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Can provision of free school uniforms harm attendance? Evidence from Ecuador[1]

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[1]This version: September 2010. Hidalgo and Oosterbeek are affiliated with the University of Amsterdam and TIER. Onofa and Ponce are affiliated with FLACSO-Ecuador. We gratefully acknowledge valuable comments from conference participants in Amsterdam.

Abstract

To raise school enrollment and attendance, many programs in developing countries eliminate or reduce private contributions to education. This paper documents an unintended negative effect of such programs. Using data from a randomized experiment that provides free uniforms to primary school children in Ecuador, we find that the intervention has a significantly negative impact on attendance. An explanation is that parents who pay for their children's uniforms (the control group) feel more committed to the school than parents who got the uniforms for free (the treated) and therefore encourage their children to attend school. Consistent with this, we find that the impact is largest shortly after the purchase of the uniform, and during the exam period when more is at stake.

JEL-codes: I22, I38, O15, H52
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1 Introduction

Governments of developing countries and NGO's alike consider it a priority to increase school enrollment and attendance. The government of Ecuador is no exception. As financial constraints are regarded a barrier for children from poor families to go to school, the government started to eliminate private contributions to education of poor families.

In the 1990s the government launched programs of free school meals for pupils enrolled in public primary schools in poor areas of the country. In 2007 the government started to provide free uniforms for pupils in public primary schools in rural areas.[1] And from 2008 onwards, pupils enrolled in public primary schools do no longer have to pay a school fee, and textbooks are provided for free. In all cases it is expected that reducing the private contributions from poor families will increase school enrollment and attendance.

In this paper, we examine to what extent the provision of free school uniforms contributes to an increase in school enrollment and attendance. For that purpose we took advantage of the further expansion of the program in Ecuador. One hundred and one schools – randomly chosen from a sample of 201 schools – were provided free uniforms one year ahead of the official schedule (in 2009 instead of 2010). Information about enrollment and school and teacher characteristics was collected through a baseline survey in the beginning of the school year (in May 2009). In addition, we made three unannounced visits (in July, September and November) to the schools to register attendance of children enrolled in fifth and sixth grade.

It is important to notice that the unit of treatment in this experiment are schools. This implies that all children enrolled in a school that is assigned to the treatment group receive their school uniform for free. Since there was no public announcement of the assignment of schools to the treatment group (implying free uniforms), parents could not react to it by sending their child to a treated school instead of an untreated school. We therefore do not expect an impact of treatment on school enrollment, and our findings are consistent with that: enrollment is not affected by the provision of free uniforms. Because of this, we can examine the impact of free uniforms on

[1] Ecuador is among the countries where school uniforms are compulsory. Other countries where uniforms are compulsory or common include: Australia, Brazil, Cambodia, Chile, China, Hong Kong, Dominican Republic, England & Ireland, Honduras, India, Indonesia, Israel, Japan, Jamaica, Malaysia, New Zealand, Northern Ireland, Pakistan, Philippines, Scotland, Singapore, South Africa, South Korea, Sri Lanka, Turkey and Wales. Arguments in favor of (compulsory) school uniforms include: (1) increasing students' safety, (2) increase student learning and positive attitudes towards school, (3) decreased behavior problems by increased attendance rates, lowering suspension rates and decreasing substance use, and (4) increased self-esteem (Brunsma and Rockquemore, 1998).

attendance without worrying about contamination due to treated schools attracting additional – probably different and less motivated – pupils.

Somewhat unexpectedly – at least for the Ecuadorian government –, we find that the provision of free uniforms reduces attendance. Averaged over three unannounced visits that were made to all schools to monitor pupils' attendance, attendance is 3.4 percentage points lower in the schools that received the free uniforms, this should be compared to a base attendance rate amongst controls of 0.92. This implies an almost 50% increase in absenteeism. Our preferred explanation for this finding is that parents who pay for their children's school uniforms (those in the control group) feel more committed to the school than parents who got the uniforms for free (the treated) and therefore do not allow their children to miss classes too easily. Consistent with this sunk cost explanation, we find that the impact on attendance is larger the first time that we measure it than the second time. This first time is closer to the actual purchase of the uniforms by parents in the control group. The negative impact is again larger during the last visit which is around the exam period. The exams may function as a reminder to parents in the control group of the cost they sank. During the exams these parents may therefore encourage their children to attend in order to make their purchase of the uniform worthwhile.

