Do tuition elimination policies in Sub-Saharan Africa matter? Evidence from the Universal Secondary Education Policy in Uganda

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Abstract

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This dissertation assesses the effectiveness of the Ugandan Universal Secondary Education policy. It seeks to ascertain whether and to what extent offering free-tuition education at eligible public and private secondary schools has affected gross enrollment rates at the lower secondary school level in Uganda between 2007 and 2015.

Using a synthetic control method as well as a linear probability model, I explore the impact of the USE policy on lower secondary school enrollment both at the country and household levels since the policy implementation in 2007 up to 2015. To carry out the analysis, I merge several sources of administrative data, including World Bank education indicators, UNESCO Institute of Statistics data on school participation, Uganda National Bureau of Statistics' statistical abstracts and Uganda's Ministry of Education and Sports' annual reports into a country-panel dataset for the period of 1992-2015 and use the latter for the synthetic control approach. The linear probability model exploits the data from the 2013 Uganda National Household Survey (UNHS).

The synthetic control analysis shows no effect of the USE policy at the country level. Instead, the results indicate that during my study period, lower secondary school enrollment rates growth in Uganda was reduced by a yearly average of 8 percentage points compared to its synthetic version. The micro-analysis, however, shows that the receipt of a government subsidy to enroll in lower secondary school had a positive and statistically significant effect ranging from .5 to 9.4 percentage points.

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Acknowledgments

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Your brother, nephew and uncle

Rev. Maurice Mamba

Dedication

To my parents Mbuanya wa Kayombo and Mbuyi wa Makabu

Though you never reached the heights of schooling

You valued education and sowed in me the passion for learning

Through undying perseverance.

Thank you for this invaluable gift.

Chapter 1: Introduction

1.1 Context and Motivation

In the wake of the "Education for All" (EFA) movement, followed by the Millennium Development Goals, which has now morphed into the United Nations' Sustainable Development Goals, countries across Sub-Saharan Africa (SSA) have implemented a variety of policies and programs aimed at expanding access to basic education. Data from UNICEF and UNESCO show that in the last two decades, primary school enrollment rates have dramatically increased in the majority of African countries and that significant progress has been made towards universal participation and gender parity (UIS, 2014).

However, despite its significant strides at the primary education level, SSA has consistently posted dismal participation rates at the secondary level compared to the rest of the world. Using World Bank data, Glewwe et al. show that from 1980 to 2010, secondary enrollment rates increased dramatically across the developing world and by 2010 stood above 50% in all regions except in Sub-Saharan Africa where only 36% percent of secondary school-age adolescents were enrolled in secondary education (Glewwe et al., 2014). More alarming is that, when disaggregated by gender, data show a great variation in the gender parity gap across Sub-Saharan Africa, with the majority of countries failing to send even a quarter of their secondary school-aged girls to secondary school (UNESCO, EFA Global Monitoring Report 2011). Worse, of those girls who enroll, a fraction as low as 3 percent in Niger, 13.4 percent in the Democratic Republic of Congo, 17 percent in Malawi, 25 percent in Ethiopia and 29 percent in Uganda, completes lower secondary school (UNESCO, 2009).

In their 2015 study, Inoue et al. (2015) confirm the above trends and show that Sub-Saharan Africa is home to 89 million out-of-school youth, which represents more than half of its youth population (Inoue, et al., 2015). The authors also estimate that by the time the present youth cohort joins the labor market, more than 40 million youth will drop out of school, which is most likely to perpetuate the intergenerational poverty with its panoply of consequences of shorter lifespans, limited participation in the labor market and civic society, increased crime rate, and more dependence on government handouts.

To counter the long-term devastating effects of such a low participation in secondary school[1], Sub-Saharan African countries have adopted and implemented various demand- and supply-side policy interventions aimed at expanding secondary school participation. Examples of typical measures include educational reforms in access regulations, extra funding for increased participation, curricula reforms, construction of schools at different levels within acceptable distances for the population, adaptation of capacity in secondary school to the expected numbers of primary school graduates and building community-school partnerships to both strengthen school capacity and encourage the youth to enroll, persist in and complete secondary school. Those measures target three categories of youth, namely those in school but at risk of dropping out, those already out of school but who could be reached through formal schooling reintegration or alternative education and, finally, those not likely to go back to school but who might increase their employability through practical training and experience (Inoue, K. et al., 2015).

Still, SSA continues to lag behind other regions in terms of secondary school participation. Education researchers and policymakers must explore the reasons for such low

1 As well as in response to the EFA movement, increasing primary school completion rates, the region's high population growth rate (Majgaard & Mingat, 2012), the accelerating economic growth and the social changes fueled by democracy, technology and global networks of production and trade (Verspoor, 2008).

participation despite the myriad of corrective measures implemented thus far and chart the way forward. It is imperative to know more about what works in order to expand secondary school participation in SSA.

1.2 Statement of the Problem

Unfortunately, hard empirical evidence on the effectiveness of the policy interventions implemented thus far is hard to come by. The literature abounds with descriptive reports and anecdotal evidence on the effectiveness of those policies, alongside a very thin body of rigorous research. Inoue et al. (2015) identify more than 30 programs implemented to expand secondary education participation across Sub-Saharan Africa but fail to show enough empirical evidence of their effectiveness. A review by CAMFED[2] (2012) of "what works" for girls' education in Africa barely distinguishes between primary and secondary participation, leaving the reader unclear on the features of some specific programs most likely to increase secondary school participation. This paucity of extensive quantitative studies constitutes a serious gap in the research and calls for more rigorous empirical studies to shed light on the effectiveness of the policies aimed at expanding secondary school participation in Sub-Saharan African countries.

One of the policies that is gaining traction across several African countries is the elimination of secondary school tuition and fees. To date, the governments of Uganda and Ghana (since 2007), South Africa (2007), Kenya (since 2008), Ethiopia (2010), Rwanda (since 2012) and Tanzania (2015) have implemented free secondary education delivery policies by eliminating secondary education tuition and fees (UNESCO, 2012). Yet, as shown in table 1.1, very few empirical studies

[2] CAMFED= Campaign for female education

have been carried out to explore the effectiveness and the financial sustainability of this policy in the long run.

