The Effects of Universal Fee-Free Secondary Education Program on Students' Access, Composition, and Achievement: Evidence from Uganda

Kazuya Masuda
Hitotsubashi University

Chikako Yamauchi
National Graduate Institute for Policy Studies

October, 2016

Abstract

Expanding access to secondary education is a key for economic development in Africa. This paper evaluates the effects of the universal fee-free secondary schooling program in Uganda on the access, composition and achievement of the students. Across cohort discontinuity in exposure to the program and cross-district variation in the effective benefit intensity based on the pre-program secondary school dropout rates allow us to identify the policy effects. Our results suggest that the program increased the number of the students taking the secondary school exit exam by 16% and raised their test score, in math and English, by 0.05-0.2 standard deviation in the median intensity district. Such learning gain was evident in government-partner low cost private schools, which usually found in rural area. We also find that the program increased the private school entry and the number of students who completed fee-charging private school. Our findings suggest that the cost of schooling remains the major constraint on the post-primary education, and the universal fee-free secondary education program improves the access to secondary school with little negative effects on student's learning performance.

JEL Classification Codes: J13; J12; D10; O10

Keywords: Post-primary education, Uganda, Access, Learning Achievement, Fee-free schooling program, Africa

1. Introduction

Improving access to secondary education is the key for economic development and poverty eradication in Africa. 1990s and 2000s in this region saw rapid improvement in primary school enrolment rates, increasing from 59 % in 1999 to 79% in 2012 (UNESCO, 2015). Gross enrolment rates in secondary education, however, remains low at 42.8% in 2013. (World Bank, 2016) Literature often attributes the limited access to basic education in developing country to its high user cost; the high tuition fees, transportation fees, and high opportunity cost. Yet, only several countries in this region-South Africa, Ghana, the Gambia, Uganda, Kenya, and Tanzania-nationally have abolished the tuition fees in secondary school.

Uganda started to offer fee-free secondary schooling in public schools and its partnering private schools for boys and girls in grade 8-11 since 2007. In this paper, I use this program - free secondary education policy- to assess its effects on the access and achievement of students in 11th grades; the final grade of lower secondary education. One feature of secondary education market in Uganda and two features of this program motivate us to rigorously evaluate its effects. Firstly, this policy targeted only the lower secondary school entrants in 2007 and onward, offering across-cohort discontinuity in exposure to fee-free secondary schooling. This allow us to use the entrants in 2006 and before as control cohorts. Secondary, the pre-program dropout rates in lower secondary school have large across-district variation in Uganda. These students -those entered the first grade of secondary school but fail to complete the final grade in the absence of the program- are most likely to complete lower secondary education thanks to fee-free secondary schooling. We define the program intensity as marginal in the districts with no pre-program dropouts; highest in the districts where all the first grade entrants drop out before completing the final grade. This regional variation allows us to compare the across-cohort change in learning outcome in high intensity districts with low intensity districts. Lastly, this policy was the first *universal* tuition waiver program in Africa. To the knowledge of the authors, this is the first study to assess the effects of the large-scale and universal tuition abolishment program at secondary education in Africa.[1]

Our results suggest that this policy successfully promoted the large number of students to complete lower secondary education. In median intensity district, the number of students taking secondary school exit exam increased by 16% compared with the pre-

[1] Blimpo et al. (2015) evaluated the effects of large scale female scholarship program at secondary education in the Gambia. Garlick (2013) assessed the impacts of tuition waiver program targeted to "poor" secondary school in South Africa.

program level. We also find that universal tuition waiver program increased the share of female among the secondary school graduates, reducing the gender enrolment gap in post-primary education. Their performance in secondary school exit exam rose by 0.05 standard deviation in Math and 0.2 standard deviation in English, although imprecisely estimated. These findings suggest that the universal fee-free secondary education program expanded the access with little negative effects on achievement of students.

Our results are consistent with the existing studies that suggest that reducing the cost of attending secondary education is effective to expand the access to secondary school. Most of such studies focus on the program explicitly targeting girls and aiming at closing gender gap. Gajigo (2016) evaluated the large-scale female scholarship program for secondary schooling in the Gambia, increasing female enrolment by 5 percent point. Also, in India, the bicycle provision program that reduced the girls' traveling cost to the secondary school increased the girls' enrolment by 30% and reduced the gender enrolment gap by 40%(Muralidharan & Prakash, 2013). These findings suggest that the financial constraint remains important barriers to the access to secondary education at least among girls. The studies that focus on the leaning outcome are, however, limited. To our knowledge, only Blimpo et al. (2015) examined the effects of Gambian female scholarship program on the academic achievement of secondary school students. They found that the program increased both enrolment and test score in math and English, suggesting that expansion of the access need not impede learning gains among girls. However, these program target girls exclusively, and no one studied the effects of the program on boys.

We contribute to the literature by being the first study to evaluate the effects of the *universal* fee-free secondary education program on the access and achievement of students in Africa. This program was implemented through Public Private Partnership (PPP) and the government developed the partnership with low-cost private school in rural area to offer free-secondary education. This unique feature of the program allows us to contribute to the broader and emerging literature on expanding school choice and private provision of education service (Hoxby, 2007; Patrinos, Osorio, & Guáqueta, 2009). Several studies have found that PPP program have been effective to increase enrolment in Tanzania, Colombia, and Pakistan(Alderman, Kim, & Orazem, 2003; Barrera-Osorio & Raju, 2011; Felipe Barrera-Osorio, Pierre de Galbert, 2015; Patrinos et al., 2009) Of these, however, only Barrera-Ossorio et al. (2015) address the effects on the test score. They evaluate the same PPP program in Uganda, finding that the developing the partnership with government increase the enrolment and test score in low-cost private school. They also found positive selection of government aided-students; the program

changed the student composition and students with strong academic background enrolled in PPP schools. They did not, however, evaluate its effects on the entire education market.

The rest of the paper consists as follows. Section 2 explains the secondary education system in Uganda and the free secondary education program. Section 3 discusses the data and identification strategy employed in this study, Section 4 shows the results, and Section 5 concludes and provides policy implications.

2. Secondary Education system and Free Secondary Education policy in Uganda

2.1. Secondary education in Uganda

Uganda employs four years of lower secondary education preceded by seven years of primary education. In 2006, about 64 per cent (404,935) of children completed primary education, whereas only 37 per cent (166,372) completed lower secondary education[2]. This statistics suggest that improving the student's access to secondary education is the next goal for the government.

The size of private sectors in secondary education is substantial compared with that in primary education. Total private enrolment accounted for about 57 per cent in 2000, whereas it is only 23 per cent in primary education (Liang, 2002). Among three types of secondary school by ownership, i.e. government, private, and community, the distinction between private and community is unclear because neither received any government subsidy. Hence, this paper describe both private and community secondary school as "private".

Before Universal Secondary Education policy was introduced in 2007, public secondary school received the government subsidies in two forms; teacher salary and capitation grant. The level of per capita grant was set by Ministry of Education and Sports, and, it was USh 65 per students per day in 2002 (Liang, 2002)[3]. Per student government subsidy in secondary education was US$148, and much higher than that in primary education (US$22), suggesting that financing secondary education is more costly for the government.

