

Working paper

Estimating the Benefit to Secondary School in Africa

Experimental
Evidence from
Ghana

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Estimating the Benefit to Secondary School in Africa: Experimental Evidence from Ghana

Final Report for IGC Contract RA-2009-06-020

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Executive Summary

As progress is made towards universal primary school enrolment, and millions of children around the world complete primary schooling and hope to move on to a secondary school, an important question for policy-makers is emerging: how quickly to expand access to secondary education? Although human capital is considered to be an important driver of growth and development, and the role of primary education has been well studied and understood, there is very little evidence of the benefits of secondary education. Some have argued that secondary education is likely to have a much larger impact than primary education on long-run earnings, health, fertility, gender equality, and civic and political participation. But expanding secondary education is a significantly more expensive undertaking than providing free primary education.

The work performed under IGC Contract RA-2009-06-020 is a key building block in a very long-term research project that aims to examine the long-run impact of secondary education on individual outcomes in the context of Ghana. This long-term research project is being conducted in collaboration with the Government of Ghana and concerns a cohort of 2,068 students who earned admission into a senior secondary school in the fall of 2008 but could not afford to pay the fees. Out of these 2,068 students, 682 students were selected (by lottery) to receive a 4-year scholarship that covered 100% of the tuition and fees at a local public secondary school. The goal is to compare the outcomes of lottery winners to those of lottery losers over time (for at least 10 years) in order to estimate the impacts of lowering the financial barriers to secondary school enrollment.

In the present report, we use data collected between September 2008 and December 2011 to examine the “first stage” – we describe the extent to which secondary school scholarships affect educational attainment; and discuss who benefits the most from such a scholarship.

Future work will consider the “second stage” – estimating the returns to secondary education on life outcomes such as labor market participation, income, fertility, health behavior, etc.

1. Description of Study Design and Study Sample

The sample includes 2,064 students who were between 13 and 25 years old, with a mean of 17 years, at the onset of the study (Fall 2008). They are split evenly between boys and girls. Among these 2,054 study participants, 682 (half boys and half girls) were randomly selected to receive a 4-year scholarship (the “treatment”) to cover their senior high school (SHS) education from September 2008 to June 2012.¹

Scholarship Program Description

The scholarship covers the full tuition and fees for a day student. The scholarship is paid directly to the school and covers the entire school “bill”. A typical SHS bill for a day student is comprised of 3 items: government approved fees which are the applied for all schools, PTA (Parents-Teachers Association) dues, and other levies and supplies. The latter two costs are school-specific. During the first 3 years of the scholarship program, an average of \$304 was paid per student receiving a scholarship (data on year 4 is not yet available.)

Students who receive the scholarship are only responsible for the cost of transportation to the SHS and feeding costs (plus boarding costs if they choose to board). The cost of transportation is typically limited since students sampled for this study were those that were placed in an SHS in the same district in which they attended junior high school and the cost of lunch is a cost that the family would bear regardless of the scholarship program.

Study Sample

All the boys sampled had passed the senior secondary school entry exam in June 2008. They were eligible to start senior high school in September 2008, but they had not enrolled as of December 2008 due to financial hardship. A similar sampling procedure for girls was not possible: since only few girls reach the end of junior high and pass the senior secondary school entry exam, finding enough girls from the 2008 cohort proved difficult. For this reason, close to a third of girls in the sample were already more than one year out of junior high school at the time they were sampled for the study (in other words, they had passed the entry exam in 2007 and were eligible to enroll in senior high school as of September 2007, but by December 2008 they still had not enrolled due to financial hardship. Note that only those who had not yet started childbearing by then were eligible for the scholarship).

Table 1 presents some summary statistics on the study sample. This data comes from baseline surveys administered to the respondents, as well as their guardian, in the Fall 2008.

Student characteristics

Students were on average 17 years old at the onset of the study. Over 30% of students in the sample were experienced sexually at the start of the study, although girls were much more likely to report this: over 45% reported having had sex, whereas only 18.5% of boy did.

Household/family characteristics

¹While the school year in Ghana runs from September to June, scholarship winners were notified in January 2009. They thus enrolled in the second term of the 2008/2009 academic year. Missing the first term is not uncommon in Ghana and our sponsored students appear to have had no difficulty catching up with their class within the second term.