Table 1.1: Evidence on the effectiveness of free-tuition policies at the secondary school level in SSA

Country	Policy Intervention	Year	Result	Author(s)
South Africa	Fee elimination (Limited to low SES areas)	2007	Mixed	Garlick, 2017 Method: DID
			Positive	Borkum, 2012 Method: Fixed effects, RD
Uganda	Universal Secondary Education (USE) (Eligible public and private schools)	2007	Positive	Asankha & Takashi, 2011 Method: Multinomial Logit
			Positive	Barrera-Osorio, et al., 2015 Method: RCT
			Mixed, Inconclusive	Omeova & Gale, 2016 Method: Logit Models
			Mixed	Ogawa & Wokadala, 2011 Method: Qualitative
			Negative	Huleybroeck & Titeca, 2015 Method: Qualitative
Kenya	Free Day Secondary Education (FDSE) (All public schools)	2008	Positive	Brudevold-Newman, 2017 Method: Quasi-experimental
			Inconclusive	Ohba, 2009, Method: Descriptive Ohba, 2011, Method: Qualitative
			Negative	Mualuko & Lucy, 2013 Method: Descriptive
				Adan & Orodho, 2015 Method: Descriptive
			Mixed	Cherotich, et al., 2014 Method: Descriptive

1.3 Research objective and questions

My study addresses the aforementioned gaps and seeks to enrich the extant literature on the economics of free secondary education delivery in the particular context of Uganda. Using rigorous econometric identification strategies, I seek to ascertain whether and to what extent offering free-tuition education at selected public and private secondary schools has affected the lower secondary school enrollment in Uganda since the policy was enacted in 2007.

Two main reasons motivate the choice of Uganda for this study. First, the historic nature of the Ugandan government's decision to eliminate fee and tuition at the secondary school level, thus becoming the first ever Sub-Saharan African country to implement such policy since the country's independence in 1963[3]. Secondly, as shown in figures 1 and 2, more than ten years into the implementation of the USE policy, Uganda continues to post stubbornly and surprisingly dismal secondary school enrollment ratios as well as low transition rates from primary to lower secondary school compared to the rest of the Sub-Saharan Africa.

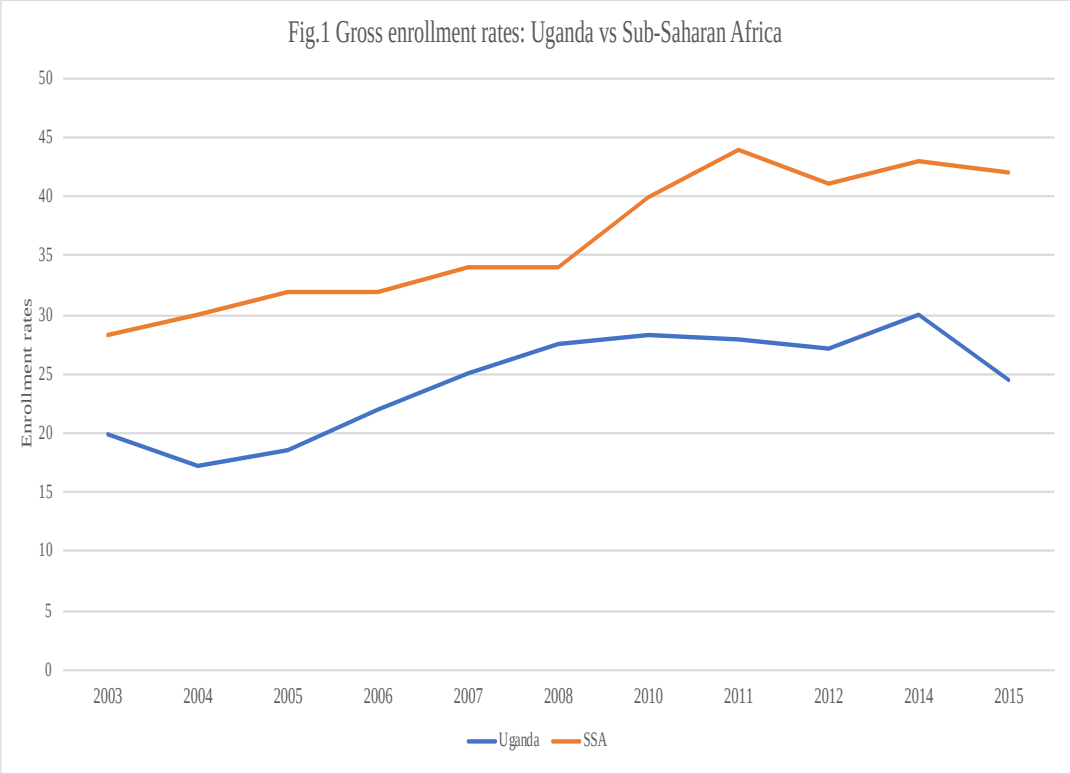


Figure 1. 1: Secondary School GER: Uganda vs Sub-Saharan Africa. *Sources: Republic of Uganda: Ministry of Education and Sports: Statistics Abstracts 2003-2016; UNESCO: http://data.uis.unesco.org/#*

3 Unlike Uganda, South Africa has also implemented a free secondary education policy since 2007, but with a limited scope by targeting only schools located in low socio-economic status communities.

