A Study of Bursary Programs:

Evaluating the Girls Scholarship Program in Western Kenya
and Rules for Secondary School Scholarship Targeting

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Executive Summary: We use data from the Girls Scholarship Program (GSP) and the Kenya Life Panel Survey (KLPS) to conduct three types of analysis of bursary programs. We evaluate the effect of different targeting rules for secondary school scholarships, we estimate the impact of attending a primary school that took part in a scholarship program, and we estimate the effect of winning a scholarship from the program. Giving scholarships based on KCPE alone would lead to under representation of children whose parents have no secondary education and girls relative to their proportion of the population. Distributing the scholarships to the top students in each school as opposed to each district does little to alleviate this discrepancy. Preliminary analysis of the medium-run impacts of the Girls Scholarship Program, where surveying is ongoing, gives largely inconclusive but suggestive evidence that there are moderate benefits from attending a scholarship program school and stronger evidence that there are large benefits from winning a scholarship.

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1. Introduction

Governments that cannot afford to provide free education for all their citizens may be interested in giving scholarships to the extent possible. Giving these limited scholarships to high achievers is attractive since it rewards effort and creates incentives for excellence, but this may create equity and sustainability concerns since a fully competitive program may tend to marginalize the poor and disadvantaged. To help determine the number of awards that might go to disadvantaged students, we use new tracking survey data from the Girls Scholarship Program (GSP) and the Kenyan Life Panel Survey (KLPS) to evaluate the effects of different targeting rules for a secondary-school scholarship using Kenyan Certificate of Primary Education (KCPE) exam scores. We also use preliminary data to evaluate the medium-run impacts of a randomized primary school merit scholarship program conducted in Western Kenya in 2001 and 2002.

We look at different methods of geographically dividing scholarships (i.e., giving them to the top scorers in each school as opposed to in each district) in order to investigate the possibility of clustering of people with similar socioeconomic status. If wealthier families all sent their children to the same school or lived in the same small area, we would expect to find that giving bursaries separately to each school instead of to the district as a whole would do much to target those who are less well-off. Instead we find that such methods do not do much to alleviate the under-representation of disadvantaged groups amongst the winners.

We also use data from an ongoing field tracking survey, the Girls Scholarship Program (GSP) to present evidence on the effects of scholarship programs. Preliminary

evidence is inconclusive, but suggests there is a moderate positive effect from attending a school in which the scholarships were offered. There is stronger evidence that winning one of the scholarships had a large positive effect. Data collection is still ongoing.

Section 2 discusses different types of targeting rules, section 3 introduces the primary school scholarship program, section 4 presents preliminary findings on the effect of attending a school where merit scholarships were awarded, section 5 presents preliminary findings of the effect of winning a scholarship, and section 6 concludes.

2. Estimating Scholarship Winners under Different Targeting Rules

Current bursary schemes in Kenya have limitations in targeting those in most need. An easy way to determine scholarship winners would be to reward high scorers on the KCPE within regions, but it is uncertain how many of these awards would go to the underprivileged. We can help to answer this question using new tracking survey panel data from the Kenya Life Panel Survey (KLPS) and GSP surveys. Awards could be given to those with the highest KCPE scores in each district, or in each division, each zone, each school, or they could be based on other criteria as well. We examine what proportion of awards would be given to students with different characteristics depending on how the program is designed.

The KLPS has data from 5200 adolescents who were originally surveyed as part of a deworming project that started in 1998 (see Miguel and Kremer (2004) for details on the original deworming study). They were re-interviewed in 2004 and 2005 when they were between the ages of 14 and 25. Of the 5200 students surveyed in the KLPS data, 2015 of them have taken the KCPE at least once. We have scaled older 700-maximum

KCPE scores to fit in line with the current 500-maximum. These 2015 students are from 75 different schools in the Budalangi and Funyula divisions of Busia district. Busia district is in Kenya's Western Province, the third poorest of Kenya's eight provinces, which the government has described as "uniformly and deeply poor" (Central Bureau of Statistics 2003a). 67% of households in the rural parts of Busia are below the poverty line, compared to 60% of households in the province (Central Bureau of Statistics 2003b).