Our findings stand in contrast with the results reported by Evans et al. (2008), who evaluate the impact of a very similar intervention in which free uniforms were provided to primary school children in western Kenya. That program selected 12 schools for the intervention, and within schools some 612 children were randomized into treatment and 693 others to the control group. The results from this study indicate that receiving a uniform increased attendance by 7 percentage points, where baseline attendance is 82 percent. Effects are larger for girls (than for boys), for younger children (than for older children), and for children that did not have a uniform at baseline. The main reason why Evans et al.'s finding does not travel, is probably the difference in absolute poverty between Kenya and Ecuador. While the free uniforms in Kenya are actually lifting a binding credit constraint, the free uniforms in Ecuador are merely replacing the uniforms parents of targeted pupils would have bought anyhow.[2]

Two recent studies deal with the sunk cost effect in the context of health-related products in developing countries. Ashraf et al. (2010) conducted an experiment in a door-to-door sale of a water purification product to about 1,000 households in Zambia. To disentangle selection effects from sunk cost effects, the authors used a

[2]The difference in results can perhaps also be attributed partially to different levels of randomization: across schools in Ecuador versus within schools in Kenya.

two-stage pricing design. In the first stage, participating households were offered the product for a one-time only, randomly chosen offer price, which was above zero and at or below the prevailing retail price. In the second stage, households that agreed to purchase received an unanticipated, randomly chosen discount. Two weeks later data were collected concerning usage of the product. The study finds no evidence that households paying a higher transaction price are more likely to use the product, some of the point estimates even suggest the opposite effect. If, however, paying something is compared to paying nothing, point estimates are consistent with the sunk cost effect, although not significantly so. This latter result is the relevant comparison for our paper, since we also compare paying something to paying nothing. Cohen and Dupas (2010) use a very similar two-stage design as Ashraf et al. to estimate the impact of the price paid on the usage of insecticidetreated bed nets that were offered by prenatal clinics to pregnant women in Kenya. Cohen and Dupas also fail to find a significant effect of the price on usage. The point estimates are negative, in this case even when paying something is compared to paying nothing.

The rest of the paper is organized as follows. The next section describes the context of the education system in Ecuador and provides further details of the free uniforms program. Section 3 describes the experimental design and the data. Section 4 presents and discusses the main results. The final section summarizes and concludes.

2 Context and program

2.1 Context

Ecuador is a low-middle income country with a large share of poor families and high inequality. Compulsory schooling in Ecuador starts at the age of 5 and ends at the age of 14. This covers one year of pre-school, six years of primary school and three years of basic secondary school. The overall enrollment rate of children in this age range is close to 0.90 but varies by social background. It is 0.75 for children from families around the 20th percentile of the wealth distribution, and 0.85 for children from families around the 40th percentile of the wealth distribution (see Oosterbeek et al., 2008). Girls who do not go to school while they should will typically help their mothers with domestic work, whereas boys typically help with farm work or work as street vendors.

To stimulate school enrollment and attendance among children of primary school age from poor families, the government decided to reduce the amount that these families have to spend on the education of their children. Besides the free uniforms

program that we evaluate in this paper, programs were introduced related to school meals, to school fees and to school textbooks. The school meals programs started already in 1995. The program first provided free breakfast and from 1999 onwards also free lunches. The compulsory school fee that was charged to all children enrolled in public schools, was eliminated in 2008. And in the same year, the government decided to provide free textbooks for mathematics, language and sciences to all public schools. The annual per pupil cost of these programs are US$ 75 for the meals, US$ 25 for the school fees and US$ 15 for the textbooks. All these programs are supposed to have a positive effect on enrollment and attendance. But none of these programs has been properly evaluated. Hence it is unknown to what extent (each of) these programs contributed to the increase in the primary school enrollment rates from 0.90 in 2006 to 0.93 in 2009.