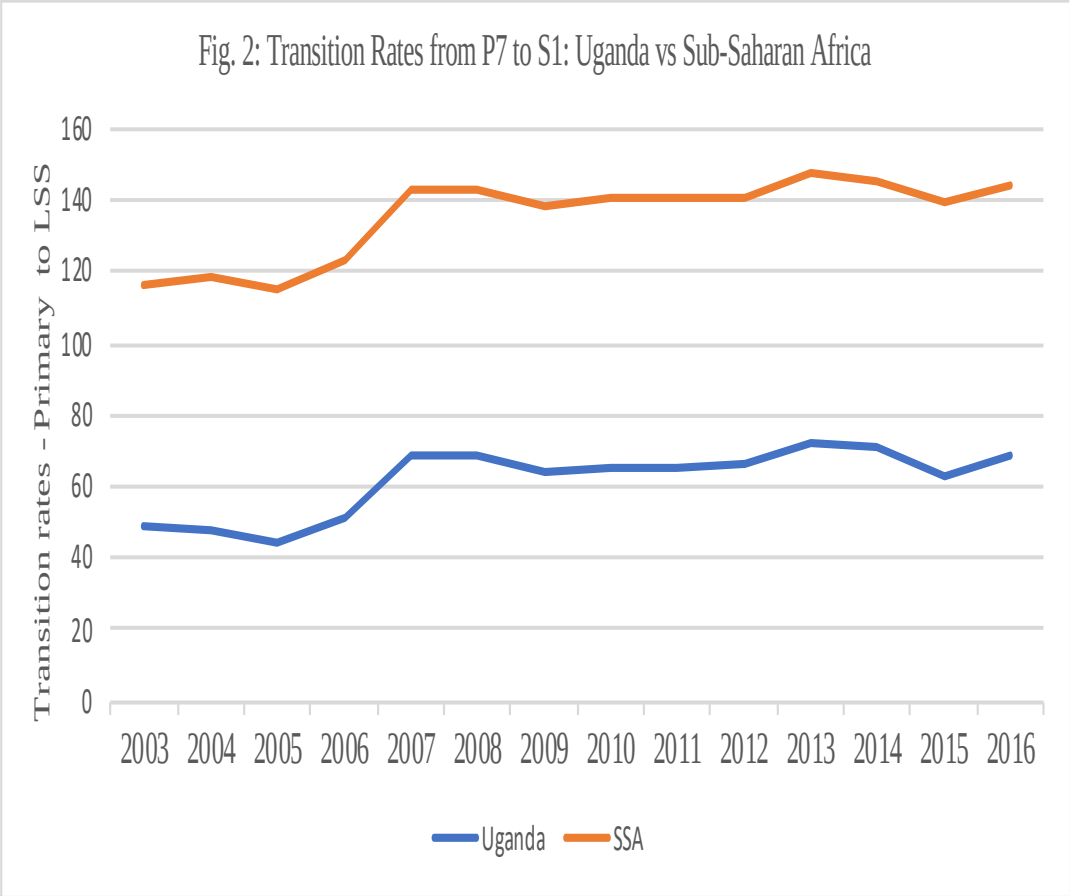


Figure 1. 2: Transition rates from primary to secondary school: Uganda vs Sub-Saharan Africa. *Sources: Republic of Uganda: Ministry of Education and Sports: Statistics Abstracts 2003-2016; UNESCO: http://data.uis.unesco.org/# Calculations by the author.*

Without discounting the gains Uganda has made in the past decade in terms of enticing more of its youth population to attend school, one has to wonder why a significant portion of Uganda's youth is still out of school despite the USE. Corrective measures must be explored to make the policy more effective.

It follows that Uganda constitutes an interesting case study that could not only inform policymakers and donors in their efforts to expand secondary school participation in Sub-Saharan Africa but also help expand our understanding of the economics of the free secondary education delivery in developing countries.

Two specific questions are at the heart of this academic investigation:

1) At the macro level, looking at the aggregate enrollment rates at the lower secondary school level in Uganda, how much of the change in enrollment could be attributed to the Universal Secondary Education policy since 2007?

2) At the micro level, do Ugandan households' schooling decisions for their youths depend at all on the USE implementation?

   a) Does the impact vary across gender?

   b) Does the impact vary across socio-economic status?

   c) Does the impact vary by location?

1.4 Definition of Key Terms

The following key terms are used in this study:

a) Universal Secondary Education: the Universal Secondary Education (USE) policy was rolled out in 2007 for lower secondary school (LSS), following Museveni's 2006 presidential campaign promise to provide free post-primary education for all students who were qualified to enter secondary school. Following the election, the Ministry of Education granted President Museveni's wish by rolling out the universal secondary education policy, defined as the "equitable provision of quality secondary education to all Ugandan students who have successfully completed the primary leaving exam" (Lewin, 2006, p. 10). The hope was that through this policy, school tuition and fees would no longer be a barrier to secondary school participation, particularly by students from poor households. The details on this policy will be provided in section 2.3.

b) Secondary school: Uganda follows a 7-4-2-4 model of education, with seven years of primary education, 4 years of lower secondary, 2 years of upper secondary and 4 years of tertiary education. The lower secondary education, also called O-Level, is open to primary school leavers with a

satisfactory score on the Primary Leaving Exam. At the end of the O-Level, students must sit for and pass the Uganda Certification Exam (UCE). Students with a satisfactory score on the UCE are granted access to the upper secondary education, also known as the A-Level. This study targets only the O-Level (Lower Secondary School) students, aged 13 to 16 years old, but also includes all students enrolled at the lower secondary school level to account for any underage and/or overage enrollment.

1.5 Outline of the dissertation

This dissertation is structured in three major parts (Table 2). The first part provides a comprehensive literature review on the secondary school participation in Sub-Saharan Africa through the lenses of the classic demand and supply theoretical framework. Chapter 2 explores the reasons for the low participation rates in secondary school across Sub-Saharan Africa while chapter 3 presents empirical evidence on the effectiveness of the policy interventions implemented thus far to expand access to secondary school. Delving into the existing literature, the first two chapters seek to shed light on "what we know" and "what works" about reversing the current trends in secondary school participation in Sub-Saharan Africa.

The second part consists of three chapters. Chapter 4 introduces and discusses the Universal Secondary Education (USE) policy as one of the policy interventions aimed at expanding secondary school participation in the specific context of Uganda. The chapter describes the USE background and documents the evidence of its effectiveness. Chapter 5 explores the macro-effects of the USE using a synthetic control method while chapter 6 delves into the USE micro-effects through a linear probability model.

The third part of the dissertation discusses the key findings from the above empirical analysis (chapter 7) and concludes with the main policy implications, limitations of the results presented, and suggestions for future research (chapter 8).

Table 1. 2: Structure of the dissertation

Part I General Introduction, Literature Review on Secondary School Participation in Sub-Saharan Africa	Chapter 1: General Introduction Chapter 2: Literature review on secondary school participation in Sub-Saharan Africa Chapter 3: Literature review on the effectiveness of policy interventions
Part II Evidence on the Universal Secondary Education effectiveness and empirical analyses	Chapter 4: Universal Secondary Education and its Effectiveness Chapter 5: Macro-effects of the USE policy: A Synthetic Control Approach Chapter 6: Micro-effects of the USE policy: A Linear Probability Approach
Part III Discussion of the results, policy recommendations and general conclusion	Chapter 7: Discussion and Policy Recommendations Chapter 8: General Conclusion

Chapter 2: Review of Secondary School Participation Literature in Sub-Saharan Africa

2.1. Introduction

This chapter is built upon the alarming statistics that show Sub-Saharan Africa's (SSA) chronic dismal participation rates at the secondary school level compared to the rest of the world. As shown in figure 2.1. below, although the past two decades have seen some notable increase in the percentage of in-school youth, participation rates in the secondary school in SSA have stood at 34.6 % on average, well below the 67.1 % world average. These results are driven by the low participation rates at the lower secondary school level, with SSA posting 41% of enrollment on average, far below the 79% world average between 1997 and 2017 (fig. 2.2).