A rule of giving scholarships to the top 10% or top 20% of highest scorers on the KCPE in the district, or instead in each division, each zone, or each school would lead to under representation of orphans[1], girls, and to children neither of whose parents had any secondary schooling[2]. Of the 2015 who took the test, 34.8% were orphans, 31.2% had no parental secondary education, and 44.67% were female. In the entire sample of 5200 students, these groups make up 34.4%, 34.0%, and 48.37% of the population, respectively. Table 1 shows the percentages of awards that would go to each of these populations along with average KCPE scores for the winners with those characteristics for different ways of dividing the bursaries.

[1] Orphan defined as a child who reported that at least one of their parents was no longer alive, not including "don't know" responses and regardless of stepfamily or living arrangements. For more specific information on orphans, see Case et al (2004) and Evans and Miguel (2004).

[2] Again, not including "don't know" responses when the child was asked about their parents' educations.

Table 1: Targeting Impact of Different Rules for Allocating Scholarships

Percent of Awards Won by Students with Given Characteristics

Scholarships Awarded to Top 10% of KCPE Scores in Each	Orphans	No Parental Secondary Education	Girls
School	32.05	23.93	28.21
Zone	28.37	23.08	27.88
Division	30.43	22.22	26.09
District	30.85	22.89	26.87

Average KCPE Score for Winners with Given Characteristics

Top 10% in Each	Orphans	No Parental Secondary education	Girls	Overall
School	338.73	338.08	336.72	342.24
Zone	350.57	350.68	348.38	352.13
Division	350.15	352.73	351.47	353.23
District	350.73	352.73	351.61	354.15

Percent of Awards Won by Students with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls
School	34.6	26.8	30.0
Zone	35.4	23.2	28.5
Division	34.3	23.2	28.6
District	32.6	22.2	30.0

Average KCPE Score for Winners with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls	Overall
School	324.8	321.1	321.8	327.1
Zone	328.7	331.8	331.4	333.4
Division	330.4	332.6	332.3	334.3
District	339.1	342.1	338.7	342.6

Notes: The far left-hand column indicates the geographic breakdown of the awards (i.e., awards go to the top 10% in each school, or the top 10% in each zone, or division, etc.). The percentages indicate, for each geographic method of breaking down the award, the proportion of awards that would be awarded to persons with the characteristic listed at the top. The test scores indicate the average KCPE score for winners with the listed characteristic, again depending on how we geographically distribute the awards. For reference, the population of test-takers is 34.8% orphans, 31.2% have no parental secondary education, and 44.67% are female.

All three of these populations are underrepresented in the awards compared to their population proportions (34.8% orphan, 31.2% with no parental secondary education, and 44.67% female). This is especially true for females, who would only receive 26 to 28% of the awards if the competition were not conducted separately for each gender. Orphan status does not seem to present as large of a disadvantage (1 to 2 percentage points underrepresented) in the competition as does the socio-economic status measure of having parents without any secondary education (6 to 9 percentage points underrepresented). Although it is not true in every instance, it does seem that the finer we slice the competition groups, the more disadvantaged students would benefit, although this increase is not very large at all, and the average winning KCPE score becomes considerably lower.

Obviously, stratifying the award by a certain characteristic (gender, for example) would guarantee those with that characteristic would benefit. Table 2 shows the results from running the scholarship program separately for boys and girls. Since female KCPE scores are lower on average, this regime lowers the average score of the winners. This method also fails to benefit those that are not directly targeted (orphans and those without parental secondary education).

Table 2: Targeting Impacts When Awards Done Separately By Gender

Percent of Awards Won by Students with Given Characteristics

Scholarships Awarded to Top 10% of KCPE Scores in Each	Orphans	No Parental Secondary Education	Girls
School and Gender	32.6	23.8	46.2
Zone and Gender	32.1	23.6	44.3
Division and Gender	29.6	21.4	44.2
District and Gender	31.4	21.6	45.1

Average KCPE Score for Winners with Given Characteristics

Top 10% In Each	Orphans	No Parental Secondary Education	Girls	Overall
School and Gender	329.9	327.3	317.1	331.9
Zone and Gender	343.9	345.4	335.2	348.0
Division and Gender	348.9	351.7	338.4	351.2
District and Gender	347.6	351.5	338.7	351.5