2.2 Free uniforms program

The free uniforms program is executed by the Ministries of Education and of Productive Inclusion. The program has two distinct objectives. Firstly, it intends to increase school attendance and enrollment among children in poor areas. And secondly, it aims to improve local economic conditions by contracting small and medium-sized local artisans for the production of the uniforms.

In the first phase of the program in 2007, free uniforms were provided to over 80,000 pupils living in rural areas of the country. The total budget in that year was US$ 2.3 million. In 2008 the government decided to provide free uniforms to all children enrolled in public schools in rural areas, and to expand the program to public schools in poor urban areas in 2010. The price of a uniform is around US$ 29. This is around 15% of the average monthly income of families in the target group. Wearing a uniform is compulsory in Ecuador and children are not allowed to attend school without a uniform. Being exposed to the treatment thus implies that parents do not have too pay for something that would otherwise cost them US$ 29. Artisans could only be contracted for the government's free uniform program if they satisfied certain quality standards, so that the free uniforms were of at least the same quality as regular uniforms. This excludes that a negative effect of free uniforms on attendance is due to inferior quality of the free uniforms.

3 Design and data

The government of Ecuador invited us to evaluate the impact of the provision of free uniforms on school attendance and enrollment. Given the planned expansion of the

program, we proposed to provide the free uniforms to some schools one year ahead of the official schedule, in 2009 instead of 2010. Two hundred and one schools in five provinces were selected to participate in the experiment. Half of these (101 schools) was randomly assigned to the treatment of the provision of free school uniforms one year ahead of the official schedule. The other half (100 schools) was treated according to schedule and thus did not receive free school uniforms in 2009. This group of schools forms the control group.

In one of the five provinces (El Oro) no single school of the 16 schools from this province included in the study, received the free school uniforms. In another province (Esmeraldas) just one out of the 16 schools that was assigned to treatment actually received the free uniforms.[3] In both provinces, schools that were assigned to treatment did not receive the uniforms due to problems with the production of the uniforms (artisans were contracted too late because of administrative issues). Since randomization was stratified by province, we can drop the observations from these two provinces without harming the experimental design. All the analyses in this paper will therefore be based on observations for the three remaining provinces: Guayas, Los Ríos and Manabí.[4] While also in the remaining provinces there is some degree of contamination, assigned treatment status and actual treatment status are highly correlated, implying that we can use assigned treatment status as an instrument for actual treatment status.[5]

The data that we use in this study were collected at the school level through a baseline survey in the beginning of the school year (in May 2009). In addition, school attendance was measured for all pupils in grades five and six through three unannounced visits (in July, September and November). In grades five and six, pupils are normally age 10 to 12. Collection of attendance data was limited to pupils in just two grades for cost considerations. Grades five and six were chosen because it was assumed that at this age pupils' attendance is more sensitive to the provision of free uniforms.

The school level questionnaire contains information about school infrastructure, the number of teachers, availability of books, computers labs, and other school inputs. The school questionnaire was addressed to the school principals. A special section in the questionnaire about the number of students enrolled in every grade during the current and past year is used to construct enrollment variables. Teachers

[3] Also one school out of the 20 that were assigned to the control group, received the free uniforms.

[4] Ecuador has 24 provinces, many of them sparsely populated. The three provinces included in this study are located in the coastal part of the country (as opposed to the mountains or the jungle). Together the three provinces have a population of almost 5 million people; the total population of Ecuador amounts to 13 million people.

[5] Further details about the first stage results are given in Subsection 4.1.