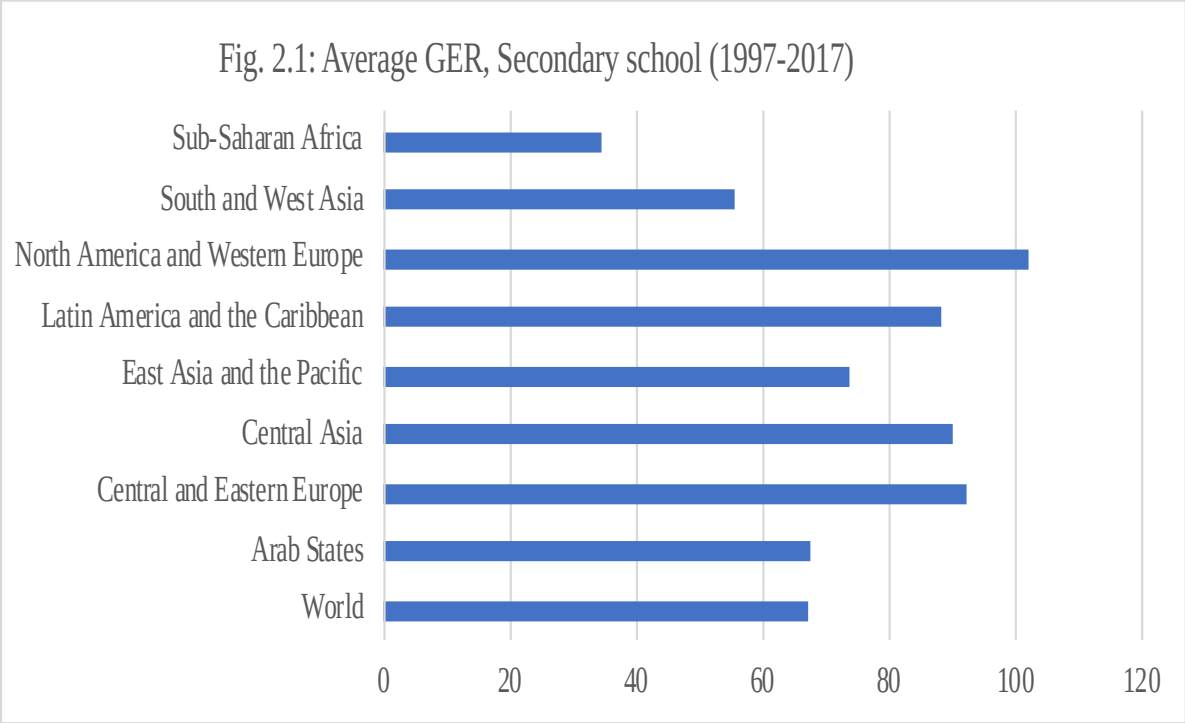


Figure 2. 3: Average GER, Secondary School (1997-2017)

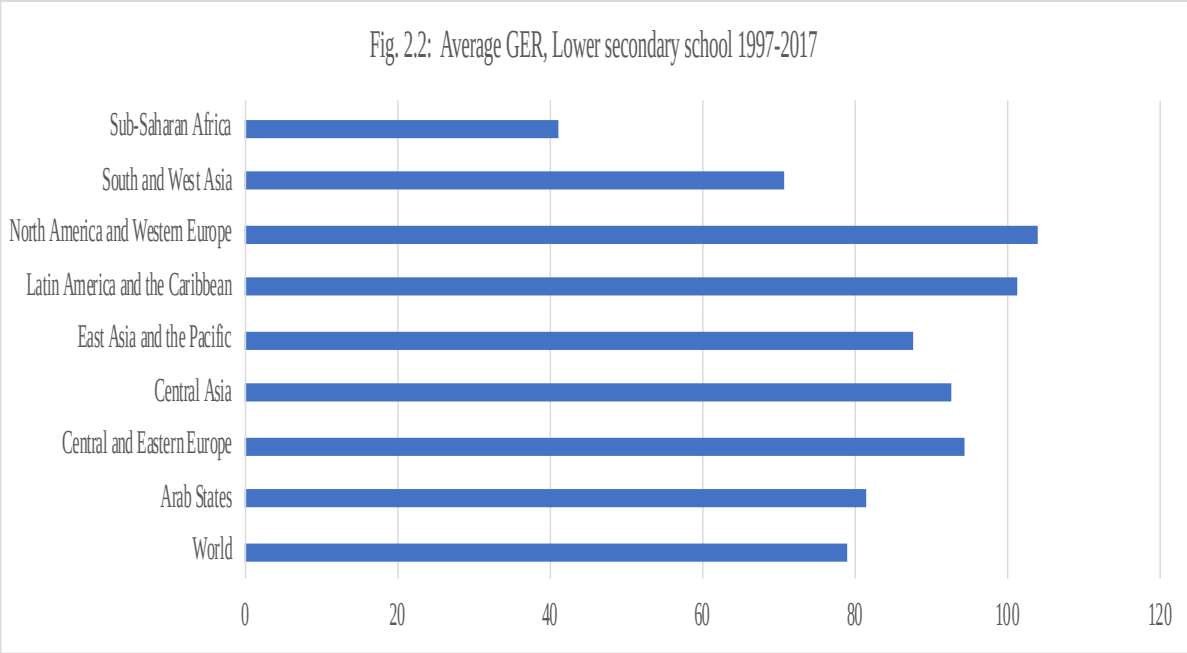


Figure 2. 4: Average GER, Lower secondary school (1997-2017)

It is crucial to investigate why there are so few African adolescents enrolled in secondary education. What are the potential solutions to this phenomenon and what do we know about their effectiveness? This first part of the literature review addresses those questions by exploring both quantitative and qualitative studies, which have labored to uncover the reasons of the low participation rates in secondary education in SSA over the past two decades. Insofar as low participation in secondary education in SSA is mostly the result of the youth dropping out of school rather than never enrolling (Lewin, K. & Little, A., 2001), this study will follow and add to Hunt's cross-country review of the dropping out from school literature (Hunt, 2008). Yet, unlike Hunt, I center my analysis around the secondary school-age population sub-group and summarize the evidence on the dismal SSA participation rates at the secondary school level.

This chapter is organized as follows. The next section describes a simple conceptual framework for the analysis (2.2). This is followed by the results of this review (2.3.) along with some concluding remarks (2.4).