Family bore almost a half of secondary school income in the form of PTA levy, tuitions fee, boarding fee, and other expenses. According to Liang's calculation, average private cost of having a household member in secondary school was about USh240,000

[2] Author's calculation using population aged between 20 and 25 from Uganda National Household Survey (UNHS) 2006.

[3] Given a secondary school operate 9 months annually (270 days), this amount is about USh 17,550 per student per year.

per year. Given, in 2000, 47 per cent of Ugandan households earned less than USh620,500 annually, this private cost accounted for over 40 per cent of it.

2.2. Uganda Certificate of Education exam

In order for students to complete lower secondary (Ordinary level (O'level)) education and study at higher secondary (Advanced level (A'level)) education, students must take Uganda Certificate of Education (UCE) exam after the completion of 11th grade.

Candidates enrolled in 11th grade must be registered for UCE exam by the head teacher of the school which they attend. Uganda National Examination Board (UNEB) also allows students to take UCE exam at public center only under the special case, such as the school lacks the capacity to manage UCE exam, whereas almost 100 per cent of the candidates sit in the examination at the school where they attend.

Candidate must take at least eight, but not more than ten, subjects. In year of 2006 and after, these subjects must include five compulsory subjects; English, Mathematics, Biology, Chemistry, and Physics. Depending on the student's performance, UNEB grades each students at each single subject using the scale from 1 to 9[4], where grade 1 indicates the “pass with distinction”. Classification of successful candidates is done based on the aggregate grades of the best eight subjects. For example, the best performing cohort, division I, includes the candidates with the aggregate of 32 or less.

This study uses school/district level data on number of UCE exam taker to measure the number of secondary school graduates, and its average test score to measure their academic achievement.

2.3 Universal Secondary Education policy

Aiming at improving student's access to secondary education, Ugandan government announced the introduction of USE policy in 2005, and started in February, 2007[5]. This policy allows eligible students to attend government USE secondary school without paying school fee and Parent Teacher Association (PTA) fee. Although most government schools were listed as USE school from the beginning, some schools stayed out of the program during the initial stage. For example, in 2007, only 791 out of 845 government aided schools benefited from the first phase of the program, but the number of USE government secondary school increased eventually to 1,024 in 2012 (Barungi, 2014).

The benefit of USE policy only applies to the students who sit in PLE in the year

[4] The grading of each subject with 100 full mark is as follows. 90-100=1; 80-89=2; 70-79=3; 65-69=4; 60-64=5; 50-59=6; 45-49=7; 35-44=8; and 0-34=9

[5] In January 2006, education minister clarified that USE policy starts in February 2007 for the first time. (New vision, 2006)

of 2006 or after, and students must perform better than aggregate score of 28[6] . According to Uganda National Examination Board, about 70-80 per cent of PLE takers in 2006 were eligible to study at secondary school without paying tuition.

Government subsidies to USE public secondary school mainly takes the form of teacher salary, capitation grant and infrastructure subsidy. Government secondary schools receive USh 41,000 per students per term to cover tuition fees (Daily Monitor, 2013).

Before USE policy starts, parents of students paid about USh 126,000 (approximately US$38 based on the exchange rate of USh3344=US$1) per year per student, to secondary school[7]. This payment was the one of the major constraints on student's access to the lower secondary education in Uganda[8]. Introduction of USE policy is expected to break this barrier, and MoES shows that total enrolment in lower secondary education improved from 814,087 in 2006 to 1,362,739 in 2013.

In addition, one of the most key features of this policy was that it was implemented through Public Private Partnership (PPP). Under this scheme, an owner of private secondary school can have partnership with government and allow eligible students to study in lower secondary education[9]. According to Barungi (2014), 90 per cent of PPP private schools chose to apply for PPP, but a few schools were approached by the MoES to be USE private school. Most PPP private secondary school mentioned that they applied for the program in order to have access to governmental funding and material support.

Requirements for private school to participate USE policy are as follows (Barungi et al., 2014).

1. Schools must charge less than USh 75,000 per term per students
2. Schools must have or establish Board of Governors to manage the

---

[6] PLE candidates must take four core subjects; i.e. English, Mathematics, Integrated Science, and Social Studies and Religious Education. Each subject is graded in the scale between 1 and 9, where grade 1 stands for “Pass with distinction”. Classification of successful candidate is done by aggregate score of four core subjects. Best performing cohort, division I, are students whose aggregate score is 12 or lower. Division II includes those with aggregate score of 24 or lower. Division III and IV do not have minimum aggregates, but require students to score at least pass with 8 in three subjects. All candidates in division I, II, II, and IV pass PLE.

[7] Author’s calculation using UNHS 2006. School fee in private school is higher than that in government school. The former charges USh 156,100, and the latter charges 103,100 on average.

[8] According to UNHS2006, 76 per cent of children who drop out after completing P7 attribute the reason for stopping schooling to the high cost of attending O'level education.

[9] MoES instituted that schools charging less than UGX 75,000 per term per student are eligible to participate in the USE programme.

implementation of USE program.

As a results, not only government school[10], but also about a third of private schools are implementing USE policy in Uganda.

On contrary to the free primary education policy, only single study done by Asankha and Yamano (2011) has ever assessed the effects of free secondary education policy. They used repeated cross section data collected in 2005 and 2009 to study whether the probability of secondary school enrolment increased after the USE policy was introduced, finding that USE policy increased the public secondary school enrolments especially for girls from poor households. However, their study relies on the strong assumption that there was no change which affected the child's secondary enrolment other than USE policy occurred at the same timing, potentially failed to isolate the policy effects from other time trend.

This study fills in this gap in the literature by employing quasi-experimental design to examine whether USE policy increased the number of secondary school graduates, and affected their academic achievement.

3. Data and Identification

3.1 Data

In this study, I assess the effects of free secondary education policy relying on three unique data sets.

1. Uganda Certificate of Education

Firstly, I evaluate whether the introduction of USE policy increased the number of secondary school graduates, and/or changed the students' learning achievement using district level data of Uganda Certificate of Education (UCE) exam from the year of 2006 to 2012. This data provides the number of students who took UCE exam, and their average test score in its five core subjects, English, Mathematics, Biology, Chemistry, and Physics. As UNEB registers all the candidate students for UCE exam every year, this data sets gives the most reliable measure of the number of students completed lower secondary education. Also, rich data on the test score allows me to assess whether introduction of USE policy affects student's learning performance.

Figure 1 describes the change in the number of students who took UCE exam between 2006 and 2012. The first USE treated cohort took PLE in 2006, and entered the first grade of secondary school, i.e. 8th grade, in 2007. Hence, they reached 9th grade in 2008, 10th grade in 2009, 11th grade in 2011, and took UCE exam in the same year. On contrary,

[10] About 24 % of government schools are also NON-USE school.