Most of the guardian respondents in the sample were women; under 14% of them were married and living with their spouse, and over 40% of the students lived in households with no male head.

Approximately 9% of household heads in the sample had only some primary education; about 40% had been to junior high, and about 13% had some secondary education. Under 4% reported having any education higher, like university or vocational school.

Values/perceptions of education

At baseline, over 90% of students and their guardians said they believe that getting some education is important, approximately 75% of guardians said they wished for at least a university education for their children, although this is slightly higher for guardians of male respondents (78%) than for the guardians of girl respondents (73%). Almost all of the students for whom we have data said they believed secondary education would yield returns in the future, defined by a difference in income at age 25 - over 40% thought these returns would be over 50%, while approximately 30% thought returns would still be positive, though less than 50%.

Keeping track of the study sample

The major difficulty in this project is to maintain good contact with all study participants throughout the years. We use two methods to do so:

- (1) Study participants were given a cell phone at the onset of the study. Once a year, we attempt to reach all respondents over the phone in order to update their contact information and ask for their current schooling status, as well as a few other follow-up questions. If they cannot be reached over the phone, we attempt to find them in person by going to their home area.
- (2) Study participants are sent mobile phone credit twice a year, with the request that they use SMS to update the research team on any change to their contact information in order to not lose contact with study participants.

Together, these methods have allowed us to keep attrition to a minimum. As of June 2011, we had kept contact with 98.9 % of our study sample. This minimal attrition is non-differential across treatment and control groups.

Table 1: Sample Characteristics

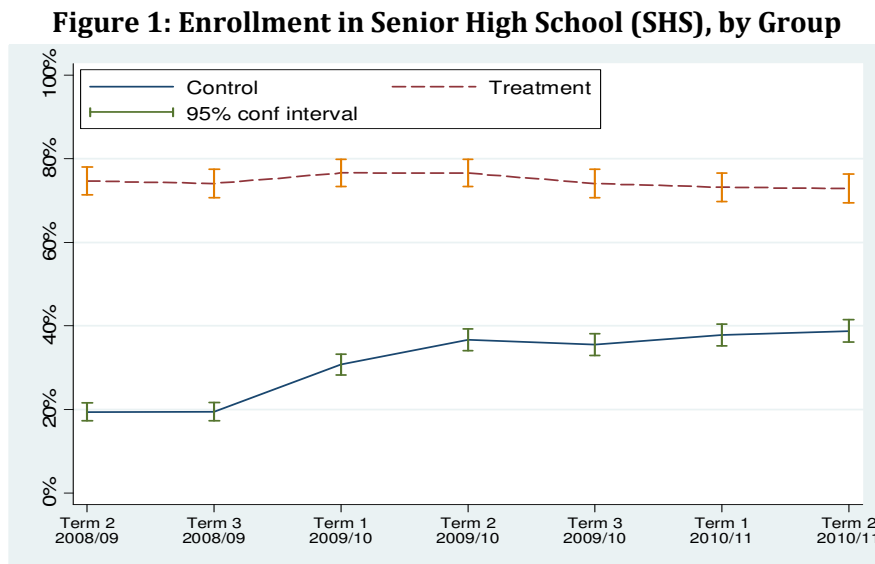
	All		Boys	Girls
	Control	Treatment	ALL	ALL
<i>Student characteristics</i>				
Male	49.1%	50.9%		
Age in 2008	17.4	17.3	17.4	17.3
Distance to the SHS in which student was placed in <10 km	62.9%	62.4%	62.5%	63.0%
Mean of BECE scores (Math, English, Science, Social Eco) (between 0 and 1)	45.2%	45.3%	45.8%	44.6%
Mean of BECE scores is missing	5.7%	8.8%	6.1%	7.3%
Think that it is very important to someone to get an education	92.1%	91.6%	93.4%	90.5%
<i>Perception of educational returns*</i>				
Returns are positive and <P50	48.0%	42.5%	44.6%	47.7%
Returns are positive and >P50	30.4%	32.7%	33.0%	29.4%
Perceived returns to education are missing	13.5%	14.3%	11.7%	15.7%
Ever had sex	32.9%	30.3%	18.5%	45.4%
<i>Guardian characteristics**</i>				
Guardian is married and living with the spouse	13.1%	11.4%	11.8%	13.3%
Guardian said that it is very important for the child to get an education	90.8%	90.1%	91.7%	89.5%
Guardian said that the minimum desired level of education for the child is university	76.4%	73.4%	78.3%	72.5%
Guardian can read a sentence in English without difficulty	20.4%	18.5%	19.0%	20.6%
<i>Household characteristics</i>				
No Male Head in the household	42.6%	43.6%	41.2%	44.6%
Age of the HH head	51.0	50.9	50.7	51.2
Number of HH members	5.7	5.6	5.7	5.6
HH head get primary education	9.5%	8.4%	9.7%	8.5%
HH head get JHS	41.1%	39.6%	40.2%	41.0%
HH head get SHS	12.9%	13.5%	13.6%	12.6%
HH head get vocational education	1.4%	0.9%	1.1%	1.4%
HH head get any higher education	3.6%	3.1%	3.2%	3.7%
HH head level of education is missing	4.5%	5.2%	5.0%	4.5%
Log of total consumption per adult equivalent	6.1	6.1	6.1	6.1
Log of total consumption per adult equivalent is missing	1.7%	2.1%	2.7%	0.9%
N	1380	678	1023	1035