Table 1. Balancing of treatment and control schools

	Controls		Treated		
Variable	Mean	SD	Mean	SD	p-value
Infrastructure index (0-7)	2.522	(1.378)	2.763	(1.896)	0.379
Pedagogical equipment index (0-4)	1.145	(0.944)	1.158	(1.033)	0.937
At least one class per grade	0.435	(0.499)	0.474	(0.503)	0.641
School owns building	0.899	(0.304)	0.921	(0.271)	0.640
Share of female teachers	0.817	(0.256)	0.793	(0.291)	0.593
Number of teachers	4.692	(2.890)	5.125	(4.217)	0.469
Mean education level teachers	4.255	(0.563)	4.249	(0.767)	0.956
Mean experience teachers (yrs)	19.20	(8.37)	18.42	(8.32)	0.574
Urban area	0.812	(0.394)	0.816	(0.390)	0.949
Enrollment pre-treatment	138.2	(109.2)	146.8	(133.6)	0.671
N	69		76		

Note: The infrastructure index is the sum of dummies for presence of: boarding for teachers, potable water, electricity, sewage, bathroom, telephone, a teachers' room, a health clinic, a playground and Internet access. The pedagogical equipment index is the sum of presence of special instructions room, science lab, computer lab, classrooms in good condition and library.

were interviewed separately and from that information we construct the share of female teachers and the average age and experience of teachers in the school. These variables will be used as control variables.

Table 1 shows descriptive statistics at the school level, separately for schools assigned to the treatment group and for schools assigned to the control group. The final column in this table shows p-values that test for differences in means between treated and controls. None of the p-values is below 0.10, indicating that the randomization worked properly. The descriptives also show that the average school is rather small, with only four to five teachers and around 140 pupils. Eighty percent of the primary school teachers in our sample of schools is female. The average level of education is between secondary school (level 4) and professional college (level 5), and average experience is close to 20 years. Although most schools own their premises, the scores on the indexes for infrastructure and pedagogical equipment are rather low. This is probably the clearest indication that the schools included in this study all belong to the poor segment of the country.

Two factors may bias our results. First, parents in control schools may anticipate the implementation of the free uniforms program in the next year and may therefore postpone the purchase of a uniform. Second, some school may not be so strict with respect to the uniform requirement and may allow their pupils to attend school without a uniform. Both factors bias the results against finding a sunk cost effect,

since in both cases parents in the control group are less pressed to sink a cost by purchasing a uniform. RESALE OF FREE UNIFORMS

4 Results

4.1 The relation between assigned treatment on actual treatment

Not all schools that were supposed to receive free uniforms actually received them. As mentioned above the schools from two provinces were dropped altogether as (almost) no school in these provinces received free uniforms. In the other three provinces actual treatment is highly but not perfectly correlated with assigned treatment. In case of such contamination in a randomized experiment, the standard practice is to use the assigned treatment as an instrumental variable for actual treatment. This is also the approach we follow here.

After dropping the schools from the two provinces where no uniforms were provided, we are left with 149 schools. Two of these schools turn out to specialize in adult education and two schools have missing data on school attendance. As a result we end up with 145 schools. Table 2 shows how these schools are divided over assigned and actual treatment status. Twenty-four schools have an actual treatment status that differs from their assigned treatment. The other 121 schools comply with their assigned treatment status. In these 145 schools we have attendance records of 6,153 pupils in fifth and sixth grade, giving an average number of observed pupils per school of around 42. The schools that were assigned to treatment but did not receive it, have a larger number of fifth and sixth graders, while the schools that were assigned to control but did receive the free uniforms have smaller numbers of fifth and sixth graders on average.

Table 3 shows the estimates of regressions of actual treatment status on assigned treatment status. The top panel presents these results for the schools from the provinces that are included in our analyses. Regressions are presented both at the pupil level (with standard errors clustered at the school level) and at the school level, and from specifications without and with control variables. All coefficients in the top panel are around 0.7 and are highly significant. In the bottom panel we show results including the schools from the two provinces where (almost) no school received the free uniforms. While actual treatment is still very highly correlated with assigned treatment, the size of the coefficient drops considerably.