UCE test takers in 2009 and before took PLE in 2005 and before when USE policy had not started yet, and thus they are untreated[11]. As can be seen in the figure, the number of

Table 1-Summary Statistics

Variable	pre-USE (2006-2009)	post-USE (2010-2012)	change
Number of test takers per year	189,677	260,375	70,698
USE participating government schools	54,260	84,799	30,539
Non participating government schools	15,743	15,829	86
USE participating private schools	32,453	52,904	20,451
Non participating private schools	87,221	106,843	19,622
Number of secondary schools	2,115	2,655	540
USE participating government schools	651	761	110
Non participating government schools	100	100	0
USE participating private schools	416	593	177
Non participating private schools	948	1,201	253
Standardized score at UCE exam	0.0000	0.0000	0.0000
USE participating government schools	-0.0004	-0.0004	0.0001
Non participating government schools	0.0046	0.0048	0.0003
USE participating private schools	-0.0012	-0.0009	0.0004
Non participating private schools	-0.0001	0.0000	0.0001

Note: Author's calculation from Uganda Certificate of Education data and Annual School Census data. Values are calculated as annual average over pre and post USE policy period.

taker increased dramatically in 2010 compared to 2009, suggesting the significant USE policy effects on students' access.

Although UCE exam data provides rich information of learning outcomes to assess the effects of USE policy, this policy should affect students' learning outcome through the change in their learning environment, such as the number of teacher available per student. In order to recognize such characteristics at the each school in certain year, I use Annual School Census (ASC).

2. Annual School Census

[11] Some may think that the cohorts who entered secondary education in 2006, and took UCE in 2009 are also partially affected by USE policy because the government of Uganda announced the implementation of USE policy in the middle of 2005. For example, forward looking agents, such as parents, who anticipated the start of USE policy might take this future policy change into account. In this case, the number of UCE takers in 2009 rose, and thus my estimate of the policy effects would be underestimated, providing the lower bound of true size of policy effects.
In other case, readers may concerns that some students who took PLE in 2006 might delay the entry to secondary education by one year. However, the government announced the timing of UCE policy introduction in January, 2006 when the admission decision had been already made. Hence, changing their decision to delay their entry may be too costly. Indeed, as long as Figure 1 shows, the number of student who delayed entry is, if any, likely to be small.

ASC, conducted by Uganda Ministry of Education and Sports (MoES), contains the detailed data on the number of teacher and their qualification, classroom, adequate sitting space, and administrative school information at each school. Although having such information since 2001 is ideal, MoES has performed ASC only since 2006. Thus, I merged UCE data with ASC data between the year of 2006 and 2012. Another important feature of ASC is that response rate from government school is almost 100 per cent as answering ASC is the part of the condition when USE schools receive capitation grant from the government. However, unfortunately, that from private school is about 60 per cent according to MoES. In order to avoid the issue derived from the non-random selection into answering ASC among private schools, I mainly focus on the government[12] secondary school when assessing the effects of USE policy on school characteristics. However, I shows the results from the same analysis using private school data so as to provide suggestive evidence. Table 1 provides the summary statistics using UCE and ASC data.

3. Uganda Housing and Population Census

   In addition, Uganda Housing and Population Census (UHPC) 2002 allows me to measure the regional variation in the effective benefit from USE policy based on the number of dropouts after completing 7th grade at each districts. UHPC is nationally representative cross section data, and calculation and measurement of this program intensity will be discussed in the following section.

3.2. Identification

In order to isolate the effects of USE policy from other unrelated time trend, and to assess whether the introduction of USE policy allows more students to complete lower secondary education, this study employs difference in differences (DID) approach by exploiting two variations in the effective benefit from such policy. The first difference used in this strategy is the varying level of exposure to USE policy by test taking cohort in each year. During the survey period between 2006 and 2012, 11th grade students who took UCE exam in the year of 2010 and after are treated as discussed in preceding section.

The second variation is the district level program intensity, Intensity_{dt}, derived from the number of dropouts after primary education in UHPC 2002. Equation (1) is the model to be estimated, and Intensity_{dt} is time variant intensity measure, and has the regional variation. It takes the value of 0 between the year of 2006 and 2009 because 11th grade students in these years were untreated by USE policy, and takes the potential

[12] Among government school which administered UCE exam, 93% are USE school, whereas, among private school, 30% are.

proportional increase in 11th grade graduates for the year 2010, 2011, and 2012. That is, Intensity_{dt} is defined as follows.

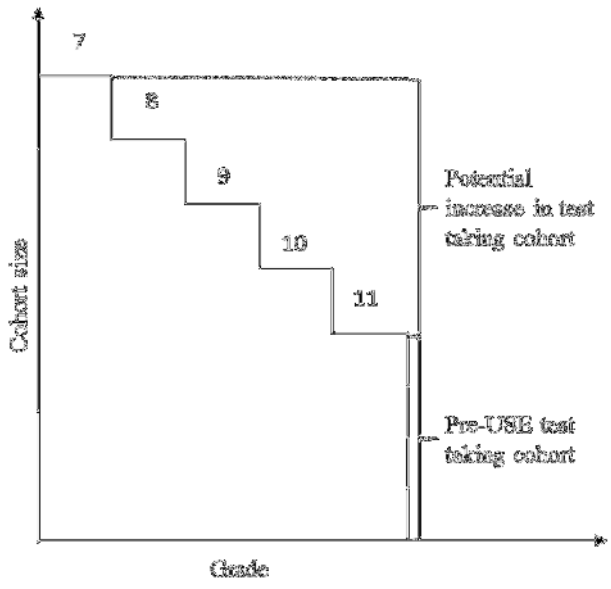
$$\text{Intensity}_{dt} \begin{cases} =0 \text{ for t=2006, 2007, 2008, and 2009} \\ =(N7_d - N11_d)/ N11_d \text{ for t=2010, 2011, and 2012} \end{cases}$$

$N7_d$: Number of individuals interviewed in 2002 UHPC and completed 7th grade in district d

$N11_d$: Number of individuals interviewed in 2002 UHPC and completed 11th grade in district d

For numerator, by taking differences between the number of population who completed 7th grade and those completed 11th grade at each district, I calculate the number of population who entered lower secondary education, but dropped out before completing 11th grade at each districts, and I regards these dropouts are the main beneficially from free secondary education, and become able to complete 11th grade thanks to free secondary education policy. One caveat of using this measure as intensity is that the bigger districts with larger population potentially have the large number of dropouts, and thus intensity. To standardize this measure by district size, I divide it by the number of 11th grade graduates at the same district in 2002 UPHC. (see Figure 2).

