered at *Liceo-Jubilar* during three consecutive Saturdays in November 2009. The survey modality was self-administration with close supervision of research staff. The questionnaire inquired about demographics, academic performance, academic expectations, risky behaviors, and habits. An additional survey was administered to parents or family referents with questions about family structure, education, income, and occupation, among other socioeconomic characteristics. The school's staff applied this survey during the interview process with parents.

Table 1 shows mean characteristics for the group of adolescents that were subject to the lottery, for adolescents excluded a priori from the selection process, and for students who were directly admitted to enter Jubilar. In addition to analyzing differences between these groups, we compare the household characteristics of the lotteried students with those of a nationally representative sample of children aged 18 or less (Uruguayan Continuous Household Survey, 2009).

Column (1) shows that the average age of students who participated in the lottery was 12 years old in December 2009. The fraction of girls was slightly higher than that of boys. Seventy percent had attended primary public school while the rest were enrolled in private schools, in most cases highly subsidized or free. Almost 40% showed poor academic performance in *Liceo Jubilar*'s placement exam. Half of the children reported being Catholic, 7% said they had other faiths, and the rest reported no religious beliefs. Over 50% of children lived with both their mother and father at the time of the initial survey, about 20% lived only with their mother, and the rest lived with their mother and stepfather, or with

their mother and other relatives. Only 5% of household heads reported not working. The average monthly household income was $12100 Uruguayan pesos (current prices, 2010), which is approximately $ 600 US dollars. A high proportion of households were recipients of social benefits such as a Food Card provided by the Ministry of Social Development.

Column (2) shows the mean characteristics for adolescents excluded from the selection process, and column (5) reports the observed differences between this group and those who were subject to the lottery.[2] The table shows that those excluded from the selection process were on average half a year older than those who participated in the lottery, were less likely to be good or excellent students according to the self-reported promotion GPA in 5th grade, their likelihood of having repeated a year was 5 times higher than that of the group subject to the lottery, and the result of the placement examination was on average 10% lower. These adolescents also showed a lower likelihood of professing the Catholic faith and higher family income.

Column (3) depicts the same variables for those who entered *Liceo-Jubilar* without going through the lottery. When compared with the group subject to the lottery (see differences in column (6)), these students show a better performance in *Liceo-Jubilar*'s placement examination but do not show statistically significant differences in other variables.

Column (4) shows average household characteristics for families with at least one children aged 18 or less in a nationally representative sample extracted from the 2009 Uruguayan Continuous Household Survey. Families of applicants to *Liceo-Jubilar* are larger and less likely to be intact than the average Uruguayan family with children. Families of the lotteried students also show lower levels of education and income. The percentage of household heads that did not complete

[2] Unfortunately, we could only complete 34 surveys out of the 43 in the group not satisfying the inclusion criteria. The information presented in Column (2) is thus a subsample of the full group.

primary school was 30% in the lotteried sample versus 6% in the nationally representative sample. Regarding income, families applying to *Liceo-Jubilar* reported an average monthly income of $12000 Uruguayan pesos (US$ 600) versus $31000 (US$ 1500) in the sample representative of Uruguayan households with children. These income levels place the families applying to *Liceo-Jubilar* at the 15th percentile of the country's income distribution. On the other hand, household heads in *Liceo-Jubilar* are more likely to work and less likely to receive transfers from the government.

Table 2 compares mean characteristics across adolescents selected by lottery to enter *Liceo-Jubilar* in March 2010 (treatment group) and applicants who were not drafted (control group). Because selection was random, we should not find statistically significant differences between both groups. This is confirmed in column (4), where we report t-tests and z-tests of the differences. Treatment and control subjects did not differ significantly in their baseline characteristics. There is a slight difference in the indicator of household durables in favor of the treatment group, although the difference is statistically significant only at 10%.

A first-year follow-up was conducted in November-December 2010. The assessment consisted in a home interview that inquired about academic achievement, perceptions about school, use of time, values, satisfaction and expectations, and health status; a self administered questionnaire with sensitive questions on crime and delinquency, substance use, and sexual behavior; and a brief parent questionnaire regarding parental beliefs about the school and updates on socio-demographics. To encourage participation and ensure the future fidelity of participants, each subject was offered a US$ 5 dollar mobile phone card. To minimize the risk of future sample attrition, extensive contact information about the adolescent, family members, and neighbors was requested and updated in this instance.

In addition to the interview, participants were subject to a math and

language standardized test. These tests had been adapted by the authorities of public education in Uruguay from the Program for International Student Assessment (PISA) and had been applied to a subset of 1st year middle school students in public schools in 2009. Students at *Liceo-Jubilar* sat for the test at school, whereas students in the control group were administered the test at a site in the Casavalle neighborhood. One concern is that the different sites of the examination may influence the results of the test by means of different motivation or diverse material conditions. To avoid this possible bias, the test was administered for the students in the control group in a site with material conditions very similar to *Liceo-Jubilar*. Also, four different dates were offered to control subjects between November and December to complete the tests. Furthermore, subjects in the control group were offered a US$ 5 mobile phone card, lunch and transportation as an incentive for completing the tests. All tests were graded by teachers unrelated to *Liceo-Jubilar*.

Finally, the adolescents were contacted by telephone at the beginning of the new school year (end of March 2011) to inquire about final promotion outcomes and school attendance at the beginning of the new academic year.

b) Sample size

As mentioned already, this cohort of students in the study consists of 101 participants, 43 in the intention to treat group and 58 in the control group. Prior to the implementation of the study, we conducted statistical power calculations to assess the likelihood of detecting effects given the sample size. For example, if the outcome of interest were the rate of promotion and control subjects achieved a promotion rate of 70% (the average public middle school promotion rate) while students in *Liceo-Jubilar* achieved a rate of 99% (which is the average current rate), given a sample of 101 subjects, we would detect this difference with a statistical power of 99%. If the promotion rate in the control group were 80%, the statistical power would be 87%. This means that within each cohort there are

good chances of detecting effects when the differences between the two groups are of significant magnitude, but the odds decrease when differences are smaller.

c) Impact Evaluation

The analysis in this paper compares 1-year outcomes for treated subjects versus control subjects in the same Cohort. We expect to have data points on two Cohorts by mid 2012, which will allow for a stronger evaluation of the 1st year impact.