2.2 Conceptual Framework

In this review, I follow the classic demand and supply framework to answer the question of the determinants of school enrollment and dropout rates in Sub-Saharan Africa. Economic theory holds that parents will enroll children in school if the balance of the perceived benefits of that schooling relative to the costs is positive (Becker, 1954). On the one hand, the benefits of schooling are both economic and non-economic. The former refers to the future income for the family whereas the latter include parents' satisfaction of seeing children learn and exceed their parents in the accumulation of human capital. On the other hand, the costs of schooling represent "the economic value of the resources or inputs used in the production" of schooling (Tsang, 1994). There exist different types of costs which are also distinguished based on varying classification schemes. For the purpose of this study, I use Tsang's second classification scheme, namely the cost of inputs by financial source (Tsang, 1994). In this vein, the costs of education can be public, private and social, direct and indirect. In an extensive study comparing the costs of public and private schooling in developing countries, Tsang has found very high private costs in public school systems in developing societies. In some countries, more than half of cost is born privately (Tsang, 2002). It goes without saying that higher private costs of education may deter poor households' demand for schooling for their children.

Direct costs refer to resource costs and include tuition and fees, textbooks, material, transportation, etc. Indirect costs, also called opportunity costs, refer to the costs incurred by withdrawing from the labor force participation, or from participation in household work or farm labor in order to

attend school. Indirect costs are thus the foregone earnings due to school enrollment; they vary by both the level and the field of education (Carnevale, et al., 2015). It follows that the higher the opportunity cost of attending school, the lower the desired investment in schooling; the lower the market rate for child labor, the higher the desired level of investment in schooling (Fiszbein et al, 2009). In light of this framework, if parents are misinformed or hold consistently misguided information about the value of education or if they hold erroneous beliefs about the returns to education, they might underinvest in their children's education. Additionally, an "intra-household principal-agent problem" or "incomplete altruism" may arise if parents are divided about what is best for the children and thus lead to a schooling decision that is sub optimal for their children (Fiszbein et al, 2009). It follows that from the demand-side standpoint, a number of factors may account for adolescent enrollment in school, namely the individual adolescent (gender, age, cognitive ability) and household characteristics (poverty and education costs, parental education, attitudes towards education).

Additionally, supply-side factors of education play a non-negligible role in the assessment of school participation. If there are no schools available in any given region, children cannot enroll. Distance to the nearest school is thus an important determinant in school enrollment, particularly for girls. Parents might be reluctant to let their girls walk long distances to school due to insecurity issues. This concern might be aggravated in rural areas and conflict zones.

Yet, school availability alone might not entice parents to enroll their children or keep them in school if they perceive the learning taking place in those schools to be of inferior quality. Low quality of education can be a serious deterrent to enrollment, persistence and school completion particularly for adolescents who might withdraw from school and engage in activities deemed rather useful and financially rewarding. Factors affecting the quality of education vary greatly;

they include teacher as well as school characteristics. On the one hand, less qualified teachers, teacher absenteeism, discriminatory classroom practices, etc. may negatively impact the quality of education and so lead to students dropping out. On the other hand, lack of adequate school equipment (lack of textbooks, desks, blackboards, toilets for adolescent girls, canteens), bad teaching practices (grade repetition, class management, inadequate language of instruction…) might also erode the quality of education and thus hinder secondary school participation (UNESCO, 2014).

However, as Melissa rightly puts it, it may be difficult to observe the precise and distinct contribution of either demand or supply-side factors in the assessment of school participation (Melissa, 2009). Attention ought to be given to the interaction of both sides within the social, political, economic and cultural context of a country or region. It goes without saying that an unstable social context, characterized by civil wars is likely to hinder school participation in general and secondary school participation in particular.

How do those factors interact so as to impact the participation in secondary education across Sub-Saharan Africa? The following section looks at the existing literature and gathers the evidence from the demand and supply side factors of education as well as the contextual factors as explained above.

2.3 Reasons for the low participation in secondary education across Sub-Saharan Africa

2.3.1 Demand-side factors

Existing literature on the demand-side determinants of (low) participation rates in secondary school across Sub-Saharan Africa distinguishes between child and household characteristics. Child characteristics include gender and age while household characteristics refer to parents' wealth, education as well as their preferences on which child to send to school and for how long. In either

case, parents' role remains crucial in the decision to invest in their child's human capital through schooling.

Child's gender

Hunt (2008) provides an extensive cross-country review of studies on school dropout. The author shows that although studies in this area tend to emphasize obstacles to girls' education, boys too can be found at risk of withdrawing from school due to child labor (See section below). Yet, gender stereotypes and practices in SSA tend to negatively affect adolescent girls' participation in secondary education more than they restrict boys' educational access. Some of the gendered stereotypes and practices include a division of labor which advocates for girls taking on household and childcare duties, and thus makes dropping out from school seem to be the norm (Brock & Cammish, 1997). A number of studies confirm this finding, showing that girls' education may be at risk in large families where girls' time to study is used to take care of younger siblings (Fuller et al., 1994; Muganda-Onyando and Omondi, 2008 cited by Abuya, 2012) and thus reducing their probability of ever enrolling compared to boys with younger siblings (Buchmann and Hannum, 2001; Lloyd and Blanc, 1996; Lloyd and Gage-Brandon, 1994; Muganda-Onyando and Omondi, 2008, cited by Abuya, 2012). Also, studies cite a form of an intra-household discrimination against girls (Abuya, 2012), one which is exacerbated often as girls' education is deemed less important than boys' (Admassie, 2003; Boyle et al, 2002; Kobiané, 2002; Odaga and Heneveld, 1995 in Nekatibeb, 2002; Rose & Al Samarrai, 2001). Parents might worry that the financial rewards of investing in a daughter's education will not accrue to them, but rather to their daughter's future husband household. Such perceptions might restrict girls' continued education, particularly at the secondary level where the costs might be high. Additional gender-based factors include the fear of assault, accidental pregnancy and early marriages. The Africa Report 2012 of

the Pan Africa "Because I am a Girl" on "Progress and Obstacles to Girls' Education in Africa" indicates that early pregnancy is widespread across Sub-Saharan African countries with "more than 50% of girls and young women giving birth by the age of 20" (Africa Report 2012). This study shows that early pregnancy means end of school for the majority of young girls, which corroborates Hunt's (2008) earlier findings. Also, using a growth model with endogenous fertility, Azarnert argues that "if the difference between male and female children arises from a possibility that an occasional pregnancy may occur during female child's school age and if abortion is not easily available, this pregnancy may result in dropping out of school"(Azarnert, 2009). Azarnert's argument is built on the observation that in Sub-Saharan Africa, childbearing and education are generally considered incompatible. In fact, as Hunt clearly shows, there seems to be an institutional pressure on pregnant students to leave school when they "start to show". Even in cases where girls who had been pregnant are allowed to return to school, studies do not seem to provide enough evidence of significant levels of re-entry (Grant & Hallman, 2006).