Figure1-Calculation of intensity measure



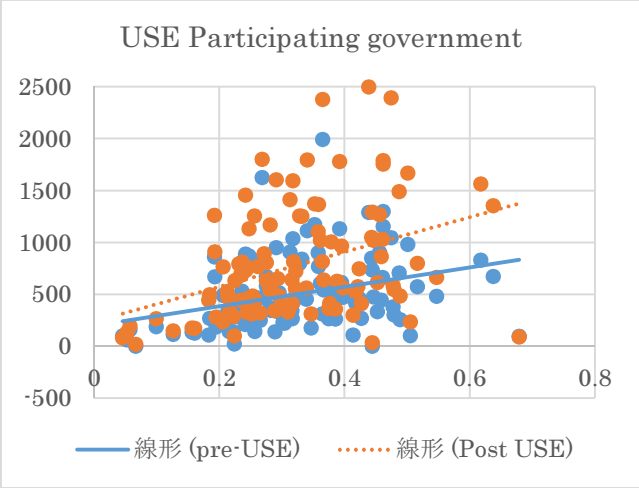
Intuitively, this innovative policy would promote more students to complete lower secondary education in the districts where many students complete primary school but drop out before completing 11th grades. On the other hand, such policy has little

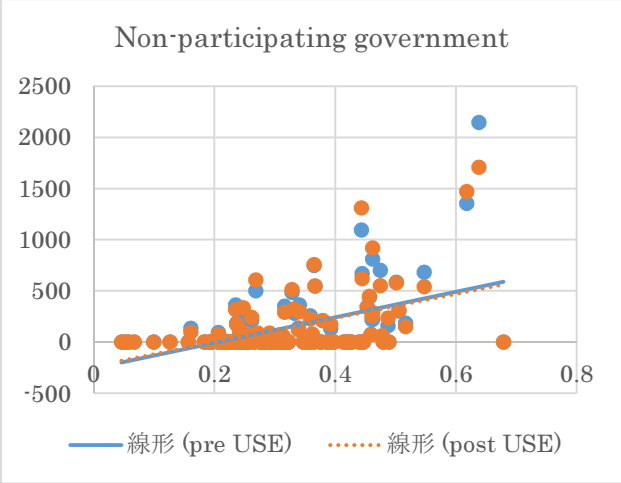
effects in the districts where no one goes to secondary school without USE policy because major barrier still exists even at the access to primary education. Also, effects is likely to be small where most of primary school graduates also complete secondary school even without fee abolishment. Appendix Table A-1 describes the calculation of these intensity measure in the district with median intensity; Iganga.

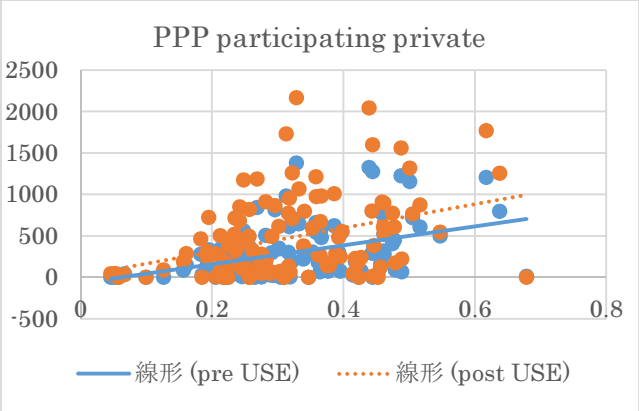
Ideally, I would like to use the data in 2006 to measure the number of dropouts just before USE policy started, but as the closest approximation, I rely on Housing and Population Census in 2002 to calculate this intensity measure. Hence, this strategy assumes that this relative variation in the cohort size of 7th grade graduates and 11th grade graduates across districts remains same over the 5 years between 2002 and 2007[13]. Figure 3 shows the positive correlation between the district intensity measure and change in the number of UCE test taker between 2006 and 2010.

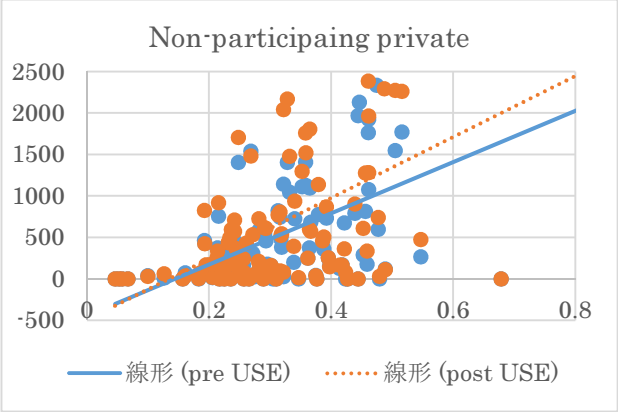
Figure 2-Positive correlation between intensity and the change in the number of secondary school exit exam taker

[13] UNHS 2006 with much smaller number of observation verify that the region variation in intensity measure across district did not change significantly from 2003 to 2006.









Note: Authors' calculation from UCE data

Using this intensity measure, I estimate the following equation (1).

$$Y_{dt} = \beta_0 + \beta_1 \text{Intensity}_{dt} + \beta_2 X_{dt} + \lambda_d + \lambda_t + \epsilon_{dt} \quad ---(1)$$

Y_{dt} is the outcomes in district d, in year of t. This set includes the number of students who took UCE exam, and average test score of secondary school exit exam.

X_{dt} is time variant district characteristics, including age-district cohort size[14].

λ_d is district fixed effects, λ_t is year fixed effects, and error term ϵ_{cdt} is clustered at district level as Bertrand et al. (2004) suggests. Figure 2 shows positive correlation between intensity and the change in the number of secondary school exit exam taker. I also further examine the heterogenous impacts of USE policy by disaggregating observations into USE participating government, non-participating government, PPP

[14] This variable is calculated using census 2002. By assuming relative cohort size across district remains over 7 years, we calculated number of age 10 children at each district to proxy the cohort size aged 17 (school entry age 6+11 year) in 2010. In the same manner, we calculated age-district cohort size for test taker in the other test years.

participating private and non-participating private secondary schools.

This intensity measure is likely to be valid for the analysis when the policy effects only observed in 2010 and after. Hence, I use this intensity when examine the effects of free secondary education policy on the test taking cohort size, and its academic achievement. However, USE policy affects some outcomes, such as the number of secondary school enrolment, the number of public and private school, and quality of learning environment, soon after its introduction in 2007. When assessing the effects on such outcomes, I use the variant of abovementioned intensity measure to assess the policy effects on these outcomes. For example, when assessing whether the introduction of USE policy increases the total enrolment in lower secondary school over 8th-11th grade, I use $\text{CumulativeIintensity}_{dt}$, which is defined as follow.

$$\text{CumulativeIintensity}_{dt}\begin{cases} = 0 \text{ for t=2006} \\ = (N7_d - N8_d)\,/(\,N8_d + N9_d + N10_d + N11_d) \text{ for t=2007} \\ = [(N7_d - N8_d) + (N7_d - N9_d)]\,/(\,N8_d + N9_d + N10_d + N11_d) \text{ for t=2008} \\ = [(\,N7_d - N8_d\,) + (\,N7_d - N9_d\,) + (\,N7 - N10_d\,)]\,/(\,N8_d + N9_d + N10_d + N11_d) \text{ for t=2009} \\ = [(N7_d - N8_d) + (N7_d - N9_d) + (N7_d - N10_d)] + (N7_d - N11_d)]\,/(\,N8_d + N9_d + N10_d + N11_d) \text{ for t=2010, 2011, and 2012} \end{cases}$$

$N8_d$: Number of individuals interviewed in 2002 UHPC and completed 8th grade in district d