The main academic outcomes to be compared across treatment and control groups are dropout rates, repetition rates, and standardized tests results. An additional set of outcomes of interest are students' academic expectations, use of time, and students' and parents' perceptions about the school climate.

The simplest way of estimating the average treatment effect is by conducting a regression of each outcome on the coefficient of the treatment dummy, i.e. a dichotomous variable that takes the value of 1 if the adolescent attended *Liceo-Jubilar* and 0 otherwise. However, one of the participants initially selected to enter *Liceo-Jubilar* ended up not attending the school and two subjects from the control group ended up attending. Thus, the group of those that were finally treated differs slightly from those initially selected to be treated (the intention to treat group). In this context, a simple Ordinary Least Squares (OLS) regression like the one specified above may introduce bias in the impact estimate if selection into and out of the treatment group is not random. To avoid this problem, we use the intention to treat sample as an instrument for effective participation and estimate the effects using instrumental variables. The F-statistic for the first stage exceeds 700, a signal that we are working with a highly predictive instrument of participation. We also adjust the regressions for gender,

an index of durable goods, and parental education at baseline.[3] Although these characteristics are balanced across treatment types (i.e. not systematically related to treatment), using them as controls helps reduce the residual variance and improve the precision of the treatment effect estimation. Standard errors are robust to heteroscedasticity and adjusted for a small sample correction factor. In order to analyze the sensitivity of results to variations in the methodology, we compare the previous results with OLS estimates and with unadjusted instrumental variables estimates[4].

One concern when conducting random experiments is the possibility of contamination across subjects in the different treatment categories. The fact that subjects in treatment and control groups live in the same neighborhood could raise concerns about an indirect effect on control adolescents through friendships with *Liceo-Jubilar*'s students. While such an effect would play in favor of our research (the real differences would be higher than the estimated ones), we believe such an effect to be unlikely. Due to the extended number of hours that students spend at school and to the different cultures between *Liceo-Jubilar* and the public system, most students in *Liceo-Jubilar* end up hanging out with their same school peers.

In this sense, one could argue that the results of the impact evaluation may be influenced by positive peer effects on treatment group if the other *Liceo-Jubilar*'s students have greater ability or more committed parents than the public school peers of the control group. Though it is a possibility, previous literature (Booker, Gill, Lavertu, Sass, Witte & Zimmer, 2009) finds no systematic evidence to support the fear that charter schools are skimming off the highest-

[3] Due to missing parental education information for one subject, the regression misses one observation. We repeated the regression without controls and the results differed only slightly. We also run variations adjusting for *Liceo-Jubilar*'s baseline placement test, but the inclusion of this variable did not change the estimation precision and reduced the number of observations due to missing data.

[4] Results mentioned but not shown are available from the authors upon request.

achieving students. Booker, Buddin and Zimmer (2005) analyze the students who transfer from traditional public schools to charter schools and they show lower achievement scores prior to moving than their peers who choose to remain in a traditional public school, thus suggesting that charter schools seem to be not "cream-skimming" as critics fear, but rather attracting lower-performing students. Bifulco and Ladd (2006) find that charter school families have tended to select schools with students more similar both racially and socioeconomically to their own children than the students in their prior traditional public school, and, as a result, the charter schools seem to be more racially segregated than the traditional public schools. Thus, the sign of the peer effect is ambiguous.

Another potential concern would arise if students at *Liceo-Jubilar* entered the school with previous spillover effects through older siblings. In our study, students with siblings in *Liceo-Jubilar* were automatically accepted at school and did not participate in the lottery. This strategy minimizes the risk of this other type of contamination.

As usual in random evaluations of social programs, results of the control group may be negatively affected by the effects on motivation of the bad luck in the lottery. But we have to bear in mind that students, from both treatment and control group, come from families with enough motivation to seek for better education alternatives.

In the first follow-up, our research focuses exclusively on the impacts of the school on the enrolled students. It does not measure potential spillover effects on family and community, such as improved employment status for family-members, better education decisions, or lower involvement of family members in risky or unhealthy behaviors. Recognizing that the school may extend its influence to other family members, we intend to explore these dimensions during the 3rd year follow-up through a household survey.

d) Cost-effectiveness

A cost-effectiveness analysis compares the incremental opportunity costs associated with *Liceo-Jubilar* to the impact of the program. The opportunity cost of the school includes all costs in human resources purchased and donated, the cost of infrastructure, the cost of supplies and materials, and other miscellaneous expenses (such as electricity, water, internet, insurance). In addition to assigning a market value to volunteer labor and donated resources, the estimation requires distinguishing the percentage of resources dedicated to the middle school program from other ongoing programs at the institution such as the high school for adults, alumni support, and community workshops. With these considerations in mind, we compute an estimate of the cost of the middle school per student and academic year, and compare it with a similar unit for public middle school programs. We then analyze the increased cost associated with the treatment's improved outcomes.

3. Results

Despite the relatively small sample size, we are able to identify various effects at a statistical significance of 95%. Tables 3-7 report instrumental variables estimates of the effects of *Liceo-Jubilar* on student's academic performance, educational resources, expectations, and perceptions about the school, as well as parent's perceptions of the school climate. All regressions use the intention to treat dummy as an instrument for final participation, and adjust for adolescent's gender, index of household durable goods, and parental education. It is important to note that all subjects in the control group ended up attending public schools when not drafted. This information helps understand the yardstick against which we are comparing *Liceo-Jubilar*'s outcomes. Two public schools concentrated 40% of the control group's enrollment; all other control adolescents were dispersed in 13 different public schools.

Table 3 shows the effects of participation in *Liceo-Jubilar* on 1st year students' academic outcomes. Each column represents a different measure of academic achievement. The first two rows show the average values for each academic measure, for the control and treatment groups respectively. These means adjust for gender, household durables, and parental education in each group. The third row shows the difference between the two groups, i.e. the average treatment effect, and the fourth row reports the standard error of that difference. Standard errors are robust to heteroscedasticity and are adjusted for a small sample correction factor. The last row indicates the number of observations available for the estimation of each outcome. Out of the 101 original observations, one refused to participate in all instances of the study. For the remaining 100 observations we have full data on students' promotion and dropout rates, 4 observations are missing data on the home interview, and 9 observations have missing data on the math and language examinations. One additional observation was lost in the regressions due to missing data on parental education.