Percent of Awards Won by Students with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls
School and Gender	32.1	25.3	45.4
Zone and Gender	31.3	23.8	44.7
Division and Gender	31.9	23.5	44.6
District and Gender	31.3	22.0	44.7

Average KCPE Score for Winners with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls	Overall
School and Gender	320.4	317.3	305.5	320.3
Zone and Gender	329.8	328.3	317.2	330.7
Division and Gender	330.1	330.1	319.0	332.1
District and Gender	338.0	339.7	327.7	340.8

Notes: The far left-hand column indicates the geographic breakdown of the awards (i.e., awards go to the top 10% of boys in each school and the top 10% of girls in each school, or the top 10% of boys in each zone and the top 10% of girls in each zone, etc.). The percentages indicate, for each geographic method of breaking down the award, the proportion of awards that would be awarded to persons with the characteristic listed at the top. The test scores indicate the average KCPE score for winners with the listed characteristic, again depending on how we geographically distribute the awards. For reference, the population of test-takers is 34.8% orphans, 31.2% have no parental secondary education, and 44.67% are female.

Giving awards separately by gender to the top percentiles ensures that girls receive awards nearly equal to their population proportion (45%), but it does not direct more awards to orphans or those with low parental education. We could also simply reserve fifty percent of awards for girls and see whether this would direct more awards to the underprivileged. Our simulations so far have resulted in between 201 to 273 scholarships using the top 10% and 304 to 467 using the top 20%.[3] Table 3 shows the results if we chose to give 300 total scholarships. We divide the 300 scholarships evenly between boys and girls in the one district, then also between the two divisions, the 8 zones, and the 74 schools. Ties sometimes prevent the awards from being split exactly equally between boys and girls.

[3] The differing number of scholarships can be understood with an extreme example: if each school had only one student and you promised a scholarship to everyone in the top 10% at each school, every single student would receive a scholarship.

Table 3: Targeting Impacts When Half of Awards Reserved for Girls

Percent of Awards Won by Students with Given Characteristics

Awards Divided Evenly amongst Each	Orphans	No Parental Secondary Education	Girls
School	32.4	24.4	50.5
Zone	32.7	25.7	50.5
Division	34.9	23.9	49.8
District	31.7	23.3	50.0

Average KCPE Score for Winners with Given Characteristics

Awards Divided Evenly amongst Each	Orphans	No Parental Secondary Education	Girls	Overall
School	325.0	319.8	310.8	325.6
Zone	331.7	330.1	319.0	334.9
Division	331.6	335.4	323.2	337.1
District	337.4	337.2	324.9	339.7

Notes: In this table half of the awards are reserved for females, and the awards are evenly divided between different geographic regions (that is, two to each gender in each school, 18 to each gender in each zone, 75 to each gender in each division, or 150 to each gender in each district). The percentages indicate, for each geographic method of breaking down the award, the proportion of awards that would be awarded to persons with the characteristic listed at the top. The test scores indicate the average KCPE score for winners with the listed characteristic, again depending on how we geographically distribute the awards. For reference, the population of test-takers is 34.8% orphans, 31.2% have no parental secondary education, and 44.67% are female.

We can see that the trend is the same with this method of targeting—average KCPE scores decline and wider geographic dispersal does not effectively provide more scholarships to groups that are not directly targeted.

We could more directly target disadvantaged groups and give awards separately to the top 10% of orphans, children whose parents have no secondary education, and girls, by school, zone, division, and the district as a whole. It is worth bearing in mind that unintended consequences may arrive from this type of direct targeting. For example, if a scholarship program used iron roof ownership as a measure of wealth that made children ineligible for scholarships, in the long run it is possible fewer people would buy iron roofs, and in the short run, reporting of iron roof ownership would likely decrease. Orphan status and parental secondary education are unlikely to be altered much in truth as a result of the scholarships, but the reported numbers may change to some degree since secondary school is such a large expense for most families. Table 4 shows the results of giving awards separately for each characteristic and by method of geographic breakdown.