Contamination of treated and controls potentially limits the generalizability of our estimates. Where an uncontaminated randomized experiment would in principle recover the average treatment effect, instrumental variable methods estimate a local

Table 2. Numbers of schools (and pupils) by assigned versus actual treatment status

		Assigned treatment		
		$Z = 0$	$Z = 1$	Total
Actual treatment	$T = 0$	59	14	73
		(2569)	(841)	(3410)
	$T = 1$	10	62	72
		(213)	(2530)	(2743)
	Total	69	76	145
		(2782)	(3371)	(6153)

Note: Cells report number of schools and in parentheses the number of pupils. Z refers to assigned treatment, T refers to actual treatment.

Table 3. The impact of assigned treatment on actual treatment

	Pupil level		School level		Sample
Assigned treatment	0.674***	0.706***	0.671***	0.669***	3 provinces
	(0.081)	(0.064)	(0.062)	(0.062)	
F-statistic	69.2	119.9	117.6	115.5	
N	6153	6153	145	145	
Assigned treatment	0.457***	0.427***	0.517***	0.495***	5 provinces
	(0.068)	(0.053)	(0.058)	(0.052)	
F-statistic	45.2	65.7	78.4	89.7	
N	9851	9851	197	197	
Controls	no	yes	no	yes	

Note: Controls at the school level include indicators for infrastructure and pedagogical equipment, a dummy for the school having at least one class per grade, a dummy for the school owning the building, a dummy for urban area, percentage female teachers, number of teachers, average level of teachers' education, teachers' experience in the teaching profession and dummies for province. Additional controls at the pupil level are dummies for pupils' sex and grade, pupils' age, class-size, share of girls in the class. At school level, robust standard errors in parentheses. At pupil level, standard errors clustered at school level in parentheses. *** indicates significance at the 1%-level.

average treatment effect (Imbens and Angrist, 1994). This latter effect is identified from the observations that change treatment status because they were randomized in.

While we cannot observe who the compliers are, it is informative to examine which factors are correlated with schools' actual treatment status deviating from the assigned treatment status. To that end the top panel of Table 4 compares observed characteristics between schools that were assigned to the treatment of free uniforms and actually received them ($Z = 1, T = 1$) and schools that were assigned to treatment but did not receive the free uniforms ($Z = 1, T = 0$). Likewise, the bottom part of the table compares observed characteristics between schools that were assigned to the control group and did not receive free uniforms ($Z = 0, T = 0$) and schools that were also assigned to the control group but in fact received free uniforms ($Z = 0, T = 1$).

The results in Table 4 reveal no significant differences in observed characteristics between the receiving and non-receiving schools in the group that was assigned to treatment. This suggests that contamination in this group is not systematically related to school characteristics. This is different in the group of schools that were assigned to the control group. The schools that actually received free uniforms while they should have not, are significantly smaller than the schools that were assigned to control and did not receive free uniforms; these schools have fewer pupils and fewer teachers, and are also less likely to have at least one class per grade. Their index for pedagogical equipment is also lower. This means that the instrumental variable estimates that we present in the next subsection are perhaps not applicable to the smallest schools.

4.2 The impact of free uniforms on school enrollment

In the next subsection we present estimates from IV regressions of school attendance on the free uniforms indicator. To interpret these estimates as the impact of the provision of free school uniforms on attendance, the intervention should not have an impact on school enrollment. Otherwise the estimated impact might reflect a change in the student composition of treated schools rather than a direct impact of free uniforms on attendance. This would for instance be the case if the provision of free uniforms attracts marginal students – students whose school choice is determined by the provision of free uniforms instead of school quality. Such students may not only be attracted by the free uniforms but may also be less inclined to attend school.[6]

[6]This is for instance what Ashraf et al. (2010) find. Households who want to buy their water purification product at a higher offer price are more likely to use it.