These first findings show that the intervention reduced the likelihood of dropping out of school by 10 percentage points in the first year, a decrease of 100% relative to the control group. In other terms, while 1 out of 10 subjects in the control group had dropped out of middle school by the end of the 1st year, the dropout rate was zero in *Liceo-Jubilar*. Almost all dropouts were female and most of them reported they had abandoned school because of violent incidents. This desertion half-way throughout the first year explains partially the 19 percentage point difference in repetition rates between treatment and control subjects. But even when dropouts are left out, the repetition rate in *Liceo-Jubilar* is significantly lower than among controls. One could argue that repetition rates may be biased in favor of *Liceo-Jubilar* by the expected greater linkage between teachers and students in a charter school due to more hours of classes. However, students of the treatment group received more suspensions (Table 4) and feel that

there's respect and discipline in *Liceo-Jubilar* in a greater rate (Table 6) in comparison to the control group. Hence, *Liceo-Jubilar* seems to have stricter discipline and this may increase repetition rates. Also, class sizes are bigger in *Liceo-Jubilar* than in public schools. The average class size is 26 in public schools versus 35 in *Liceo-Jubilar*. Thus, there are fewer students per teacher in public schools and one could argue that this may bias repetition rates in favor of public schools.

We find no statistically significant differences in the results of the math and language PISA examinations. All students performed rather weakly in the math test. In order to interpret properly these results, we have to bear in mind that these examinations were elaborated by PISA to assess knowledge of older students (especially directed to those that have finished 3rd grade). This could explain the low rate of correct answers. Control subjects answered correctly 6 questions out of 22 and results in *Liceo-Jubilar* were slightly higher in magnitude (6.2 correct questions), but the difference was not statistically significant. Something similar occurs with the results of the language examination: language grades are slightly higher in *Liceo-Jubilar* than among control subjects, but the difference is not statistically different from zero. Along the same lines, there is a positive but non-significant effect of participation in *Liceo-Jubilar* on the likelihood of finishing 1st grade without having to take compensatory exams in February. Interestingly, several of those who had dropped out in 2010 re-enrolled in middle school in 2011. This explains why the difference in attendance at the beginning of 2011 is smaller than the difference in dropout rates identified in 2010.

Table 4 displays differences in treatment intensity and resources between *Liceo-Jubilar* and the public alternative. First, subjects in the treatment group show a lower number of absences from school during the year than their counterparts in the control group. Although the difference is not statistically

different in absolute value, we must take into account that *Liceo-Jubilar*'s school year begins one month in advance that public schools. When comparing the ratio of absences to school days, the difference is significantly higher in statistical terms for *Liceo-Jubilar*. Students at *Liceo-Jubilar*, on the other hand, have a higher number of suspensions during the year. This difference is statistically significant and unimportant in magnitude when considered in absolute value (1.8 suspensions per year for control subjects vs. 2 for intervention subjects) but becomes more relevant when assessing the ratio of suspension to school days. The difference sheds light on one of the building stones of *Liceo-Jubilar*'s pedagogic approach: discipline.

All adolescents in *Liceo-Jubilar* report having sufficient books and materials to study; the rate is 87% among control subjects. Students in *Liceo-Jubilar* spend 3.5 more hours per day at school than control subjects (whose average is 5.3). This extended schedule is associated with less time sleeping, less time in the street, and also less time helping with household chores. Students attending *Liceo-Jubilar* also spend half the time than control students travelling from home to school (or viceversa). This is associated with *Liceo-Jubilar*'s policy of excluding applicants that do not live in Casavalle and with the insufficient availability of public school options in the neighborhood. While receiving more educational resources in many dimensions, class sizes are bigger in *Liceo-Jubilar* than in public schools. The average class size is 26 in public schools versus 35 in *Liceo-Jubilar*.

The effects of the intervention over the adolescents' expectations and values are presented in Table 5. *Liceo-Jubilar* students have higher academic expectations than those attending public education. Participation in *Liceo-Jubilar* increases the expectations of finishing college by 35 percentage points relative to a baseline rate for control individuals of 24%. All students in *Liceo-Jubilar* believe that being successful in life is important, a 12 percentage point increase

over the average for the control group. More than 60% of intervention subjects also believe that helping others get out of poverty is very important in life, versus 49% in the control group. This latter effect is only significant at $p<0.10$.

Students' and parents' perceptions about the school climate are also favorable to the intervention, as depicted in Tables 6 and 7 respectively. Nearly all students in *Liceo-Jubilar* feel happy about the school, feel that teachers are fair with students, and feel safe at school. These perceptions are 15 percentage points above those of control subjects. The differences are even higher when considering perceptions about discipline, respect, and conflict resolution. Only 44% in the control group believe that students in their school respect their teachers and staff, and that there is a disciplined environment. Among *Liceo-Jubilar* students, 93% endorse these beliefs. Furthermore, only 29% of control subjects believe that students at their school can resolve conflicts without fights, offenses, or threats, while 81% of *Liceo-Jubilar* students have that perception. There are no statistically significant differences between treatment and control subjects in feelings of discrimination and sense of difficulty with the school.

Regarding parents' perceptions (Table 7), all of *Liceo-Jubilar* parents believe that their children are secure at school and that the school is a source of support when they encounter problems. These rates are 65% and 44% respectively for parents of children in public schools. All parents in *Liceo-Jubilar* get involved in some way with school activities, whereas only 6 out of 10 parents of public school students report collaborating with school activities. Seventy three percent of control parents think their children would learn more if professors were less likely to be absent from school. No parent of *Liceo-Jubilar* students thinks this way. One of the most striking findings is that 61% of parents of control subjects would send their children to another school if they had the choice. No parent in *Liceo-Jubilar* thinks about changing their child to another school. When asked to grade their child's school on a scale from 1 to 12, *Liceo-Jubilar* receives a grade

of 11.5 versus 8.3 for public schools. Finally, less than four out of ten parents of subjects in public schools expect that their child will finish college, whereas that expectation is held by 70% of parents of students in *Liceo-Jubilar*. All reported results are statistically significant at 5%.[5]

Sample Attrition. The various instances of data collection had different degrees of response across subjects. Four adolescents in the control group rejected responding to the home interview carried out in November. Nine study participants (1 in *Liceo-Jubilar* and 8 in the control group) did not perform the math and language tests. On the other hand, grade promotion data was obtained for 100% of the subjects in the study, either through phone calls and visits in the case of controls, or through school records in the case of *Liceo-Jubilar*.[6] To investigate whether non-response rate was associated in any way to the student's previous academic performance, we regressed the probability of non- response on the student's gender, an index of household durables, results from *Liceo-Jubilar*'s placement test in 2009, and parental education[7]. Being a woman increases the probability of rejecting sitting for the tests. As for the rejection of the four home interviews, they are slightly associated with improved performance in *Liceo-Jubilar*'s baseline placement exam. This raises some concern about a potential overestimation of some of the effects, although we doubt that four cases would substantially change the findings. In any case, the main results on dropout and repetition outcomes are obtained for the full sample.