Table 4: Targeting Impacts for Awards Done Separately for All Characteristics and by Geography

	Percent of Awards Won by Students with Given Characteristics		
Scholarships Awarded to Top 10% of KCPE Scores from each Gender, Orphan, Secondary status and	Orphans	No Parental Secondary Education	Girls
School	44.7	44.9	48.8
Zone	36.2	33.6	45.7
Division	35.6	32.2	44.1
Overall	35.3	31.9	44.4

	Average KCPE Score for Winners with Given Characteristics			
Top 10% from each Gender, Orphan, Secondary status and	Orphans	No Parental Secondary Education	Girls	Overall
School	289.6	280.3	285.4	298.7
Zone	337.3	330.0	328.7	342.4
Division	343.9	338.7	336.4	348.8
Overall	345.8	339.7	337.1	349.8

Notes: In this table all awards are also done separately for each characteristic (the top 10% of orphans receive awards, the top 10% with no parental secondary education, and the top 10% of girls in each school, each zone, each division, or each district). The percentages indicate, for each geographic method of breaking down the award, the proportion of awards that would be awarded to persons with the characteristic listed at the top. The test scores indicate the average KCPE score for winners with the listed characteristic, again depending on how we geographically distribute the awards. For reference, the population of test-takers is 34.8% orphans, 31.2% have no parental secondary education, and 44.67% are female.

This method of having separate competitions for orphans, those with no parental secondary education, and females definitely accomplishes the goal of giving more awards to these disadvantaged groups. As the sample size increases, the percentages of awards won by these groups should approach their population proportion, but with rounding and small samples, the disadvantaged groups are often overrepresented, the more so the finer the geographic stratification is done. Running the scholarships by school would ensure that as high as 45% of the winners were orphans and 45% of the winners' parents had no secondary schooling, despite these groups making up only 34 and 31 percent of the population, respectively.

Appendix 1 repeats Tables 1, 2, and 4 using the data from both the GSP and the KLPS. The GSP data is similar to that from the KLPS; it is also a tracking survey of students from the Busia district of Western Kenya. More details on the GSP data are below in section 3. In this population, girls make up a much larger percentage of the population because they are 100% of the GSP sample. Using the combined sample, we have 2941 test-takers, of whom 31% are orphans, 32% have parents with no secondary education, and 62% are female. The larger trend of more benefit to disadvantaged groups through more specific geographic distribution remains similarly small, while direct targeting is again far more effective.

Thus we can see that data from both the KLPS and the GSP indicate that running bursary programs separately by school as opposed to district does little to direct more awards to the underprivileged. In most cases only 1 or 2 percent more of the awards go

to the underprivileged, while average winning KCPE scores decrease by as much as 20 points.

3. Primary School Scholarship Program

The next two sections look at the impacts of a specific primary school scholarship program. We examine two types of impact, first, the impact of attending a school where the scholarship competition is offered, and second, the impact of winning one of the scholarships. Although the policy debate in Kenya now focuses on scholarships for secondary schooling, some light can be shed on the subject by analysis of data from a program at the primary level.

In 2001 and 2002, a merit scholarship program for girls was conducted in primary school standard 6 in 127 of the schools in the Busia and Teso districts of Western Kenya. The scholarship provided the cash equivalent of two years' worth of school fees and uniform costs, split between awards to the school in the girls' names and awards directly to the girls' families. Girls participating in the program took the annual mock exam in preparation for taking the KCPE after standard 8. The scholarship was awarded in each of the two years by International Child Support—Africa (ICS) to all standard 6 girls who scored in the top 15% of girls in the program schools in their district. Two hundred scholarships were awarded each year. Half of the 127 schools in the districts were randomly selected to have the scholarship competition, enabling reliable statistical comparison of those eligible for scholarships with those who were ineligible. Boys were not eligible for the scholarship in any school.

Girls attending schools eligible for the scholarship saw significant test score gains, and even girls from program schools with low scores on pre-tests (that were thus unlikely to win the award) saw gains. And despite being completely ineligible, boys showed positive benefits from attending scholarship schools in the short run in the larger of the two program districts. Analysis of the effects of attending program schools in the smaller district was complicated by attrition due in part to a lightning strike at one of the schools. In Busia district, test scores improved by 0.2 to 0.3 standard deviations for girls in schools with the scholarship program (Kremer et al 2005). These effects were significantly larger than those found by Angrist and Lavy in their 2002 analysis of a somewhat similar merit scholarship program in Israel.