$N9_d$: Number of individuals interviewed in 2002 UHPC and completed 9th grade in district d

$N10_d$: Number of individuals interviewed in 2002 UHPC and completed 10th grade in district d

$\text{CumulativeIintensity}_{dt}$ takes the same value as previous analysis in 2006. On contrary, in 2007, $\text{CumulativeIntensity}_{dt}$ takes the potential proportional increase in 8th grade compared to pre-program total enrolment. In other words, its numerator is potential absolute increase in 8th grade cohort, but then divided by the sum of pre-USE cohort size in 8th, 9th, 10th, and 11th grades[15]. In 2008, its numerator is the sum of 8th grade potential increase and 9th grade potential increase, holding denominator as pre-program total enrolment size. Then, we employ the same strategy to calculate the district

[15] Intensity=[(potential increase in 8th grade)+(potential increase in 9th grade)]/[(pre-USE 8th grade cohort size)+(pre-USE 9th grade cohort size)]

level cumulative intensity in 2009, 2010 and after. Appendix describes the calculation of these intensity measure in the district with median intensity; Iganda.

Lastly, this paper also examines the change in the number of students who took UCE exam at school level by estimating the variant of equation (1) as follows.

$$Y_{icdt} = \gamma_0 + \gamma_1 \text{Intensity}_{dt} + \gamma_2 X_{dt} + \eta_i + \lambda_c + \lambda_d + \lambda_t + \mu_{icdt} - - - (5)$$

where Y_{isdt} is the outcome of school i, in type c, in district d, in year of t, and η_i is school fixed effects. γ_1 indicates the change in the test taking cohort size at each school. If it has positive sign, it suggests that one school registered more 11th grade students than pre-program level. In summary, I use these regional variations in the effective benefit from and across cohort variation in exposure to USE policy to examine its effects on students' access, private school supply, learning environment, and achievement. The results will be discussed in the following section.

Table 2 shows the estimates from OLS regression which regresses intensity measure on district level characteristics using the data from UHPC 2002. The results suggest that high intensity districts is likely to have population with high educational attainment and more valuable assets. In the following sections, this paper shows whether USE policy improve students' access to secondary school and harm academic achievement more in such districts.

Table2-The characteristics of high intensity district

Outcome	Intensity
Adult population (20 years old and older)	-0.000
	(0.000)
Child population (19 years old and younger)	0.000
	(0.000)
Average educational attainment in year	0.091***
	(0.010)
Unemployment rates among the population aged 20-29	0.417*
	(0.244)
Share of household which owns radio	0.015
	(0.055)
Share of household which resides in Urban area	-0.045
	(0.066)
Share of household which has access to electricity	0.086
	(0.304)
Obsevation	109
R-sq	0.758

Notes: Author's calculation using Uganda Housing and Population Census in 2002. Standard errors in parentheses. * p<0.1 ** p<0.05 *** p<0.01

4. Results

The objective of this section is sixfold. First, section 4.1. studies whether free secondary education increased the number of secondary school graduates. Secondary, I examine the change in the students' characteristics in secondary education, in section 4.2. Third, section 4.3. will test if USE policy increased the number of school in a market. Forth, its effects on school quality, in terms of physical and human resource available per student, is examined. Fifth, the change in the average test score of 11^{th} grade students is discussed in section 4.5. Lastly, these estimates will be submitted to robustness check in section 4.6.

4.1 Effects on Students' Access

This section examines whether free secondary education policy increased the number of students who took UCE exam. Simple supply-demand analysis predicts that the fall in the price of education in participating secondary schools fuel the demand for secondary education. Hence, USE policy is likely to increase the number of secondary school graduates.

Indeed, Table 3 shows significant positive effects of the program on the number of students taking secondary school exit exam. Using the value of intensity measure in median districts, 0.328, the results in column 1 suggest that, in Iganga, the number of test-taker increases by 783 students in 2010, compared to the level in 2009 and before. The size of increase is as large as about 16 per cent relative to the number of 11th grade graduates in 2009. This analysis suggests that the financial constraint remains the important barrier to the access to secondary education, and fee-free secondary education program is effective to make secondary school accessible.

In order to examine whether the effects differ across school type, column 2-5 disaggregate secondary schools into USE participating government schools, non-USE participating government schools, PPP participating private schools, and non-participating private schools. The results show the effects are heterogeneous. Of 783 total increase in the number of secondary school graduates, 248 (=757*0.328) are from USE participating government secondary school, 104 (=319*0.328) are from PPP participating private school where school fee was abolished by the program. The rest of 450 (=1373*0.328), however, are from non-participating private secondary school. This result suggests that free secondary education is effective to make secondary school accessible in program participating secondary schools, and furthermore, in non-participating private schools. Interpretation of the results on participating secondary schools is straightforward; the number of graduates increased where the program made schooling financially accessible. However, the reason for the change in non-participating private school is tricky.

Table3-Student's access to secondary school, change in the number of graduates

Outcome: Number of secondary school exit exam takers per district	All types of secondary school	USE participating Government	Non participating Government	PPP participating Private	Non participatng Private
	(1)	(2)	(3)	(4)	(5)
Intensity	2387.78***	756.916***	-61.232	318.604**	1373.489**
	(791.37)	(198.234)	(89.413)	(129.906)	(604.530)
Observation	763	763	763	763	763
R-sq	0.516	0.566	0.027	0.432	0.213

Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for district fixed effect, year fixed effect, and district-year cohort size of population in 2003. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

The change in the number of UCE takers in non-participating private secondary schools might occur for two reasons. First, the increase in the demand for secondary education in participating secondary schools might excess the supply because the supply of secondary schools, and other physical and human resource is limited. Then, low cost non-participating private secondary schools may satisfy their demand. Secondary, as shown later in section 4.4., the school quality in participating secondary schools might suffer as such schools became more accessible than pre-program level. This change in the class size and students composition might promote middle class students to fly from participating secondary schools to non-participating private secondary schools. These interpretation will be further discussed with the evidence in the following sections.

Table 4 discusses the heterogenous effects by student's characteristics. Once this total increase in the number of secondary school graduates is disaggregated by students' gender, free secondary education policy was likely to benefit more female than male students (row 1 and 2). In other words, the results suggest that fall in secondary education price is likely to fill the gender gap in the access to secondary education even if the program did not target girls explicitly. This finding is in line with the empirical evidence from early study in Uganda (Ashanka and Yamano, 2011). Among four types of secondary schools, the gender composition among the peer changed more in PPP participating private schools, which may affects their learning achievement.

Table 4-Heterogeneous effects by gender, and change in student composition

The effects of free secondary education	USE participating government	Non participating government	PPP participating private	Non participating private
Outcome	(1)	(2)	(3)	(4)
Male test taker	348.045***	-47.292	99.082	608.823**
	(107.685)	(51.985)	(64.632)	(287.848)
Female test taker	409.063***	-13.707	219.674***	768.085**
	(93.444)	(39.446)	(69.286)	(319.198)
Observation	763	763	763	763

Note: Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for district fixed effect, year fixed effect, and district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

In summary, this section finds that the program increased the number of 11th grade graduates in USE participating secondary school and profit seeking non-USE participating private school. Among the students, the universal fee-free secondary schooling program benefited female more than male even without targeting girls explicitly.