Sensitivity of the results. Results were re-estimated using OLS regressions with and without robust standard errors, and instrumental variables regressions

[5] The perception outcomes could be subject to measurement error. If such were the case, results could be biased towards zero and our findings would also reflect a lower bound for the underlying effects.

[6] The 9 subjects that did not complete the math and language tests included three that did not respond the survey.

[7] Results mentioned but not shown are available from the authors upon request.

without adjusting for the controls at baseline (gender, parental education, and durable goods). The different methods produce very slight difference in the estimated effects and standard errors, and do not change at all the conclusions reported above. Authors can make these results available to the reader if interested.

4. Discussion

Despite being privately funded, *Liceo-Jubilar* shares many other features with charter or independent schools, i.e. publicly funded schools that have been freed from some regulations over the school curriculum, instruction, and operations, in exchange for some type of accountability on student achievements outcomes. While charter or independent schools cover a wide variety of programs and settings, many of the merits attributed to these centers stem from their autonomy and flexibility. Chang & Mehan (2011) emphasize that faculty and staff's commitment to the objectives of the institution, expressed through a common language, common expectations and common forms of interaction, sets up the basis for the academic development of students and teachers' professional growth. Rutherford (2006) highlights teachers' empowerment in charter schools, which is manifested through a higher ability to decide about program contents, more leadership in education, and more investment in professional development. Booker, Gilpatric, Gronberg, & Jansen (2007) argue that independent schools improve student performance by adapting their programs to the context and characteristics of students. The capacity for innovation and exploration of new pedagogical approaches, a greater involvement of parents and families, community participation through financial support and volunteerism, and stronger pressure to achieve goals and be accountable to the community have also been identified as major drivers of success and satisfaction with the school (Berends,

Cannata, Goldring, & Preston, 2012; Bifulco & Ladd, 2005; Bierlein, Finn, Manno, & Vanourek, 1998).

Many of these attributes are found in *Liceo-Jubilar*, as revealed in a recent study analyzing the perceptions of teachers and principals about the contribution to change and innovation in forty Uruguayan schools (Assandri, Podestá, Sarasola, & Troncoso 2010). The study measured six dimensions of the organizational culture in each school: (1) collegiality, which has to do with the interaction among teachers as a result of formal community needs (discussion of programs, methods, learning assessment, and strategies), (2) shared vision, which captures whether the members share the same goals and have a common vision about the center's goals, (3) shared planning, which inquires about teachers' participation in programs aimed at evaluating and achieving common goals, (4) collaboration, which measures trust and support links in everyday practices among members of the organization, (5) professional learning, a dimension that tells if the teachers have a reflective attitude, are open to change, and are committed to their own learning and professional growth, and (6) transformational leadership, which reveals staff's perceptions about management's support of innovation, process improvement, and building of commitment among teachers.

Almost all indicators of organizational culture were higher in *Liceo-Jubilar* when compared to other schools. In particular, the study highlights the high levels of leadership and collaboration found within the institution, which exceed other schools' means in more than half a standard deviation. According to the report, "most of the staff in *Liceo-Jubilar* believes that the management team supports innovations processes and generates commitment from teachers." It also highlights the widespread attitude of mutual support and joint search for solutions observed in the institution.

In addition to the cultural factors that describe the relationship between teachers and school administrators, *Liceo-Jubilar* differs from other middle schools because of its greater workload and schedule, a strong emphasis on discipline, a holistic approach towards the student, close interaction with families and the community, and accountability of outcomes and financial status. Regarding the schedule, students spend an average of 9 hours per day at school (3.5 hours more than students in public education) and the school year is 6 weeks longer than in traditional public schools. In a recent study for the United States, Hoxby & Murarka (2009) find a strong association between the length of the academic year and better academic results in charter schools. The extended daily schedule has also been associated with lower repetition rates in Uruguayan primary school (Buzzetti & Curti 2010).

Students in *Liceo-Jubilar* receive academic and personal support through reading, math, and study workshops, as well as through the close supervision of a monitoring team integrated by psychologists and social workers. A wide variety of other workshops (computing, communication, sports, crafts, theater, music, cooking) and off-campus activities (camps, day trips) contribute to stimulate interest, strengthen job skills, and work values. The involvement of families in the school's activities is part of the educational proposal. Each family participates at least in one committee (cleaning, school maintenance, breakfast or lunch, outings) throughout the year. At least one adult in the family is expected to respond for the student's behavior and academic development. In addition, a number of workshops, including computing, gym, and cooking, are open to family members and adults from the community. Strict discipline and a religious approach complete the pedagogical proposal. While the school has a Catholic Christian philosophy, students are given complete freedom of worship.

The focus of *Liceo-Jubilar* on disadvantaged adolescents allows the school staff and educators to successfully address context-specific problems experienced

by students. But as some opponents of charter schools have argued, the approach raises concerns about the potential segregation of students. To avoid this problem, the school is continuously promoting the exchange between students and adolescents and adults from other social contexts. This is done through interaction with volunteers in the school, through outings, and through sports competitions. Accountability for students' performance and financial management of the organization is a final factor that distinguishes *Liceo-Jubilar* from other schools.

The impact evaluation discussed in this report, at one year follow-up from the initiation of treatment, shows a strong impact of *Liceo-Jubilar* on students' retention in the schooling system and on their likelihood of promotion. No statistically significant differences are perceived, however, on learning outcomes, as measured by the math and language tests. This result is in line with the literature in the United States, that shows that the strongest improvements in learning for students that attend charter schools occur after the first few years (Booker, Gilpatric, Gronberg, & Jansen, 2007; Lavertu & Witte 2009).