We are now interested in examining the medium-run effects of the program, both for girls who simply attended a scholarship school as well as for those who won the scholarship itself. Starting in late 2005, we began attempting to locate and survey all girls that were in standard 6 in 2001 and 2002 from the 68 program and comparison schools in Busia district. This gave us a sample of 3237 girls. As the end of 2006 approaches, we have effectively tracked almost 70% of the sample already and are continuing tracking into 2007, with a goal of 80% effective tracking. The girls that are located are administered a survey containing questions on education, health, and labor market outcomes as well as cognitive tests and information on the family, crime victimization, social capital, and religion, among other things. This survey is similar in many ways to the Kenyan Life Panel Survey (KLPS), which was also recently conducted in two divisions of the Busia district.

4. Effect of Attending a Scholarship Program School

In the short-run, every girl that attended a school where the scholarships were offered saw test-score gains. We are now interested in seeing if benefits from attending a bursary program school exist in the long term. Since ICS randomly selected 68 of the 127 to be given the scholarships, we can use simple techniques from randomized evaluations or experiments to analyze the effect of attending a scholarship school without worry of contamination from unobservable characteristics. For this to be true, the baseline characteristics of the treatment and control groups should be balanced, which is in fact the case. For more information on the sample balance, please refer to Table 1 of Kremer et al (2005).

Preliminary analysis with 1540 observations yields interesting yet mostly inconclusive results. Measures of cognitive ability, highest standard completed, whether or not the girl is still in school, KCPE score, whether or not the girl is idle, self-reported happiness, mental health, suffering a major health shock, having been married, having been pregnant, height, and weight all presently show no statistically significant effect of treatment (that is, attending a school in which the scholarships were offered). Regressing the dependent variable on treatment alone sometimes yields significant results, but this is not robust to controlling for variables that one might expect to be strongly correlated with outcomes (age, scores from tests prior to the scholarship program implementation, mother and father's education).

It should be noted that balanced control and treatment samples should mean that the coefficient on the treatment effect would remain fairly stable when additional controls are added. This is in fact the case if one uses only the observations that have complete

data for all controls, but unfortunately the baseline data is missing test score information for some individuals. Again, please refer to Table 1 of Kremer et al (2005).

As an example, we show below in Table 5 three specifications modeling the effect of attending a program school on highest school standard completed.

Table 5: Impact of Attending Scholarship Primary School (in 2001-2002) on Years of Educational Attainment (in 2005-2006)

	-1 Basic	-2 Controls	-3 Interactions
Scholarship Program School	0.131	0.087	0.068
	[0.101]	[0.070]	[0.066]
Age at time of treatment (demeaned)		-0.264	-0.232
		[0.030]***	[0.047]***
Mean School Test Score 2000		0.36	0.229
		[0.055]***	[0.091]**
Age at treatment * Treatment			-0.069
			[0.060]
Mean School Score * Treatment			0.238
			[0.106]**
Cohort (2001 or 2002) Controls	No	Yes	Yes
Observations 1538	1538	1495	1495
R-squared	0.004	0.247	0.252
Robust standard errors in brackets			
* significant at 10%; ** significant at 5%; *** significant at 1%			

Notes: Heteroskedasticity robust standard errors clustered by program school shown in brackets.

Program treatment appears to have a moderate positive effect on education attained in our specifications—a tenth of a year of schooling—although the coefficient is not significant. When we include interaction terms in the third specification, we also see that the coefficient for mean school test score interacted with treatment is positive and significant, suggesting that students in better schools benefited more from the program than otherwise equal students in schools with lower average test scores. These estimates give suggestive evidence for positive medium-run impacts of the bursary program on later educational attainment. Once the field survey work is completed, it will be possible to estimate these effects with greater precision.

The regression also shows that age at time of treatment is strongly negatively correlated and test scores before the program and mother's education are strongly positively correlated. This is as one might expect since older girls have generally repeated a standard due to poor grades or poor finances and younger girls are generally more on-track in their education and would be expected to attain more schooling. Parents' educations are good socioeconomic status measures, and since schooling poses a significant cost to most families, the wealthier are likely able to attain more schooling.