Table 4. Comparing groups of schools

Variable	Mean	SD	Mean	SD	p-value
	$Z = 1, T = 1$		$Z = 1, T = 0$		
Infrastructure index (0-7)	3.286	(2.367)	2.645	(1.775)	0.334
Pedagogical index (0-4)	1.286	(1.139)	1.129	(1.016)	0.630
At least one class per grade	0.357	(0.497)	0.500	(0.504)	0.327
School owns building	0.929	(0.267)	0.919	(0.275)	0.906
Share of female teachers	0.819	(0.280)	0.787	(0.295)	0.698
Number of teachers	6.000	(6.906)	4.927	(3.389)	0.564
Mean education level teachers	4.144	(1.200)	4.273	(0.643)	0.692
Mean experience teachers (yrs)	17.58	(9.54)	18.61	(8.09)	0.703
Urban area	0.714	(0.469)	0.839	(0.371)	0.346
Enrollment pre-treatment	181.9	(185.4)	138.9	(119.4)	0.400
N	14		62		
	$Z = 0, T = 0$		$Z = 0, T = 1$		
Infrastructure index (0-7)	2.593	(1.403)	2.100	(1.197)	0.231
Pedagogical index (0-4)	1.203	(0.979)	0.800	(0.632)	0.086
At least one class per grade	0.508	(0.504)	0.000	(0.000)	0.000
School owns building	0.881	(0.326)	1.000	(0.000)	0.007
Share of female teachers	0.822	(0.240)	0.788	(0.349)	0.764
Number of teachers	4.962	(2.993)	3.100	(1.449)	0.002
Mean education level teachers	4.295	(0.569)	4.023	(0.486)	0.106
Mean experience teachers (yrs)	19.67	(8.42)	16.45	(7.92)	0.229
Urban area	0.814	(0.393)	0.800	(0.422)	0.922
Enrollment pre-treatment	149.1	(112.3)	74.2	(59.3)	0.002
N	59		10		

Note: Z refers to assigned treatment, T refers to actual treatment. See also the note of Table 1.

Since the provision of free uniforms to treatment schools was not publicly announced, we may expect that school enrollment – and thereby composition – is not affected. To examine whether this is indeed the case, we collected data on school enrollment. In the baseline questionnaire, principals were asked to report the numbers of enrolled pupils in their school in the current year (2009) and the previous (2008), broken down year by gender and grade level. From this information we constructed current and lagged values of the following enrollment variables: total enrollment, number of enrolled boys, number of enrolled girls, enrollment in grades 1 to 3, and enrollment in grades 4 to 6.

In Table 5 we present IV estimates of the impact of the provision of free uniforms on these school enrollment variables. In all specifications enrollment in the year of the experiment is regressed on enrollment in the previous year and on a variable indicating the provision of free school uniforms, where this indicator is instrumented by the assigned treatment status. We present results from specifications with and without further control variables, and from specifications with enrollment measured in levels and in logs.

The results in Table 5 show no sign of any impact on enrollment. Of the 20 estimates presented in the table only one is significantly different from zero at the 10%-level. Also 12 estimates are negative and 8 are positive, again suggesting no systematic pattern. We take these results as evidence that the provision of free uniforms did not have any impact on school enrollment, and thus that our estimates of the effect of free uniforms on attendance are not biased by changes in composition.

4.3 The impact of free uniforms on school attendance

Attendance was measured for all pupils enrolled in fifth and sixth grade through three unannounced visits. These visits took place in July, September and November. The school year runs from April to December, so that July is relatively early in the school year. The base attendance rate among pupils in schools assigned to the control group is 0.93 during the first visit, 0.90 during the second visit, and 0.93 during the third visit. This gives an overall average base attendance rate of 0.92 among the pupils in control group schools. As the bottom rows of Table 6 show, base attendance rates are fairly similar for boys and girls, and for fifth and sixth graders.[7]

Table 6 reports estimates of the impact of the provision of free school uniforms on attendance. As dependent variables, we look at attendance during the three

[7]Using data from pupils in control schools, a regression of average attendance on pupil's sex allowing for clustering at school level gives a p-value of 0.279. A similar regression for grade level returns a p-value of 0.093.