Our results also show high levels of satisfaction among treatment students and their families with the school. Students in *Liceo-Jubilar* feel happier and more secure at school than control subjects. One of the most striking differences between treatment and control subjects has to do with students' perceptions of respect, discipline, and conflict resolution at school. The violence with which control adolescents perceive the relationships with their peers is a matter of great concern. Only one in four students in the control group believe that youth in their schools resolve conflicts without fights, insults, or threats. Violence is also behind school dropout decisions. As mentioned before, most dropouts are female who justify their abandonment by problems of insecurity and violence at or in the vicinity of the school. In this sense, the relative closeness of *Liceo-Jubilar* to the

students' homes and the internal atmosphere of cohesion appear to operate as protective factors, contributing to retain students.

Another highlight in our findings is the significant effect of treatment on students' academic expectations. Only a year after the initiation of the intervention, *Liceo-Jubilar* students are twice as likely to believe they will graduate from college. A similar change occurs in their parents' expectations, suggesting that the school fosters parental confidence in their children and strengthens the family's commitment in their child's education.

A final salient result is the high fraction of parents of public school students (67%) that report they would send their child to another school if they were able to choose. This claim reflects a high level of dissatisfaction with the traditional educational system and a clear difference in opportunities with youth from other strata of society who have the ability to choose.

Regarding costs, the annual operating costs in *Liceo-Jubilar* were US$ 1400 per student in 2010, without taking into account in-kind donations (food, book, materials) and volunteer workload. When these are assigned an opportunity cost, the school's cost doubles. Data from the National Administration of Public Schooling shows that in 2008 the average running cost of a public middle school was US$ 1279 per student per year. If we express these costs in Uruguayan pesos and convert them to 2010 currency, the amount is US$ 1470. On the other hand, the Uruguayan Institute of Children and Adolescents (INAU), a government institution that finances private after-school youth programs for socioeconomically disadvantaged students, pays US$ 1300 a year for each adolescent attending such programs. These centers would be the counterpart for the afternoon activities at *Liceo-Jubilar*. The figures above suggest that *Liceo-Jubilar*'s school budget is very similar to what the Uruguayan Government pays today for a disadvantaged student attending a public middle school and an after-school program.

Because a fraction of the control subjects (15%) attend after-school programs, we cannot say that the effects of *Liceo-Jubilar* build exclusively upon the outcomes attained in the formal public education. Still, our findings are probably a lower bound for that effect. In order to construct a cost-effectiveness ratio, we need to consider the extra-cost for those students attending after school-programs. The average cost for control subjects when taking this into account is US$ 1632. Thus, the incremental cost of *Liceo-Jubilar*'s program per student per year would be US$ 2800-1632 = 1168. This would be the dollar incremental amount that would be needed annually in order to reduce repetition rates to zero in a similar population.

5. Conclusions

Policymakers and politicians of all sectors in Uruguay seem to agree on the urgent need to improve public education, reverse the country's human capital deterioration, and promote equality of opportunities. However, there is little consensus on how to make progress towards these objectives. We aim to contribute to this debate by showing differences in outcomes between the public school model and an alternative academic program, a tuition-free privately managed school in Casavalle. Our evaluation follows up and compares two groups of 1st year middle school students that were randomly assigned to attend this privately managed school or to attend public schools as usual. Our analysis also quantifies the incremental costs associated with the school's better outcomes, relative to the control group's alternative.

Following Bierlein, Finn, Manno, & Vanourek (1998), we identify several features that distinguish the evaluated program, *Liceo-Jubilar*, from traditional public schools in Uruguay. These are: a) an individualized educational approach (although the formal curriculum is dictated by the National Administration of Public Education); b) autonomous and efficient organization (the school is smaller

and more likely to be flexible and incorporate innovative initiatives); c) greater organizational leadership; d) strong interaction with the family; e) extended schedule; f) community involvement through financial aid and volunteering; and g) accountability. As a signal of its organizational quality, *Liceo-Jubilar* was awarded on March 2011 the Integrated Quality Project Certification, accredited by the Agency for the External Assessment of Quality in Educational Centers (Bilbao, Spain).

The international literature on charter and independent schools has attributed the merits of these educational centers to the autonomy of management and to the effects of competition. Unlike these international examples, *Liceo-Jubilar* does not compete for students or public funding with other schools. First, it is one of a few private schools to provide free of charge formal middle education to disadvantaged adolescents. Second, its size is small enough not to be considered a threat by other public schools in the city. This makes *Liceo-Jubilar*'s case unique, in the sense that we are able to isolate the benefits from higher autonomy from the effects of competition. By saying this, we do not intend to underestimate the potential value of competition, but cannot attribute our findings to this force. The results presented here can only be attributed to an independent administration that has managed to combine inputs correctly and adapt to the context and special requirements of their students.[8]

The external validity of our conclusions is limited in principle to families similar to those that sign up their children in *Liceo-Jubilar* and that satisfy *Liceo-Jubilar*'s inclusion criteria. In other words, our conclusions can only be extrapolated to adolescents that do not exceed the grade-appropriate age in more than a year, and that come from poor families with enough motivation to seek for better education alternatives. Despite this selectivity, we believe the number of

[8] We cannot ignore that part of the intervention's success relies on the particular characteristics and leadership of *Liceo-Jubilar* 's principal, staff, and teachers.

Uruguayan families in this same situation is non-negligible if we consider that forty percent of Uruguayan adolescents (80,000) are poor.[9]

Liceo-Jubilar's experience can provide new tools to policy makers and educators that want to pursue the road of higher center autonomy and decentralization. The extension of public funding to privately managed schools that are demonstrating positive results could be a promising pathway to improve academic outcomes among poor adolescents. But beyond enhancing the positive attributes of a particular school model, this work is a red light on the opportunities that tens of thousands of Uruguayan adolescents are being denied and on the urgent need to offer alternatives that allow them to develop their potential and provide them with minimal tools to escape poverty.

[9] Only 4,000 of these adolescents participate in after-school programs.

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Table 1. Table of means by subsamples.