Moreover, the literature shows that biological (menstruation) as well as safety issues are also likely to restrict girls' education. Studies indicate that as girls reach puberty or start to menstruate, they might temporarily withdraw from school, and as they fall behind, they are most likely to lose interest in staying in school (Rose & Al Samarrai, 2001). This finding is, however, contradicted by Grant et al. (2013). In a randomized experiment aimed at exploring the individual- and school-level factors associated with menstruation-related school absenteeism in Malawi, the authors surveyed 717 female students and found that menstruation accounted only for a small proportion of all female absenteeism and that it did not create a gender gap in absenteeism. Also, absenteeism due to menstruation was not sensitive to school environments. Co-residence with a grandmother

and spending time on schoolwork at home are associated with lower odds of absence during the last menstrual period.

Other studies cite pre-marital sex as a possible cause for dropping out of school (see Hunt, 2008). Using the 2004 National Survey of adolescents in Burkina Faso, Ghana, Malawi and Uganda to investigate the empirical association between premarital sex and leaving school among those who enrolled in school at the onset of adolescence, Biddlecom et al. found that girls were more vulnerable to leaving school once they engaged in premarital sex (Biddlecom et al., 2008). Although this study presents a number of limitations, which the authors take care to document (p. 347), the main finding corroborates the storyline that gendered practices and stereotypes may constitute a major obstacle to girls' secondary education across Sub-Saharan Africa.

On the other hand, safety concerns are mostly related to distance to school. If schools are located too far away from home, and if travel is found to be a risk, parents might withdraw the girls from school. Further details are provided on this aspect in subsequent sections.

Child's age

Most studies treat age in conjunction with other factors to explain the low secondary school participation across SSA. In addition to biological changes, which, as we saw earlier, might lead pubescent girls to drop out of school and marry, age is also associated with higher opportunity cost because of increasing prospects of market and non-market work (Colclough et al., 2000 cited in Hunt, 2008). This point is explored in detail in the subsequent section.

Other age-related factors include socio-cultural practices such as rites of passage ceremonies from childhood into adulthood. Hunt's summary of more than a dozen related studies shows that those ceremonies could either overlap with school calendar (Boyle et al, 2002), lead to prolonged absences and eventually to drop out, or engulf the monetary resources that could have been used

for school (Colclough et al, 2000,; Kane, 2004 cited in Hunt, 2008). Additionally, studies show that the youth coming out of those ceremonies might think of themselves as too grown up for schooling while teachers and schools might still see them as children (Hunt, 2008). The resulting tension may make it nearly impossible for the youth to stay in school. It is important to note that this finding is corroborated only for Liberia in UNESCO's 2013 regional report on out-of-school children in Central and Western Africa (UNESCO, 2013).

Other child characteristics: Health and Orphan-hood

A number of studies have also explored the links between health and access to secondary education. Of major concern is the widespread of HIV-AIDS across Sub-Saharan Africa, which, in 2014, accounted for close to 70 percent of the global total of people infected with HIV (World Health Organization, 2015). Numerous reports have shown the devastating effects of the pandemic on both demand and supply of education as well as on the quality and management of education in HIV-AIDS infected areas (Carr-Hill, et al., 2002). Children living with sick relatives are mostly affected emotionally and physically; those who lose one or both parents are likely to be removed from school to either take care of the sick or to be pulled into the informal economy to supplement the lost income (Carr-Hill, et al. 2002). However, Moumie's study on the factors influencing secondary school attendance in Tanzania has found a negative but not significant of effect of living in a HIV household on secondary school attendance. Yet, as the youth get older, wealth and access to credits appear to benefit wealthy youth living in HIV households with bank accounts relative to poor youth living in both HIV and non-HIV households (Moumie, 2009). Poverty thus exacerbates the negative effects of HIV-AIDS on secondary school participation.

Yet, a glaring hole in the existing literature is the lack of empirical studies of the "child soldier" phenomenon which, according to various global reports (UNESCO, 2010; UNESCO &

UNICEF, 2014) has had devastating effects on school participation across a large section of African countries in the past two decades. Available studies, as shown later in this review, are both national and sub-national descriptive reports on the links between civil wars/conflicts and literacy and educational attainment (UNESCO, 2010).

Household poverty and costs of education

There exists an abundant literature on the correlation between households poverty and demand for education, with the majority of studies suggesting poverty and credit constraints as the "most common primary and contributory reason for students to be out of school"(Birdsall et al, 2005; Boyle et al, 2002; Brown & Park, 2002; Bruneforth, 2006; Cardoso & Verner, 2007; Gakuru cited in Ackers et al, 2001: 369; Dachi & Garrett, 2003; Hunter & May, 2003; Porteus et al, 2000; Ranasinghe & Hartog, 2002; UIS & UNICEF, 2005; Vavrus, 2002 cited in Hunt, 2008). Hunt's summary of studies shows that children from seemingly well-to-do families are more likely to be in school while those who are "poorer are more likely never to have attended, or to drop out once they have enrolled" (Hunt, 2008).

Parents' decision to never enroll their children or the pressure to withdraw them from school both stem from households' inability to shoulder the higher direct costs of education. In 2012, UNESCO and UNICEF commissioned a study on the "out-of-school children" in select countries across West, Central, Eastern and Southern Africa. Working within the framework of "zones of exclusion" developed by the Consortium for Research on Educational Access Transitions and Equity (CREATE)[4], the study sought to "provide up-to-date knowledge and evidence on the profiles of OOSC, the barriers and bottlenecks that children and families face in accessing education, and an analysis of responses, including policies and strategies to enable children to gain

[4] See http://www.create-rpc.org/

meaningful access"(UNESCO, 2014). For this review, I limit my analysis to the relevant findings concerning exclusions at the lower and upper secondary school levels. Using a series of logistic regressions, the study shows that economic hardship is one of parents' main reasons for not sending their children to school. In the Democratic Republic of Congo, Ghana, Liberia and Nigeria, for example, the lack of money is closely related to both the low household income and costs associated with education (Ibid.). The study shows that in most of the Central and Western African countries, the unit cost of education for one child in secondary education can be substantial. For example, "a place in a public secondary school will cost between U.S. $24 (Niger) and U.S. $300 (Cameroon). Even for public institutions, the cost of education still remains high for households" (Ibid.). In addition to school tuitions and fees, parents shoulder the costs of textbooks, uniforms, and transportation. Evans et al. (2009) have found that the cost of providing a school uniform for a child may constitute a barrier to accessing basic education. (Evans et al., 2009). Tonini has also found that in Tanzania, private costs of education in the form of non-tuition contributions to schooling (michango)[5] constituted a barrier to accessing secondary education (Tonini, 2010). Those contributions were collected for a variety of educational costs including salary for an extra teacher, reams of paper, school furniture, foods, Id cards, emblems. Those fees changed over time that they caused serious hardships on households and limited their ability to enroll their children in school.