4.2 Effects on School Supply

In section 4.1, we have seen that free secondary education program increased the secondary school graduates not only in participating secondary schools but also fee-charging private schools. One possible explanation for this is that the new private school entered the market to satisfy the excess demand for secondary education created by the program. In order to reveal the picture behind this unexpected change in education market, this section examines the change in the number of secondary school in the market by school type.

Table 6 shows the change in the number of schools by type since free secondary education policy started in Uganda. First of all, the total number of secondary school increased in the districts in high intensity districts where free secondary education program enabled more students to graduate from secondary school (column 1). With the value of cumulative intensity in Iganga, this increase started in the year of 2007, when the program was implemented, and by the year of 2012, about 8.2 (=43*0.191) secondary schools enter the market in the district with median intensity. The number of government secondary school, however, stays at pre-program level over the years (column 2). On the other hand, the number of the private school rose rapidly in the district with high program intensity. Furthermore, once we disaggregate private schools into PPP participating private school and non-PPP participating private school, again most increase is explained by non-PPP participating private school entry (column 4 and 5). This finding is consistent with the results in Table 3.

Table6-School supply

Outcome: Number of secondary school per district	Total number of secondary school	Government	Private	PPP participating private	Non-participating private
	(1)	(2)	(3)	(4)	(5)
Cumulative intensity	42.575**	2.668	39.907**	5.462**	34.444**
	(17.958)	(2.038)	(16.758)	(2.568)	(15.464)
N	763	763	763	763	763
R-sq	0.412	0.374	0.348	0.412	0.242

Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for district fixed effect, year fixed effect, and district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

The possible explanation for this private school entry is that the program made USE participating secondary school more attractive in spite of limited supply of available seats, and thus created the excess demand for new space for secondary schooling. Profit seeking private secondary school, thus, entered the market to satisfy such demand. In summary, the program was likely to indirectly promote private school to enter the market (Table 4) and more students graduated from fee-charging private school (Table 3) in high intensity districts.

Private sector sometimes plays important role in expanding the access to school in developing countries. One of such typical examples comprises the large voucher program introduced in Chile in 1980. This government program provided the voucher to any children, and voucher allows them to attend either public or private school. Under this scheme, both types of school received equal government subsidy per student enrolled in its school. This innovative program increased the entrants into the market place, and as a results private school attendance increased from 15% in 1980 to 42% in 2005 (Hsieh and Urquiola, 2006). I interpret the rapid expansion of private secondary school market in Uganda is in line with Chilean experience, and discuss the effects of such change on overall education outcome in later section.

4.3 Effects on Students' Achievement

This section uses the “average test score” of secondary school exit exam to discuss whether the free secondary education program deteriorated the students' learning achievement. The program may reduce the “average” test score for two reasons.

-Class size effects: Physical and human resource available per students may decrease if free secondary education policy increase the number of enrolment without increasing school resources at the same time. Class size effects is likely to place downward pressure on the average test score, and according to the finding from the preceding sections, such

effects may occur in participating secondary schools and non-participating private secondary schools.

-Composition effects: The composition of students who took secondary school exit exam may change after USE policy started. If the program makes secondary school accessible for the students from less wealthy household and their ability is positively correlated with the wealth of household, their test score is likely to be lower than the "average" test score before the program started. Such composition effects also put downward pressure on the average test score, and likely to occur in participating secondary schools.

The program, on contrary, may improve the test score of students by changing time allocation of them.

Time allocation effects: The program may change the time allocation of students who would have been enrolled in secondary school in the absence of the program. The fee elimination may free students from income-generating activity after school, and spend more time for learning. This change may improve the test score of students.

However, the direction of the policy effects on average test score in a certain type of secondary school is inconclusive because the change in learning environment and students' sorting across school occur simultaneously. In other words, isolating the change in student's test score due to the former change from the one due to the latter is potentially difficult in the setting of this study. In such context, Hsieh and Urquiola (2006) proposed to examine the change in the average test score of all student in one education market. In so doing, this approach net out the change in test score derived from student sorting across schools[16]. This paper first follows their strategy and recognizes "district" in Uganda as one education market. Then, in the first part of this sub-section, I presents the change in the average test score at each district level. If class size effects and composition effects occurred in Uganda, the average test score is likely to decrease in the high intensity districts where more children took secondary school exit exam after the program started.

[16] This approach net out the effects of the change in the across-school composition of students who would have completed 11th grade even in the absence of free secondary education policy. However, it is worth noting that free secondary education policy may change the overall composition of students who take UCE exam, by allowing more students with diverse background to complete 11th grade. Hence, what I estimate in this section is the gross change in the average test score derived from following two reasons. One is the effects of free secondary education policy on the academic achievement of students who would have completed secondary education even without USE policy, and the other is the effects of such policy on the composition of students who complete 11th grade thanks to school fee abolishment.

Table9-Effects on Students' Achievement, Change in test score per district

Outcome: Standardized test score per district	Aggregate	English	Mathematics
	(1)	(2)	(3)
Intensity	0.53*	0.52	0.18
	(0.29)	(0.33)	(0.24)
Observation	759	759	759

Note: Note: Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for district fixed effect, year fixed effect, and district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

Table 9 shows the effects of free secondary education program on the district level mean score of secondary school exit exam by subjects. The results in column 1, with the value of median intensity 0.328, describe that this innovative policy increased the average test score in aggregate of core five subjects by 0.2 standard deviations (=-0.53*0.328) in the district with median intensity. It improved the test score in English by 0.2 standard deviation and in Mathematics by 0.05 standard deviation, although estimates are not statistically significant. These results suggest that the program, at least, did not deteriorate the academic achievement of students.

.

Table 10 disaggregates the secondary schools into school types, and shows that, such learning gain is evident in PPP participating private schools. The test score in other types of secondary school, however, remain at pre-program level. These results are consistent with the prior experimental study in Uganda. Barrera-Ossorio et al. (2015) found that developing partnership with the government improved the test score of students in low-cost private school by 0.2-0.3 standard deviation both in English and mathematics. They discuss that such learning improvement is driven by student selection; the students in treatment school performed better in primary school exit exam and come from households with better education. The natural question, then, is where the less competitive students go after the program started.

Given the negative coefficient in non-participating private schools (column 4), less competitive students may sort into the fee-charging private school, where the admission is less competitive than participating secondary schools. Our results, however, suggest that even if good student sort into PPP participating secondary school, and less competitive students sort out to other type of secondary school, the program did not decrease the average test score of students overall (Table 9). In summary, Table 10 shows

that free secondary education program improved the district level average test score of 11th grade students and such learning gain is notable in PPP participating private secondary school.