Table 5. Estimates of the impact of free uniforms on school enrollment

	In levels		In logs	
Group	(1)	(2)	(3)	(4)
All	1.325	-0.972	-0.034	-0.127
	(6.180)	(6.062)	(0.142)	(0.099)
Boys	-0.744	-0.687	0.036	-0.005
	(3.623)	(3.428)	(0.142)	(0.127)
Girls	2.425	0.241	-0.024	-0.102
	(3.615)	(3.523)	(0.128)	(0.099)
Grades 1-3	-0.187	-1.348	-0.007	-0.083
	(4.226)	(4.213)	(0.135)	(0.102)
Grades 4-6	1.617	0.212	-0.068	-0.178*
	(3.237)	(3.043)	(0.132)	(0.098)
Further controls	no	yes	no	yes

Note: All regressions include controls for lagged (log) enrollment and province dummies. Further controls include indicators for infrastructure and pedagogical equipment, a dummy for the school having at least one class per grade, a dummy for the school owning the building, a dummy for urban area, percentage female teachers, number of teachers, average level of teachers' education, teachers' experience in the teaching profession and dummies for province. Number of observations equals 145 schools. Robust standard errors in parentheses. * indicates significance at the 10%-level.

visits separately and at attendance averaged over the three visits. We estimated specifications with and without control variables, and with and without interaction terms between provision of free uniforms and pupils' sex and grade. All estimates come from IV-regressions in which assigned treatment status is the instrument for free uniforms, and assigned treatment times a dummy for girl (or a dummy for sixth grade) is the instrument for the interaction term of free uniform and pupil's sex (grade).

All estimates from the specification without interactions (in the first row) have a negative sign, and six out of eight estimates are significantly different from zero. Only for attendance measured in September, estimates are not significantly different from zero. Pupils in schools where uniforms were provided for free are less likely to attend schools than pupils in schools where parents had to buy the school uniforms of their children. The size of the impact is around 4 percentage points. Relative to a base attendance rate of 0.92, this is quite substantial. It implies that absenteeism increases by almost 50%.

The next two panels in Table 6 present results from specifications with interaction terms. The results in the middle panel indicate that the negative impact of free uniforms on attendance is mainly attributable to the behavior of boys. All the

Table 6. Estimates of the impact of free uniforms on school attendance

	Attendance July		Attendance September		Attendance November		Attendance average	
Free uniforms	-0.033**	-0.041***	-0.011	-0.008	-0.043*	-0.052**	-0.029*	-0.034**
	(0.017)	(0.016)	(0.023)	(0.021)	(0.024)	(0.022)	(0.017)	(0.015)
Free uniform	-0.029	-0.039*	-0.019	-0.019	-0.062**	-0.074***	-0.037*	-0.044**
	(0.024)	(0.021)	(0.029)	(0.025)	(0.028)	(0.026)	(0.022)	(0.018)
Free uniform × Pupil is girl	-0.005	-0.005	0.017	0.023	0.039**	0.045**	0.017	0.021
	(0.026)	(0.025)	(0.023)	(0.022)	(0.020)	(0.021)	(0.016)	(0.015)
Free uniform	-0.036*	-0.043**	-0.017	-0.010	-0.053**	-0.059**	-0.035**	-0.038**
	(0.021)	(0.021)	(0.022)	(0.022)	(0.023)	(0.024)	(0.016)	(0.015)
Free uniform × Fifth grade	0.004	0.004	0.011	0.005	0.019	0.013	0.011	0.007
	(0.025)	(0.025)	(0.031)	(0.030)	(0.026)	(0.026)	(0.020)	(0.019)
Additional controls	no	yes	no	yes	no	yes	no	yes
Mean controls	0.93		0.90		0.93		0.92	
Mean treated	0.90		0.89		0.91		0.90	
Mean boys (controls)	0.91		0.89		0.94		0.91	
Mean girls (controls)	0.94		0.91		0.92		0.92	
Mean fifth grade (controls)	0.93		0.89		0.92		0.91	
Mean sixth grade (controls)	0.92		0.92		0.94		0.93	