* Perceived returns to secondary education are measured as the difference between how much you make at 25 years with vs. without SHS education. ** In most cases the guardian was female, typically the mother. If the female guardian was unavailable during the baseline survey, the male guardian was interviewed.

2. Results: Understanding the Barriers to Secondary School Enrollment

Is financial hardship a key barrier to secondary school enrollment?

We can answer this question by looking at the impact of the scholarship on enrollment rates. We present in Figure 1 the average enrollment rate by treatment group for each term since the study start. The gap in enrollment between those offered the scholarship and those not offered the scholarship is quite substantial: enrollment rates are twice as high among those that received the scholarship (the treatment group) compared to the control group.

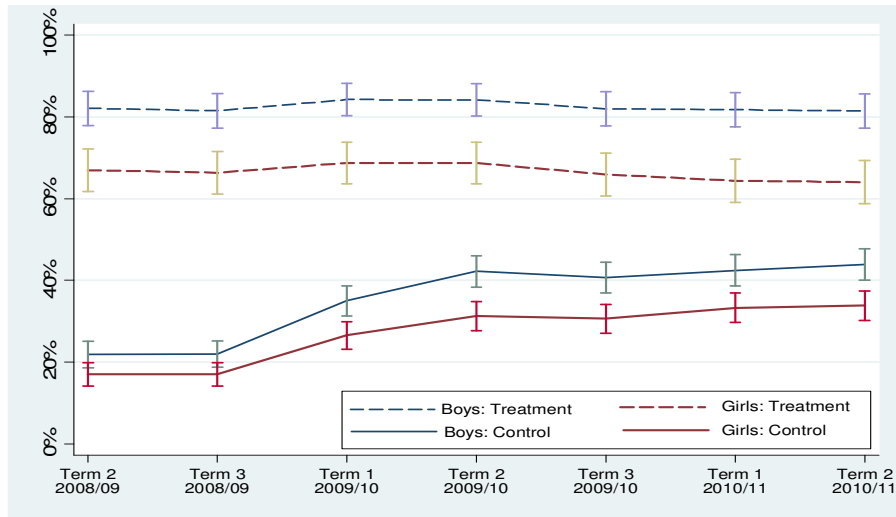


Interestingly, among those who did not win a scholarship (the control group), enrollment has nearly doubled since the start of the study, from around 20% to nearly 40%. This suggests that some youths need about a year to accumulate sufficient resources to enroll. So far these students have managed to stay enrolled for a second year. It remains to be seen whether they will be able to afford financing to complete their secondary education.