Variables	Randomized candidates (1)	Excluded candidates (2)	Candidates selected a priori (3)	Households w/children ECH09 (4)	Dif (2)-(1) (5)	Dif (3)-(1) (6)
Demographic Characteristics						
Age	12,259 N=95	12,708 N=33	12,215 N=26		0,449***	-0,045
Male	0,450 N=100	0,512 N=43	0,577 N=26		0,062	0,127
Academic Indicators						
Preschool Attendance	0,733 N=86	0,621 N=29	0,714 N=21		-0,112	-0,018
Public Primary School Attendance	0,707 N=99	0,719 N=32	0,692 N=26		0,012	-0,015
Children's Club Attendance (if Public Primary School Attendance)	0,313 N=99	0,382 N=34	0,308 N=26		0,069	-0,005
Good/Excellent Student	0,460 N=100	0,235 N=34	0,423 N=26		-0,225**	-0,037
Average/Regular Student	0,440 N=100	0,618 N=34	0,500 N=26		0,178**	0,060
Bad Student	0,100 N=100	0,147 N=34	0,077 N=26		0,047	-0,023
Repeated at least One Grade	0,170 N=100	0,349 N=43	0,077 N=26		0,179***	-0,093
Results from pre-Test at Jubilar	4,802 N=96	4,421 N=38	5,680 N=25		-0,381*	0,878***
Less than 4 in the pre-Test at Jubilar	0,396 N=96	0,526 N=38	0,200 N=25		0,130*	-0,196**
Religion						
Catholic	0,500 N=98	0,176 N=34	0,423 N=26		-0,324***	-0,077
Other Religions	0,071 N=98	0,088 N=34	0,115 N=26		0,017	0,044
Household Environment						
Number of People at Home	4,460 N=100	4,412 N=34	5,231 N=26	4,157 N=18.648	-0,048	0,771**
Both Parents at Home	0,560 N=100	0,676 N=34	0,577 N=26	0.629 N=18.648	0,116	0,017
Only one Parent at Home	0,190 N=100	0,176 N=34	0,154 N=26	0.367 N=18.648	-0,014	-0,036
House Owner	0,571 N=98	0,600 N=15	0,654 N=26	0,568 N=18.648	0,029	0,082
Parents' Education: Primary only	0,567 N=99	0,467 N=15	0,577 N=26	0,630 N=18.648	-0,100	0,010
Parents' Education: High School Grad	0,131 N=99	0,133 N=15	0,115 N=26	0,312 N=18.648	0,002	-0,016
Household Head Works	0,949 N=99	0,933 N=15	0,885 N=26	0,810 N=18.648	-0,016	-0,065
Household Income	12.108 N=100	15.331 N=43	10.821 N=26	31.482 N=18.648	3.222***	-1.288
Durable Goods Index	0,319 N=100	0,306 N=34	0,292 N=26	0,383 N=18.648	-0,013	-0,027

Receiving Economic Transfers from Government	0,495 N=99	0,467 N=15	0,615 N=26	0,613 N=18.648	-0,028	0,120

* statistically different from zero at 10%; ** statistically different from zero at 5%; *** statistically different from zero at 1%

Table 2. Mean Comparison of Baseline Characteristics. Group Subject to Randomization.				
Variable	Treated + Control	Treated (1)	Control (2)	Dif (1)-(2)
Demographic Characteristics				
Age	12.259 N=95	12.286 N=42	12.239 N=53	0.047
Male	0.450 N=100	0.432 N=44	0.464 N=56	-0.032
Academic Indicators				
Preschool Attendance	0.733 N=86	0.750 N=40	0.717 N=46	0.033
Public Primary School Attendance	0.707 N=99	0.705 N=44	0.709 N=55	-0.005
Children's Club Attendance (if Public School Attendance)	0.313 N=99	0.318 N=44	0.309 N=55	0.009
Good/Excellent Student	0.460 N=100	0.523 N=44	0.411 N=56	0.112
Average/Regular Student	0.440 N=100	0.386 N=44	0.482 N=56	-0.096
Bad Student	0.100 N=100	0.091 N=44	0.107 N=56	-0.016
Repeated at least One Grade	0.170 N=100	0.159 N=44	0.179 N=56	-0.019
Results from pre-Test at Jubilar	4.802 N=96	4.884 N=43	4.736 N=53	0.148
Less than 4 in the pre-Test at Jubilar	0.400 N=96	0.372 N=43	0.415 N=53	-0.043
Religion				
Catholic	0.500 N=98	0.568 N=44	0.444 N=54	0.124
Other Religions	0.071 N=98	0.091 N=44	0.056 N=54	0.035
Household Environment				
Number of People at Home	4.460 N=100	4.455 N=44	4.464 N=56	-0.010
Both Parents at Home	0.560 N=100	0.568 N=44	0.554 N=56	0.015
Only one Parent at Home	0.190 N=100	0.159 N=44	0.214 N=56	-0.055
House Owner	0.571 N=98	0.605 N=43	0.545 N=55	0.059
Parents' Education: Primary only	0.567 N=99	0.614 N=44	0.527 N=55	0.087
Parents' Education: High School Grad	0.131 N=99	0.136 N=44	0.127 N=55	0.009
Household Head Works	0.949 N=99	0.932 N=44	0.964 N=55	-0.032
Household Income according to the Survey	12,108 N=100	11,516 N=44	12,574 N=56	-1,058
Durable Goods Index	0.319 N=100	0.345 N=44	0.299 N=56	0,047 *
Receiving Economic Transfers from Government	0.495 N=99	0.477 N=44	0.509 N=55	-0.032

* statistically different from zero at 10%; ** statistically different from zero at 5%;*** statistically different from zero at 1%

Table 3: Treatment Effect on Academic Performance
Instrumental Variables Estimation [#]

Mean Values by Group and Differences	Dropout in 2010 (1)	Grade Retention in 2010 (2)	No Grade Retention nor Additional Exams in February (3)	Attendance 2011 (4)	Results in PISA Mathematics (max=22) (5)	Results in PISA Spanish Language (max=3) (6)
Control Group	0.10	0.21	0.51	0.96	5.89	1.63
Treatment Group	0.00	0.03	0.63	1.00	6.25	1.80
Difference	-0.104**	-0.185***	0.115	0.046	0.360	0.162
Standard Error	(0.047)	(0.061)	(0.102)	(0.033)	(0.668)	(0.139)
N	95	99	99	99	90	90

[#] Regressions control by gender, household durable goods index and parents education.