In addition to limiting enrollment, school fees also seem to limit attendance at school (Mukudi, 2004), which may lead to temporary withdrawals (Boyle et al, 2002 cited in Hunt, 2008). Additional studies indicate that, in some areas of Uganda and Zambia (Obasi, 2000; Ackers et al. 2001, cited in Hunt' 2008) and to a larger degree in the Democratic Republic of Congo, children

[5] "Michango" is Swahili for contributions/donations.

failing to pay school fees may be locked out of schools and sent home until parents honor their financial obligations.

It follows that being poor and not having access to credit markets reduces the demand for schooling regardless of its perceived benefits (Colclough et al, 2000). Recent reports from UNESCO and UNICEF show a strong correlation in Sub-Saharan countries between the poorest quintiles and non-schooling or dropping out of school. The level of poverty can be so high that families will spare little time and resources for education, as food survival becomes a priority.

Additionally, studies on Eastern and Southern African countries also show that household poverty interacts with other factors such as health, which raises the odds for unhealthy and sick children from poor families to be out of school ((Pridmore 2007, cited in UNICEF-UNESCO, 2014). Furthermore, poverty intersects with structures of inequality and exacerbates the school exclusion of some ethnic groups (e.g. pygmies in the DR Congo), children with disability, and poor girls.

Child labor

Household poverty can also lead to the widespread incidence of child labor, which could inhibit the demand for schooling due to the higher opportunity cost for older children (Rolleston, 2009; Avotri et al., 1999; Hunt, 2008). Parents must decide whether to keep the children in school and receive lower income or take them out of school, which they cannot afford, and send them to work and so enjoy higher consumption. The aforementioned joint study by UNESCO and UNICEF on out-of-school children in West, Central, Eastern and Southern Africa shows that, while directly related to poverty and school exclusion, child labor is itself the result of a combination of economic and socio-cultural factors (UNESCO, 2014). As a complex phenomenon, child labor encompasses activities ranging from domestic and household-related work to agricultural work; it involves paid

and unpaid work and has differential effects on children, depending on gender and location. The UNESCO-UNICEF study confirms earlier findings showing that child work is more pronounced in rural than in urban and peri-urban areas, girls have more duties than boys and that in some cases, children in rural areas divide their time between school and work whereas children in urban areas can only handle one activity at a time (UNESCO, 2013, 2014). Kazeem's detailed study using a series of logistic regression models of child labor in Nigeria also documents the existence of gender and socioeconomic disparities in child work and shows that girls and rural children face a double risk of working if they belong to poor households (Kazeem, 2012).

Yet, the causal impact of child labor on educational access is less than clearly established in the existing literature. Even correlational studies do not seem to concur on the expected educational effects of child labor. Child labor is seen as either enabling or disenabling school participation. On the one hand, a thin body of research shows that child labor may allow children to gain access to school by earning money or by freeing up other household members to go to school. Rose's and Al Samarrai's research on Ethiopia indicates that because of their work, boys had better chance than girls to earn income and share the cost of their education (Rose & Al Samarrai, 2001). Research on Ghana by Odonkor (2007) and Casely-Hayford (2004) confirms those results, showing that "children at the upper primary and JHS levels hire their own labor out in order to pay for direct/indirect costs of schooling…"(Odonkor, 2007; Casley-Hayford, 2004 cited in Ghana Report, 2013). On the other hand, most research points out the disenabling effects of child labor. The literature shows that although most of the domestic and household-related work may not necessarily impede school participation (Admassie, 2003; Canagarajah & Coulombe, 1997; Moser, 1996; Ravaillon & Wodon, 1999; the PROBE Team, 1999 cited in Hunt, 2008), the pressure on child's time could be so great that it could disrupt regular attendance (Croft, 2002;

Brock & Cammish, 1997: 34; Ersado, 2005; Guarcello et al, 2005) or lead to increased instances of lateness (Guarcello et al., 2005 cited in Hunt, 2008). The pressure is heavier on girls within domestic/household settings, with a higher percentage of girls leaving school to care for younger siblings. It goes without saying that full time childcare and work in peak agricultural times may not be easy to reconcile with schooling. Korboe et al. (2011) show that, in Ghana for example, children are engaged in farm work in the morning or after school, which leaves them little or no time at all for homework. Those demands can result in tiredness during class lessons, affect their performance and eventually lead to drop out (Korboe et al., 2011). Qualitative analysis of a country survey carried out in DR Congo in 2012 confirms these findings for any form of work children may engage in while still in school (DR Congo UNESCO Report. 2014).

Research also shows that children may engage in child activities at the school level, with teachers using children's labor during class times for a range of activities including farming, carrying farm produce home, weeding around the teachers' houses, fetching water and firewood, carrying building materials like stones and pebbles. As a result, parents would prefer to utilize their own children's labor on their farms rather than sending them to school and waste time on the teacher's farm (Unesco Ghana Country Report, UNESCO, 2014).

However, in some urban areas, child labor may be the result of a pull from the local informal economy. Studies by Dachi & Garrett and Duryea (2003) indicate that a buoyant labor market may be a motivating factor behind children's decisions to leave school in urban Brazil (Dachi & Garrett, 2003; Duryea, 2003 cited in Hunt, 2008). Citing studies on Cote d'Ivoire, Jamaica and South Africa, Hunt shows that a higher number of boys leave school because earning money and attaining adult status is more attractive to them. In those instances, the opportunity cost of attending is somehow high, and even higher if the household's income is not high enough to cover the costs of

education. Yet, the probability of dropping out of school could also increase if parents have limited education or fail to perceive the benefits of more than just a basic education.

Parental education

There is a widely accepted notion that parental education is one of the most consistent determinants of child education. Higher parental/household head level of education is associated with increased access to education, higher attendance rates and lower drop out rates. In their study of the effects of compulsory educational laws in the United States, Oreopulos, Page and Stevens (2006) find that increases in parents' education result in reduced dropout rates for their children (cited in Foley et al, 2014).