Zooming in on girls

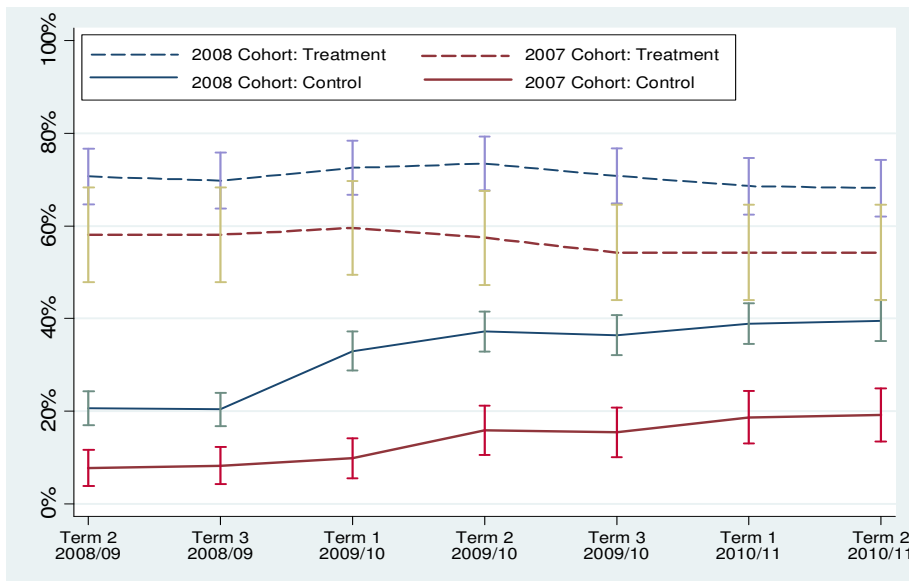
Figure 2 shows how enrollment varies by gender. Only 64% of girls awarded a scholarship were enrolled in school as of Term 2 of the academic year '10/11, compared to 81% of boys. Among those in the control group, enrollment rates are also lower among girls than boys, with 34% of girls enrolled vs. 44% of boys.

Figure 2: Enrollment in Senior High School (SHS), by Group and Gender



Part of the lower enrollment rates among girls comes from the fact that a subset of girls in our study sample had been out of school for more than a year already, at the time the study started. As shown in Figure 3, secondary enrolment rates, with and without the scholarship, are lower among girls who had taken the exit exam in 2007, i.e., those who had been out of school longer. Specifically, while 68% of the girls who took the exit exam in June 2008 took up the scholarship in the Fall 2008, only 54% of those who exited in June 2007 did so. What's more, 40% of those who exited junior high school in June 2008 and did not win the scholarship ended up enrolling anyway, compared to 19% of those who exited in June 2007. These results suggest that, the more time passes between primary and secondary school, the less “enrollable” girls become.

Figure 3: Girls' Enrollment in Senior High School (SHS), by Group and BECE Year



What are the other barriers to secondary school enrollment?

About 20% of boys and 35% of girls who won a scholarship did not enroll in secondary school. For those, financial hardship cannot be the reason for non-enrollment. What are the other barriers then for these youths? In Table 2, we analyze the determinants of enrollment by study group and gender.

Table 2: Determinants of SHS enrollment at 2011 follow-up

	<i>Dependent variable:</i>			
	Enrolled in SHS as of April 2011			
	Boys		Girls	
	Control	Treatment	Control	Treatment
Age at study start (Fall 2008)	-0.043*** (0.013)	-0.023 (0.015)	-0.069*** (0.013)	-0.013 (0.020)
Distance to the SHS in which student was placed in <10 km	0.003 (0.046)	0.159*** (0.052)	0.066* (0.040)	-0.009 (0.060)
Mean of JHS exit exam score (from 0 to 1)	0.302 (0.256)	0.574* (0.297)	0.462* (0.249)	0.350 (0.367)
Had ever had sex at time study started (Fall 2008)	-0.133** (0.052)	-0.063 (0.066)	-0.104*** (0.037)	-0.279*** (0.058)
<i>Guardian characteristics</i>				
Guardian said that it is very important to get an education	0.069 (0.075)	-0.008 (0.081)	-0.006 (0.060)	0.208** (0.089)
Guardian can read a sentence in English without difficulty	0.071 (0.052)	0.029 (0.061)	0.025 (0.044)	-0.090 (0.070)
<i>Household characteristics</i>				
No male head	0.024 (0.044)	0.046 (0.049)	-0.019 (0.041)	-0.054 (0.058)
Age of the HH head	0.001 (0.002)	-0.003 (0.002)	0.000 (0.001)	-0.003 (0.002)
Number of biological parents of the respondent in the HH	0.041 (0.028)	0.048 (0.034)	0.021 (0.027)	0.006 (0.039)
Log of total consumption per adult equivalent	0.011 (0.034)	0.032 (0.043)	-0.023 (0.031)	-0.036 (0.042)
N	669	344	691	328
R-squared	0.132	0.227	0.216	0.359
Mean of dependent variable	0.436	0.802	0.335	0.626

Notes: Table shows coefficient estimates of OLS regressions. All regressions include fixed effects for districts. Standard errors in parentheses. ***, **, * indicates significance at 1%, 5% and 10%.