Table 10-Effects on student's achievement by school type

Effects of free secondary education	USE participating Government	Non participating Government	PPP participating Private	Non participatng Private
Outcome: standardized test score	(1)	(2)	(3)	(4)
Aggregate	0.23	0.86	0.80***	-0.22
	(0.19)	(0.52)	(0.21)	(0.36)
English	0.25	0.46	0.69***	-0.17
	(0.18)	(0.44)	(0.21)	(0.44)
Mathematics	0.30	0.82	0.86***	-0.65
	(0.22)	(0.61)	(0.21)	(0.41)
Observation	751	281	625	616

Note: Note: Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for district fixed effect, year fixed effect, and district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

A natural next question would be whether the increase in the average test score in participating private secondary school is because free secondary education program improved the academic achievement of the students who would have graduated from secondary school even before or in the absence of the program. Or it may be simply because the test score of students who became able to graduate secondary education is higher than the pre-program average test score. Ideally, we would like to use individual data and observed the counterfactual test score distribution of students who have graduated secondary education even if the program did not be implemented. The setting and data used in this study, however, does not allow us to conduct such analysis. Instead, we use school level data to examine the change in the average test score in the same school over time by including school fixed effects. In doing so, we limit the sample to the secondary schools which have been existing since before the program started, allowing me to see whether, in such schools, the average test score improved or average test score at district level rose because the average test score in newly established participating private secondary school is higher than traditional participating school.

Table11-Change in traditional school which has been existing since 2006 or before

Effects of free secondary education	USE participating Government	Non participating Government	PPP participating Private	Non participatng Private
Outcome: standardized test score per school	(1)	(2)	(3)	(4)
Aggregate	-0.00	0.05	0.40*	0.20
	(0.14)	(0.32)	(0.21)	(0.13)
English	0.01	-0.12	0.40*	0.20
	(0.14)	(0.26)	(0.23)	(0.12)
Mathematics	0.12	-0.01	0.51**	0.07
	(0.14)	(0.32)	(0.22)	(0.16)
Observation	4230	674	1346	4279

Note: Note: Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for school fixed effect, year fixed effect, and district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

Table 11 shows the change in the academic achievement in traditional secondary school which has been existing since before USE policy started. Section 4.2. shows that the number government secondary school symmetrically increased across districts after the program started, and hence the results for government school are qualitatively very similar to Table 10 (column 1 and 2) . Hence, this part shed more light on the results for private secondary school. The results show that the increase in the test score is smaller in traditional participating private schools (column 3). This result suggests that free secondary education program is less likely to change the academic achievement in the traditional PPP participating private secondary schools which have been running since before the program started. In other words, the rise in the average test score in Table 10 is likely because the average test score in new PPP participating secondary school is higher than the pre-program average among PPP participating private secondary schools. It is also worth noting that the sign of coefficient for fee-charging private school changed from negative (column 4, in Table 10) to positive (column 4 in Table 11). These result suggest that the program did not deteriorate the performance of students in traditional private school. On contrary, the average test score of students in newly established private school is likely to be lower than traditional private school. This is consistent with our explanation of sorting in section 4.2. In summary, these finding implies that the program is welfare improving in that, the program increased the number of secondary school graduate with little negative effects on their academic achievement.

4.4 Effects on Learning Environment

Preceding sections show that the program increased the number of students taking secondary school exit exam and their test score. The natural next question is how the program changed the test score of students. The previous section explained three possible explanation; class size effects, composition effects, and time allocation effects. In this section, we focus on the class size effects and assess whether the government sustain the resources available per students by building facility and employing teachers more in the district where the program increased the secondary school enrolments more.

The first row in Table 12 shows the change in the physical resource available at secondary school after USE policy started in 2007. The results show that the number of classroom per student fell in all four types of secondary school (row 1). This change may reflect the fact that the classroom may be congested after the program started. The number of adequate sitting space per students (row 2) relatively stayed at pre-program level except in the participating private school. Hence, the class size effects may put downward pressure on the test score in this type of secondary school.

Last two rows further show the change in the quantity and quality of human resources available per student. The results illustrate that the school employed new teacher, and as a result, the number of teacher per students remains at pre-program level (row3). The teachers with good training, however, is not easily available in the market and hence, the number of teacher with certificate per student decreased after the program in all types of secondary school (row4). Increasing the number of teachers maybe more important for the government than class rooms because the participating secondary schools started double shifting system - using the same class room per day- after the program. Hence, the class size effects, if any, may be mitigated by this system.

Table 12-School characteristics

Effects of free secondary education	USE participating Government	Non participating Government	PPP participating Private	Non participatng Private
Outcome	(1)	(2)	(3)	(4)
Classroom per student	-0.018*	-0.033*	-0.048**	-0.184***
	(0.009)	(0.020)	(0.022)	(0.035)
Adequate sitting space per student	-0.060	0.273	-0.503**	-0.166
	(0.148)	(0.319)	(0.233)	(0.164)
Teachers per student	-0.025	0.112***	0.020	-0.026
	(0.022)	(0.041)	(0.034)	(0.032)
Teachers with credential per student	-0.035*	-0.063*	-0.050**	-0.100***
	(0.020)	(0.034)	(0.025)	(0.024)
N	5317	1433	3601	8744

Note: Values are coefficient of cumulative intensity with median of 0.328. Authors' calculation using annual ASC data between 2006 and 2012. All specifications control for school fixed effect, year fixed effect, and

district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

Altogether, this section finds that free secondary education program may increase the number of student in one class room. This change may put downward pressure on the students' test score. However, by employing more teacher and using the existing class room twice a day, the class size effects may be mitigated.

4.5 Effects on students composition

This section examine whether the program changed the composition of students in each type of secondary school. First, we focus on the change in the number of orphan enrolment. They are more likely to face the financial constraint in the absence of the program, and the program is expected to increase their enrolment and change their time allocation. The results in the upper panel of Table 13 suggest that the orphans exited the fee-charging secondary schools (column 2 and 4) to participating secondary school (column 1 and 3). Time allocation effects would put upward pressure on their test score, and thus, test score in participating secondary schools. On contrary, depending on the ability of orphans, the direction of composition effects on the test score in each type of secondary school is ambiguous.

The lower panel shows the change in the number of late test takers; negative selection of the students. Given children enter primary school at 6 year-old, and it takes 11 years to complete lower secondary school, students are considered to be "on time taker" if they take secondary school exit exam at 17-18 year-old. The results show that the number of "late taker" increased in the fee-charging private school (column 4). This is consistent with our argument in section 4.3. This influx of less competitive students may explain the fall in the test score in non-participating private school (Table 10). On contrary, the number of late takers did not increase in other types of secondary school (column 1,2, and 3). Hence, the negative composition effects, at least the domain of late taker, is unlikely to put downward pressure on the test score of participating secondary schools and non-participating government schools.

Table 13-Effects on student's achievement by school type

The effects of free secondary education	USE participating government	Non participating government	PPP participating private	Non participating private
Outcome	(1)	(2)	(3)	(4)
Orphan enrolment per district	1230.8***	-304.4**	596.9**	-730.3**
	(330.7)	(130.5)	(258.2)	(353.2)
Observation	784	784	784	784
Test taker aged 19 or older	123.789	-6.558	-17.262	183.683**
	(81.299)	(11.087)	(53.165)	(78.686)
Observation	763	763	763	763

Note: Upper panel from Authors' calculation using annual UCE data between 2006 and 2012.