5. Effect of Winning a Bursary/Scholarship

Another method through which the ICS scholarships could have had an impact is by directly benefiting the winners themselves. First we will briefly examine what types of girls won the awards. Table 6 shows the average of several demographic and socio-economic characteristics of winners compared to non-winners, most of which it could be

argued were entirely pre-determined before the contest, or, failing that, not significantly affected by the program.

Table 6: Average Characteristics for Winner and Non-Winners

	Population	Non-Winners	Winners	H_0: diff=0 t statistic
Age at time of treatment	13.78	13.81	13.48	2.817
Mother's Years of Education	6.77	6.63	8.09	-4.127
Father's Years of Education	9.01	8.88	10.18	-3.443
Latrine Ownership	96.2 %	95.9 %	99.4 %	-2.154
House Has Electricity	6.2 %	5.8 %	10.3 %	-2.222
House Has Iron Roof	56.8 %	55.0 %	72.3 %	-4.129
Ownership of House	92.1 %	92.6 %	87.7 %	2.149
Either Parent Deceased	23.3 %	23.9 %	18.1 %	1.630

As one might have guessed, ICS scholarships went to girls who were better off on average. Their parents were more educated and more likely to still be alive, they were more likely to have electricity and a latrine in the home, and the girls themselves were likely to be a little younger. As indicated by the large t-statistics in the rightmost column, all of the differences are statistically significant. Of the winners, 18% are orphans, compared to 24% of the non-winners. Of the 155 winners surveyed in the data, 30% of their parents have no secondary education, 10% have electricity, 72% live in a home with an iron roof, and 99% live in a home with a latrine.

On average the winners and non-winners differed along several observable characteristics, but we can use regression discontinuity analysis to compare those that barely won the award to those that almost won. The main idea behind this type of analysis is to compare those just below the top 15% scholarship cutoff to those just above the 15% scholarship cutoff. We would argue that since girls did not know where the 15% cutoff would be when they took the test, there should be no endogenous sorting around the winning cutoff. Thus within a small bandwidth around the cutoff, winning was essentially random, and the unobservable characteristics of barely-winners and barely-non-winners should be the same in expected value, enabling easy comparison. By controlling for a girl's score on the competition test linearly, squared, and cubed, all that remains should be due solely to winning the scholarship. For a more detailed explanation of regression discontinuity analysis, see DiNardo and Lee (2004) or Lee (2005).

This analysis yielded more significant results. Table 7 shows the regression discontinuity models for the effect of winning a scholarship. In specifications that control for the score on the scholarship-determining test, the coefficient on winning is significant,

indicating that winning the scholarship by itself led to an extra one-fourth of a year of schooling. One simple explanation for this increase is that households face credit constraints and use the $38 from winning to pay for more schooling. Another is that winners feel more confident in their abilities and are more now optimistic about the returns to additional schooling.

Table 7: Effect of Winning Primary School Scholarship (in 2001-2002) on Years of Educational Attainment (in 2005-2006)

	-1	-2	-3
	Basic	Controls	Interactions
Scholarship Program School	0.032	-0.105	-0.102
	[0.066]	[0.061]*	[0.061]*
Age at time of treatment	-0.236	-0.14	-0.139
	[0.028]***	[0.027]***	[0.027]***
Mean School Test Score 2000	0.173	-0.075	-0.07
	[0.054]***	[0.057]	[0.056]
Won Scholarship	0.847	0.253	-0.109
	[0.098]***	[0.122]**	[0.477]
Competition Test Score (CTS)		0.512	0.496
		[0.059]***	[0.058]***
CTS^2		-0.008	-0.032
		[0.023]	[0.029]
CTS^3		-0.014	-0.019
		[0.010]	[0.014]
CTS*Won Scholarship			0.149
			[0.732]
CTS^2*Won Scholarship			0.215
			[0.381]
CTS^3*Won Scholarship			-0.057
			[0.060]
Observations	1495	1321	1321
R-squared	0.231	0.399	0.401

Notes: Heteroskedasticity robust standard errors clustered by program school shown in brackets. All specification include cohort controls (whether they were in the 2001 or 2002 program) and for those that in control schools that would have won an award had they attended a treatment school.