Note: All regressions include controls for province dummies. For specifications with interaction terms of free uniform and girl/grade, main effects for girl/grade are also included. Additional controls are dummies for pupils' sex and grade, pupils' age, class-size, share of girls in the class, indicators for the school's infrastructure and pedagogical equipment, a dummy for the school having at least one class per grade, a dummy for the school owning the building, a dummy for urban area, percentage female teachers, number of teachers, average level of teachers' education and teachers' experience in the teaching profession. Number of observations equals 6153 pupils in 145 schools. Standard errors in parentheses are clustered at the school level. ***/**/* indicates significance at the 1%/5%/10%-level.

estimates of the main effect are negative and all the estimates of the interaction effect of free uniforms and the pupil being a girl are positive. The results in the bottom panel show that the impact of free uniforms does not differ across grades.

The negative impact of the provision of free uniforms on attendance is surprising given the program's goal to increase attendance and given the previous finding for Kenya reported by Evans et al. (2008). Our preferred explanation for this unexpected finding is that private contributions for children's education positively affects parents' commitment. In the Ecuadorian context, the default is that parents purchase their children's school uniform. Hence parents are used to buying school uniforms and all children enrolled in a school will have one. The key difference between treated and controls is then that parents of children enrolled in control schools paid for the uniforms themselves whereas the parents of children enrolled in treated schools did not. To the extent that parents are prone to the sunk cost fallacy ("bygones are no bygones"), the purchase of a school uniform may stimulate them to send their children to school.

The fact that the intervention has a larger impact on attendance during the first visit than on attendance during the second visit is consistent with this. The first visit occurs in July, three months after most parents in the control group purchased the uniforms, whereas the second visit occurs two months later. It might be that during the time that elapsed between the first and the second visit, parents in the control group accepted the cost of their purchase is sunk. The fact that the intervention has an even larger negative impact at the third visit may seem inconsistent with this. This is not the case, however, if parents' responsiveness varies with what is at stake. The last visit takes place in November. In Ecuador's coastal provinces this is the month in which schools organize exams that are important for the decision to advance a grade. With the exams coming up, parents in the control group may be reminded of their purchase earlier in the year, and they may stimulate their child to make this investment worthwhile.[8]

5 Conclusions

This paper evaluates the impact of the provision of free school uniforms on school enrollment and attendance in Ecuador. In contrast to a previous study for Kenya that finds a positive impact of free uniforms on attendance, we find a significantly negative effect on attendance in Ecuador. While the programs in both countries

[8]Ecuador is located on the equator and the coastal provinces do not have changing seasons. Hence, it is not the case that in November parents in the control group have to buy new clothing because the season changed.

are targeted at poor households, poor people in Ecuador are probably less poor than poor people in Kenya. This means that in Ecuador, everyone enrolling in school owns a uniform. The essential difference between treated and controls is then that parents of children enrolled in control schools paid for the uniforms themselves whereas the parents of children enrolled in treated schools did not.

An explanation for our finding is then that parents who pay for their children's school uniforms (those in the control group) feel more committed to the school than parents who got the uniforms for free (the treated) and therefore do not allow their children to miss classes too easily. Consistent with this sunk cost effect explanation, we find that the impact on attendance is larger shortly after the purchase of the uniform and during the exam period when more is at stake.

Ashraf et al. (2010) and Cohen and Dupas (2010) find no evidence of a sunk cost effect in the usage of health-related products in Sub-Saharan Africa. Apart from differences between health and education, an explanation for this difference may be the absolute costs of the products. The highest price paid for the water purification product in Ashraf et al.'s experiment equals US$ 0.25, which is about 0.1% of the monthly income of households in the target group. The highest price paid for the bed net in the study of Cohen and Dupas amounts to US$ 0.60, which is around 0.3% of monthly income of households in the target group. These amounts are substantially below the US$ 29 that a school uniform in Ecuador costs.

Obviously we should not jump to conclusions on the basis of the results from one experiment. Our result points, however, to a potentially important mechanism that so far has not received too much attention in the economics of education literature. Private contributions to education may serve as a commitment device for parents to encourage their children to attend school.

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