This analysis shows that:

(1) The older students are at the time they get admitted into secondary school, the less likely they are to enroll. This could be because the opportunity cost of being in school is higher for them, as

their capacity to generate income on the labor market is higher as they are older (stronger). This suggests that programs that encourage early school entry (that is, prevent delay in primary school enrollment) could have long-lasting consequences on total schooling.

(2) Distance to the secondary school does not appear to be an obstacle to enrollment.

(3) Those students who perform better in school (i.e., they have higher JHS exist exam scores) are more likely to enroll in secondary school. This suggests that households believe that the returns to education are larger for those with higher ability.

(4) Having started sexual activity is a major barrier to secondary school enrollment for both boys and girls, but especially for girls.

(5) Within our selected sample of students who qualified for secondary school but were too poor to enroll immediately after leaving junior high school, guardian and household characteristics do not play a major role in explaining secondary school enrollment.

3. Results: Short-run Impacts of the Scholarship on Marriage and Fertility Outcomes

We have not yet conducted a comprehensive follow-up survey. The first of those surveys is scheduled for the Fall 2012 (exactly 4 years after the baseline survey was conducted) and will be funded through an NIH grant.

However, we already have some evidence on a few outcomes that were measured during the phone surveys conducted to update the contact and school enrollment information from all study participants. In particular, we have some evidence on marriage and fertility outcomes.

Table 3: Effects of the Scholarship program and of SHS attendance on Family Status

	Mean in control group	Girls			
		Estimated Impact of scholarship		Estimated Impact of SHS attendance*	
		<i>Coef</i>	<i>p-value</i>	<i>Coef</i>	<i>p-value</i>
Married	0.062	-0.020	0.19	-0.070	0.18
Ever had a child	0.218	-0.024	0.31	-0.080	0.33

Notes: * impact of SHS estimated through Instrumental Variable analysis, where SHS attendance is instrumented with Scholarship status.

All regressions include controls for the value of the dependent variable during baseline survey, for age in 2008, and for whether the 2011 follow up interview was made in person or through phone. We also added district fixed effects.

The table shows encouraging results, even though none are statistically significant at this stage.

The first result is that the scholarship program reduced early marriage. While 6.2% of girls in the control group had married by June 2011, this was reduced by 2 percentage points, to $0.062 - 0.020 = 4.2\%$ among girls in the scholarship group. This corresponds to a 30% decrease in early marriage. Since the difference in probability of SHS enrollment between treatment and control groups was much less than 1, this implies a very large impact of secondary school enrollment on marriage.

The second result is that the scholarship program also reduced early pregnancy. While 21.8% of girls in the control group had started childbearing by June 2011, this was reduced by 2.4 percentage points, to $0.218 - 0.024 = 19.4\%$ among girls in the scholarship group. This corresponds to an 11% decrease in early fertility. This implies a non-trivial impact of secondary school enrollment on early childbearing.

4. Next Steps

While the IGC grant is ending, with support from complementary funding sources we will conduct three follow-up surveys, in 2012 (4-yr follow-up), 2015 (7-yr follow-up), and 2018 (10-yr follow-up).

The follow-up survey is currently being designed and piloted. It is specifically designed to provide very rich information on all the channels through which education may improve the lives of youths, including sections on: labor market outcomes; knowledge and practices on health and reproductive health; preferences regarding fertility and marriage; kinship ties and gender roles; personal efficacy; belief in determinism and interest in public affairs; cognitive (measured by digit span tests as well as Raven's matrix test) and non-cognitive ability (measured by modules on motivation, self-discipline, risk aversion and discount rates); economic wellbeing; and partner characteristics and bargaining power in the family.

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