* p<0.1, ** p<.05, *** p<.01

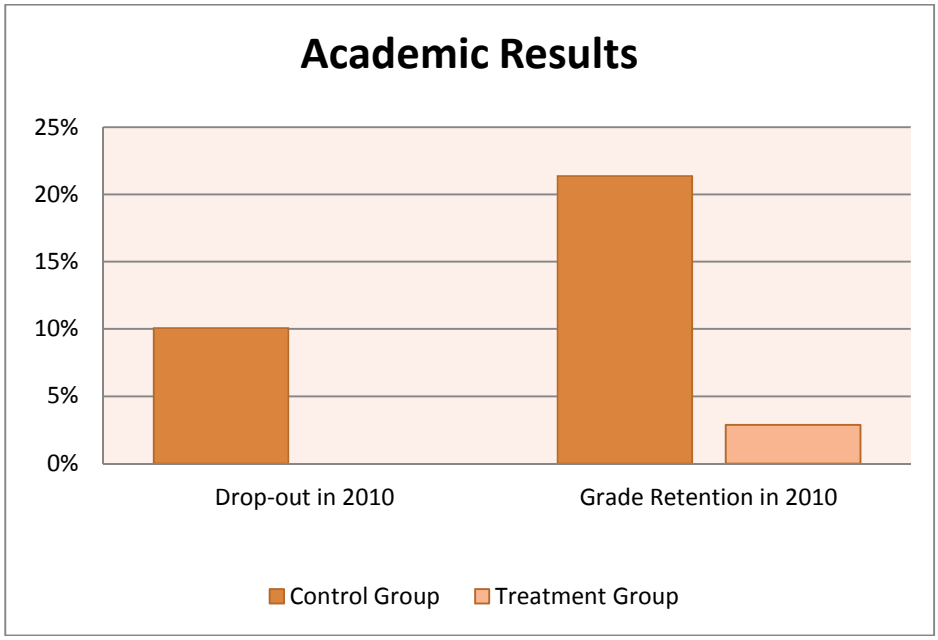

Table 4: Treatment Effects on Resources

Instrumental Variables Estimation [#]

Mean Values by Group and Differences	Number of absences to Secondary School in 2010 (1)	Suspensions during 2010 (2)	Class Size (3)	Student thinks that has the appropriate educational material in order to study (4)	Hours a day at Secondary School (5)	Hours a day devoted to sleep (6)	Hours a day in the street (7)	Hours a day helping in household tasks (8)	Minutes to reach Secondary School building from home (9)
Control Group	8.98	1.85	26.01	0.86	5.28	8.54	0.63	0.89	19.20
Treatment Group	6.72	1.98	34.99	1.00	8.75	7.96	0.16	0.46	11.17
Difference	-2.260	0.133***	8.978***	0.147**	3.474***	-0.574**	-0.471***	-0.431***	-8.032***
Standard Error	(1.424)	(0.047)	(1.367)	(0.060)	(0.346)	(0.220)	(0.143)	(0.160)	(2.596)
N	90	90	85	90	95	95	95	95	90

Regressions control by gender, household durable goods index and parents education.

* p<0.1, ** p<.05, *** p<.01

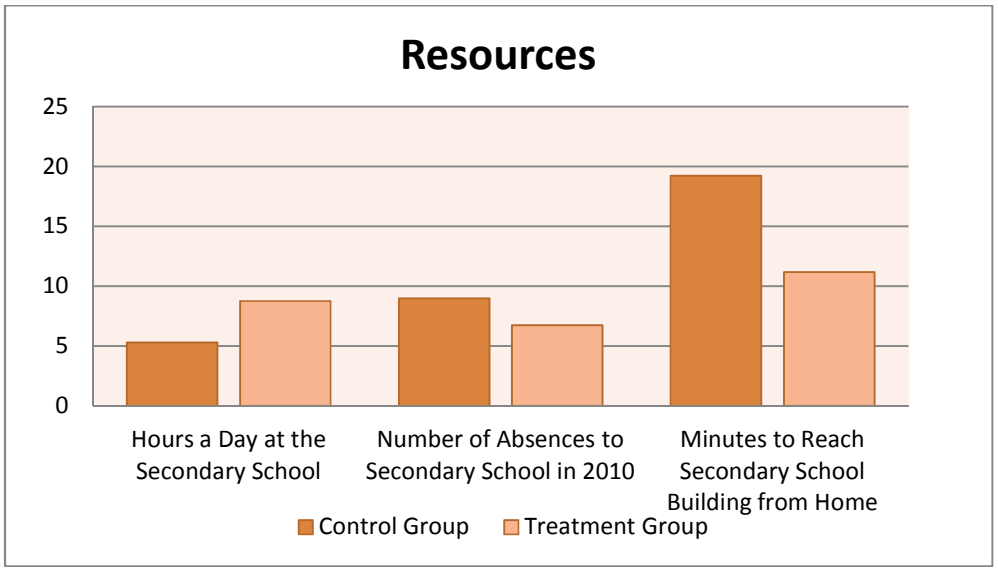

Table 5: Treatment Effects on Students' Expectations and Values

Instrumental Variables Estimation [#]

Mean Values by Group and Differences	Aspiring to complete undergraduate level at university	Success in one's life is very important	Helping people to get out of poverty is very important
	(1)	(2)	(3)
Control Group	0.24	0.84	0.49
Treatment Group	0.59	0.96	0.64
Difference	0.348***	0.116*	0.153
Standard Error	(0.104)	(0.060)	(0.109)
N	99	95	95

Regressions control by gender, household durable goods index and parents education;
* p<0.1, ** p<.05, *** p<.01