Lower panel from authors' calculation using annual ASC data between 2006 and 2012. Standard errors clustered at school level in parentheses. * p<0.1 ** p<0.05 *** p<0.01

4.6 Robustness check

Before concluding the sections, I submit the estimated results to robustness test by controlling additional covariates. Upper panel of Table 14 uses the number students who took secondary school exit exam as dependent variable to examine the robustness of finding, and column 1 shows the results from baseline specification for the ease of comparison. Column 2 includes the interaction between the regions fixed effects and year fixed effects, but the results show that our main findings are robust to its inclusion. This set of variables control for the unobserved heterogeneous change by four regions across years, including heterogeneous trends in the general economic development. Another concern leading to the bias in our estimates is the effects of government program which targets the district with high unemployment. As timing of the introduction of USE policy is almost same as the presidential election held in 2005 and global economic recessions, isolating the effects of such government program from USE policy effects is one of major challenges. To address such concern, column 3 control for the interaction between pre-program unemployment rates and year fixed effects, but again the estimates remains similar. Lastly, reconstruction from civil war in Northern regions of Uganda would affects the access and achievement of secondary school students at the same time as USE policy. In order to provide conservative estimates to address this concern, column 4 excludes the sample from North region, and again our estimates are robust for this specification. The same robustness test is conducted by using the average test score as dependent variables, in lower panel in Table 14. These results conclude that our results in preceding sections are not spurious.

Table 14-Robustness Check

Outcome: Number of secondary school exit exam takers per district	Baseline (1)	Region*Year (2)	Unemployment (3)	Without north (4)
Intensity	2387.78***	2456.45***	2282.71***	2385.20**
	(791.37)	(761.50)	(735.69)	(1003.20)
N	763	763	763	567
R-sq	0.516	0.567	0.548	0.556
Outcome: Standardized aggregate test score from core subjects per district	Baseline (1)	Region*Year (2)	Unemployment (3)	Without north (4)
Intensity	0.53*	0.58*	0.74*	0.83***
	(0.29)	(0.32)	(0.40)	(0.26)
N	756	756	756	560
R-sq	0.954	0.963	0.958	0.962

Note: Note: Authors' calculation using annual UCE data between 2006 and 2012. All specifications control for district fixed effect, year fixed effect, and district-year cohort size of population in 2002. Standard errors are clustered at district level. * p<0.1 ** p<0.05 *** p<0.01

4. Conclusion

This study examined whether the introduction of *universal* fee-free secondary education program promotes students' access to lower secondary education, students' sorting, opening of private school, and sacrifice the quality of education, and students' learning achievement. We exploit across cohort discontinuity in exposure to the program and across district variation in the effective benefit from the program using the dropout rates prior to the program. Our results suggest that the program is effective to boost the number of secondary school graduates both in participating secondary schools and non-participating private school. Without targeting the girls explicitly, the program narrowed the gender enrolment gap in secondary school. We also find that the program improved the test score in secondary school exit exam in math and English by 0.05-0.2 standard deviation. Such learning gain was evident in PPP participating private secondary school. We also find that the program increased the number of private school in the market and the number of private school graduates.

Hence, this paper concludes that the financial constraint remains the important barrier to the access to secondary education in Africa. Against such background, *universal* fee-free secondary education program is welfare improving for a country in that, it increased the number of secondary school graduate without deteriorating their academic achievement.

Reference

Alderman, H., Kim, J., & Orazem, P. F. (2003). Design, evaluation, and sustainability of private schools for the poor: the Pakistan urban and rural fellowship school experiments. *Economics of Education Review*, *22*(3), 265–274.

Asankha, P., & Yamano, T. (2011). Impacts of universal secondary education policy on secondary school enrollments in Uganda. *Journal of Accounting, Finance and Economics*, *1*(1), 16–30.

Barrera-Osorio, F., & Raju, D. (2011). Evaluating public per-student subsidies to low-cost private schools: regression-discontinuity evidence from Pakistan. *World Bank Policy Research Working Paper Series, Vol*.

Barungi, M., Wokadala, J., & Kasirye, I. (2014). Implementing Universal Ssecondary Education Policy in Uganda: How Has the PUBLIC-PRIVATE Partnership Performed? *EPRC Research Series*, (115).

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How Much Should We Trust Differences-In-Differences Estimates? *The Quarterly Journal of Economics*, *119*(1), 249–275.

Blimpo, M., Gajigo, O., & Pugatch, T. (n.d.). Financial Constraints and Girls' Secondary Education: Evidence from School Fee Elimination in The Gambia.

Burde, D., & Linden, L. L. (2013). Bringing Education to Afghan Girls: A Randomized Controlled Trial of Village-Based Schools. *American Economic Journal: Applied Economics*, *5*(3).

Daily Monitor. (2016, January 29). Traditional schools to charge high fees. Retrieved from http://www.monitor.co.ug/News/Education/Traditional-schools-to-charge-high-fees/-/688336/3053210/-/q6kbtc/-/index.html

Felipe Barrera-Osorio, Pierre de Galbert, J. H. and S. S. (2015). The Impact of Public-Private Partnerships on Private School Performance: Evidence from a Randomized Controlled Trial in Uganda. *Conference Paper Presented at RISE Launch Event on 18-19 June 2015 in Washington DC*.

Gajigo, O. (2016). Closing the education gender gap: estimating the impact of girls' scholarship program in The Gambia. *Education Economics*, *24*(2), 167–188. http://doi.org/10.1080/09645292.2014.985287

Garlick, R. (2013). How Price Sensitive is Primary and Secondary School Enrollment. *Evidence from Nationwide Tuition Fee Reforms in South Africa [Unpublished]*.

Hoxby, C. M. (2007). *The economics of school choice*. University of Chicago Press.

Kazianga, H., Levy, D., Linden, L. L., & Sloan. (2013). The Effects of "Girl-Friendly"

Schools: Evidence from the BRIGHT School Construction Program in Burkina Faso. *American Economic Journal: Applied Economics*, *5*(3), 41–62.

Lewin, K. M. (2009). Access to education in sub-Saharan Africa: Patterns, problems and possibilities. *Comparative Education*, *45*(2), 151–174.

Liang, X. (2002). Uganda Post-primary Education Sector Report. *Human Development*.

Lucas, A. M., & Mbiti, I. M. (2012). Access, sorting, and achievement: the short-run effects of free primary education in Kenya. *American Economic Journal: Applied Economics*, *4*(4), 226–253.

Muralidharan, K., & Prakash, N. (2013). *Cycling to school: increasing secondary school enrollment for girls in India*.

New Vision. (2006). PLE out. Retrieved from http://www.newvision.co.ug/new_vision/news/1156615/ple

Patrinos, H. A., Osorio, F. B., & Guáqueta, J. (2009). *The role and impact of public-private partnerships in education*. World Bank Publications.

The United Nations Educational Scientific and Cultural Organization (UNESCO). (2015). Education for All Global Monitoring Report 2015.

World Bank. (2016). *World Development Indicator*.