Table 8 shows the effect of winning a scholarship on later KCPE exams. The third model indicates that winning the scholarship in and of itself led to an increase of over three-quarters of a standard deviation, a very large increase. Perhaps ICS scholarship winners were so motivated by their reward on KCPE-preparation standardized exams that they were far more confident when they took the real KCPE. Further work using the full sample once data collection is complete will help establish the robustness of these results.

Table 8: Effect of Winning a Primary School Scholarship (in 2001-2002) on Normalized KCPE Score (in 2005-2006)

	-1 Basic	-2 Few Controls	-3 Interactions
Scholarship Program School	-0.018	-0.047	-0.05
	[0.091]	[0.081]	[0.081]
Age at time of treatment (normalized)	-0.215	-0.21	-0.209
	[0.041]***	[0.040]***	[0.040]***
Mean School Test Score 2000	0.272	0.095	0.09
	[0.061]***	[0.081]	[0.081]
Won Scholarship	0.716	0.073	0.789
	[0.099]***	[0.096]	[0.311]**
Competition Test Score (CTS)		0.474	0.486
		[0.080]***	[0.086]***
CTS^2		0.032	0.066
		[0.024]	[0.027]**
CTS^3		-0.012	-0.003
		[0.010]	[0.013]
CTS*Won Scholarship			-0.927
			[0.590]
CTS^2*Won Scholarship			0.284
			[0.347]
CTS^3*Won Scholarship			-0.04
			[0.061]
Observations	897	824	824
R-squared	0.246	0.336	0.339

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Heteroskedasticity robust standard errors clustered by program school shown in brackets. All specification include cohort controls (whether they were in the 2001 or 2002 program) and for those that in control schools that would have won an award had they attended a treatment school.

At this point we should emphasize that these findings are preliminary. The regressions used to analyze the data were able to incorporate only 1540 observations of the 1750 we hope to have in the end, and the data from these 1540 observations had not made their way completely through our rigorous data cleaning process. So perhaps with additional data and after more thorough cleaning, standard errors on our estimates will decrease and we can say with more confidence what the medium-run impact of our program was, both for winners and program school attendees.

The sample consists of girls that are presently between the ages of 13 to 23, with most between the ages of 16 to 20. Not a single one of these girls had completed secondary school by the time of the survey.[4] So it could be that differences will appear between the treated and comparison groups eventually, but have yet to do so since the girls have not had time to differentiate themselves significantly in their accomplishments. For example, the average highest standard completed amongst girls not in school is 7.43 while amongst girls still in school it is only 8.15. Over 65% of the sample was still in school at the time of the survey, and it is likely that for some, being out of school is a temporary condition, and once health or finances improve the students will return to school.

It is also possible that sample attrition will affect our estimates. If, after concluding our surveying process, we find that those from treatment schools and those from comparison schools had significantly different rates of attrition, our estimates could be biased as a result. At present, with the 1540 observations that have been incorporated into the data, we have been able to survey 42.51% of the girls from non-scholarship

[4] Indeed, since the scholarship program was implemented in standard 6 in 2001 and 2002, it would be impossible for participants to have finished secondary school by the time of the follow-up survey without skipping a grade, a relatively unusual occurrence in Kenya.

schools, and 50.70% of the girls from scholarship schools. We have also been able to survey 44.93% of the girls that did not win individual scholarships, and 69.51% of the girls that did win scholarships.

Clearly this differential attrition could bias our estimates, and we hope to remedy much of this disparity in the remaining months of tracking. We will likely add at least 200 more observations to our sample, and this is before factoring in deaths and survey refusals, but due to the high mobility of our sample (girls have married and moved away to Nairobi or Uganda and even the USA without leaving any contact information, for example) there will inevitably be some attrition. Our final analysis will likely use a method such as the non-parametric trimming method in Lee (2002) to account for any differential attrition that remains by providing upper and lower bounds around our estimates.

5. Conclusion

Merit scholarships are appealing to many, because, by definition, they go to those who earn them. They may not, however, go to very many underprivileged children, who may have had fewer opportunities to excel, creating an equity concern. If wealthier children were geographically clustered, disadvantaged children could benefit from running bursary competitions separately at each school rather than in the district as a whole. Our research indicates that within the geographic area we examine, dispersing merit scholarships more broadly geographically would not help much to steer awards to underprivileged students, and doing so would greatly reduce the average winning KCPE

score. The increase in equity is not nearly as great as what could be achieved by direct targeting rules.