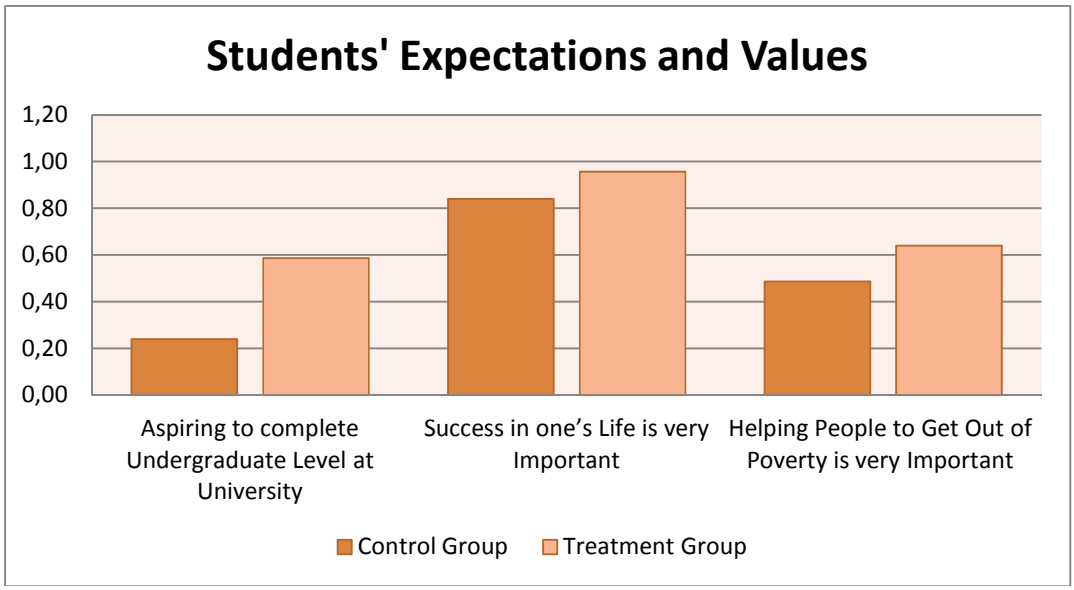

Table 6: Treatment Effects on Students' Perceptions About the School Climate

Instrumental Variables Estimation [#]

Mean Values by Group and Differences	Feels happy about the school	Feels safe at school	Feels there's respect and discipline	Students solve conflicts without fights, insults, or threats	Feels at ease with other students	Thinks that professors are fair	Student talks to educators about their worries/ concerns	Professors are engaged with students' learning	Feels discriminated against	Feels that school is difficult	Thinks that what he/she is learning is useless
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control Group	0.84	0.85	0.52	0.29	0.94	0.86	0.93	0.98	0.15	0.29	0.02
Treatment Group	0.99	1.00	0.93	0.81	0.98	1.01	1.00	1.00	0.08	0.21	0.00
Difference	0.143**	0.148***	0.407***	0.527***	0.043	0.156***	0.076*	0.023	-0.067	-0.078	-0.021
Standard Error	(0.065)	(0.052)	(0.082)	(0.090)	(0.047)	(0.058)	(0.042)	(0.022)	(0.068)	(0.097)	(0.020)
N	90	90	90	90	90	90	90	90	90	90	90

Regressions control by gender, household durable goods index and parents education;

* p<0.1, ** p<.05, *** p<.01

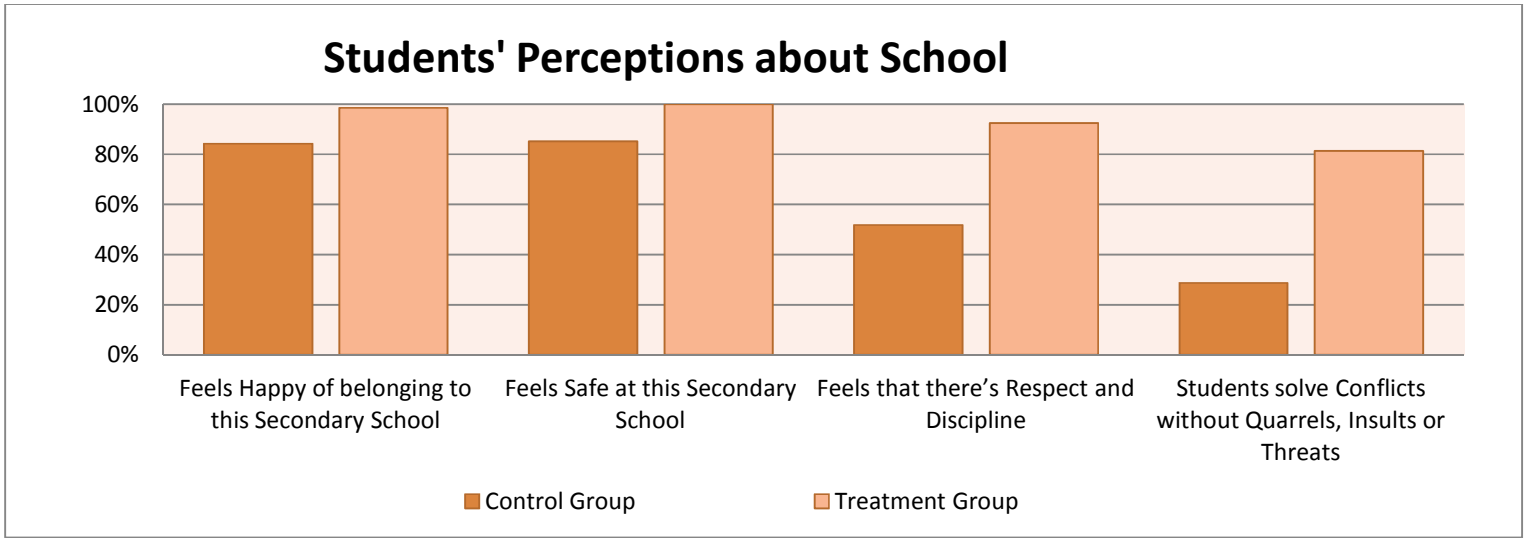

Table 7: Treatment Effects on Parents' Perceptions about the School's Climate

Instrumental Variables Estimation [#]

Mean Values by Group and Differences	Child is safe at school	Child finds help and motivation at school	Child is discriminated against	Child would learn more if professors were not absent from classes	Parent turns to the school in case of problems	If could choose, parent would send child to another school	Parents collaborate with activities at school	Grade awarded to the school (from 1 to 12)	Parent expects his/her child to graduate from college	Parent expects his/her child to graduate from high school	Parent thinks his/her child won't graduate from high school
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control Group	0.65	0.91	0.07	0.73	0.44	0.67	0.60	8.09	0.37	0.35	0.27
Treatment Group	1.00	1.00	0.05	0.01	1.00	0.03	1.00	11.48	0.64	0.22	0.14
Difference	0.353***	0.094*	-0.019	-0.724***	0.566***	-0.645***	0.417***	3.391***	0.270**	-0.136	-0.134
Standard Error	(0.082)	(0.048)	(0.054)	(0.082)	(0.076)	(0.088)	(0.083)	(0.405)	(0.114)	(0.105)	(0.090)
N	90	87	89	84	88	90	90	90	91	91	91

Regressions control by gender, household durable goods index and parents education

* p<0.1, ** p<.05, *** p<.01