Also, using preliminary tracking data from the GSP survey, there is some suggestive evidence that a school's participation in a primary school scholarship program leads to moderate gains in educational attainment for all pupils (0.10 to 0.13 years). There is also stronger evidence from a regression discontinuity design that winners do much better than non-winners, including those who barely lost.

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Appendix 1

Overall Population Statistics, GSP and KLPS

	Population Proportion	Average KCPE Score
Orphan	0.308	255.8
No Secondary	0.315	253.4
Female	0.621	255.7

Table 1A: Targeting Impacts for Different Geographic Dispersal of Awards, Using Both KLPS and GSP

Percent of Awards Going To Students with Given Characteristics

Scholarships Awarded to Top 10% of KCPE scores in Each	Orphans	No Parental Secondary Education	Girls
School	28.7	27.3	52.8
Zone	25.3	24.4	51.3
Division	26.9	24.3	49.8
Overall	27.7	23.4	46.4

Average KCPE for Winners with Given Characteristics

Top 10% in Each	Orphans	No Parental Secondary Education	Girls	Overall
School	334.1	328.1	328.3	335.9
Zone	347.1	342.6	340.0	346.6
Division	347.4	245.5	344.0	349.0
Overall	349.9	349.9	349.9	352.7

Percent of Awards Going To Students with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls
School	30.3	28.1	53.0
Zone	30.1	25.7	51.5
Division	30.0	24.6	51.4
Overall	28.4	23.9	51.1

Average KCPE for Winners with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls	Overall
School	321.6	315.4	316.3	322.4
Zone	327.0	325.3	324.7	329.3
Division	328.6	329.2	327.6	331.2
Overall	338.3	338.6	337.1	340.6

Table 2A: Targeting Impacts When Awards Done Separately by Gender, Using Both KLPS and GSP

Percent of Awards Won by Students with Given Characteristics

Scholarships Awarded to Top 10% of KCPE Scores in Each	Orphans	No Parental Secondary Education	Girls
School and Gender	29.4	26.8	62.8
Zone and Gender	27.9	24.7	62.2
Division and Gender	26.3	23.7	62.2
Gender	26.4	24.0	66.8

Average KCPE for Winners with Given Characteristics

Top 10% in Each	Orphans	No Parental Secondary Education	Girls	Overall
School and Gender	327.9	322.3	320.3	329.4
Zone and Gender	342.2	339.4	335.2	343.9
Division and Gender	346.4	344.7	339.2	347.6
Gender	344.1	342.6	337.2	345.4

Percent of Awards Won by Students with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls
School and Gender	28.8	27.0	62.6
Zone and Gender	27.4	26.1	62.4
Division and Gender	28.3	24.8	62.1
Gender	26.8	23.6	67.2

Average KCPE for Winners with Given Characteristics

Top 20% in Each	Orphans	No Parental Secondary Education	Girls	Overall
School and Gender	318.2	313.0	309.2	318.0
Zone and Gender	327.7	323.3	319.0	327.5
Division and Gender	328.5	327.6	321.9	329.8
Gender	333.5	332.6	326.2	334.5

Table 4A: Targeting Impacts for Awards Done Separately by Targeted Characteristics and by Geography, Using Both KLPS and GSP

Percent of Awards Going To Students with Given Characteristics

Scholarships Awarded to Top 10% of KCPE Scores from Each Gender, Orphan, Secondary Status and	Orphans	No Parental Secondary Education	Girls
School	42.5	44.8	64.8
Zone	33.7	34.6	64.3
Division	31.6	32.6	61.9
Overall	31.0	31.7	61.7

Average KCPE Score for Winners with Given Characteristics

Top 10% from Each Gender, Orphan, Secondary Status and	Orphans	No Parental Secondary Education	Girls	Overall
School	285.5	279.5	288.1	296.3
Zone	329.4	324.7	327.0	336.6
Division	341.5	336.5	338.0	345.8
Overall	344.7	340.2	341.3	348.4