Additionally, studies suggest that gender and level of education of the parent play a critical role in educational access in general (Ainsworth et al, 2005). While some studies find that maternal education is more important for girls and paternal schooling for boys (Handa, 1996; Glick and Sahn, 2000 cited in Kabubo-Mariara and Mwabu, 2007), Hunt's review of recent work points to a lack of consensus on which parent's level of education matters the most and for which child (Hunt, 2008). Context is important in determining whether it is the mother's or the father's level of education that greatly influences either the sons' or the daughters' schooling. Al Samarrai and Peasgood's (1998) work on Tanzania shows that a mother's primary education can increase the probability of girls enrolling in secondary school by 17.6% and has no effect on the enrollment of boys (Al Samarrai and Pewasgood, 1998). Yet, Glick and Sahn's (2000) findings indicate that improvements in fathers' education raise the schooling of both sons and daughters in West Africa, while mothers' education significantly impacts only daughters' schooling (Glick and Sahan, 2000, cited in Hunt, 2008). Nonetheless, the literature shows that educated women who are heads of households tend to school their children more than educated men ((Lloyd et Blanc, 1996 ; Pilon et

Clévenot, 1996 ; Wakam, 2002 et 2003, Kobiané, 2003 et 2006 cited in UNICEF/UNESCO, Report on out-of-school children, DR Congo, 2013). This conclusion is predicated on the finding that women are better at allocating family resources towards children's needs (De Vreyer, 1993 ; Pilon et Clévenot, 1996 ; Lloyd et Blanc, 1996, Ibid.).

The studies reviewed above make the assumption that "non-educated parents cannot support or often do not appreciate the benefits of schooling"(Juneja, 2001; Pryor & Ampiah, 2003; Boyle et al., 2001, cited in Hunt, 2008). Failure to properly appreciate the benefits of schooling, in conjunction with low parental education and other gendered stereotypes explained earlier determine parents' attitudes, which are central in their decision to invest in their children's education.

Parental attitudes towards education

In a study aimed at addressing the gap in the literature on attitudes towards schooling and demand for education in developing countries, particularly Ethiopia, Weir (2010) finds that 2/3 of parents with positive attitudes had one or more of their school-aged children enrolled; yet, 30 percent of those parents did not send their children to school. The author concludes that while attitudes were shown to contribute to the decision to enroll, they were not found to be responsible for all variations in the probability of enrolment. Some parents are unable to send their children to school, even if they value education, owing to resource limitations and other constraints. This finding supports earlier conclusions from Boyle et al.'s study in Bangladesh, Nepal, Sri Lanka, Kenya, Uganda and Zambia showing that the poorest parents do value education, and that their decision to invest or not to invest in their children' education takes into account the quality of education available, the value for money and investment potential (Boyle et al., 2002, cited in Hunt, 2008). It is, however, possible that the very poor may have a very high

time preference rate of discount rather than one close to "market rate." This might explain why, in Bangladesh, for example, Assadulah (2006) found a "persistent household underinvestment in schooling and practice of child labor (…) despite respectable private returns to schooling (7.1% for year of schooling)" (Assadulah, cited in Shafiq, 2007). This underinvestment may result from many poor families' and especially rural families' lack of knowledge or information regarding the true gains in income from secondary school. Jensen (2010) conducts an experiment on eight-grade students in the Dominican Republic to investigate the accuracy of perceived returns to education, how individuals update their beliefs when supplied with careful estimates of the returns to education (information), and the link between the perceived returns to education and schooling decisions. From the baseline survey, he finds that eighth-grade students, on average, overestimate earnings associated with a primary school education and underestimate earnings associated secondary school and college completion, leading to an underestimate of the returns to education. The author shows that his experiment, which provided randomly chosen students with information regarding the author-calculated returns to education, was effective in decreasing the perceived earnings associated with primary school and increasing perceived earnings associated with secondary school. Overall, the treatment caused on average a 0.20 year increase in schooling over the next four years in which the students were followed. It is important to note, however, that the effect is driven by the least poor households: the intervention caused an increase in schooling of 0.33 year for the least poor, while the point estimates were close to zero and statistically insignificant for the poor households. Since both socioeconomic groups updated their perceived returns in similar ways, these results suggest that credit constraints may have prevented the poorest households from increasing their investment in education.

Dinkelman and Martinez (2011) test the impact of providing information on merit-based scholarships and government loans for tertiary education in Chile. They focus on 8th graders and their parents because the majority of Chilean students must choose a high school and field of study by the end of 8th grade. Fifty-six schools were randomly assigned to have their students watch a 15-minute video on the tertiary education experiences of Chileans who grew up in poor families, accessed loans and scholarships for post-secondary education, and went on to professional careers. The video also provided information on specific eligibility cutoffs for these financial resources on Chile's standard high school achievement test. An additional 56 schools were randomly selected to distribute the video to students for home viewing with their parents, and 114 schools served as a comparison group. The authors show that both interventions significantly increased students' knowledge of loan opportunities, and the take-home version significantly increased parents' knowledge. The video also appeared to shift the type of schooling desired by students: those with higher grades were more likely to report that they would study at a college, while those with lower grades were more likely to report that they would study at a vocational training school. The incidence of any absence in the interviewed month among students assigned to either information treatment dropped by 8.8 percentage points relative to the control absenteeism rate of 64%, but six months after the intervention there were no significant effects on test scores or where students enrolled in secondary school.

Parental attitudes towards education can also be determined by family networks and peer influences. In their review of the evidence on expanding access and student learning in post-primary education in developing countries, Banerjee et al. (2013) identify a number of studies that show that "educational choices are effected by the decisions of one's peers, particularly close peers"(Barnejee et al., 2013). In their review, the author single out a study by Bobonis and

Finan (2009) which tests for neighborhood peer effects in secondary school decisions, using PROGRESA. As explained earlier, part of the implementation of PROGRESA entailed conducting a survey of all households in treatment and control villages in order to construct a welfare index. Only households that were (1) classified as poor according to the welfare index and (2) in treatment villages were eligible to receive cash transfers. Bobonis and Finan compare the secondary school enrollment rates of children classified as non-poor in treatment villages to those of children classified as non-poor in control villages. The results suggest substantial peer effects: the authors estimate marginally statistically significant spillovers of 5.0 percentage points, relative to a secondary school enrollment rate of 70 percent among non-poor children at the baseline survey. This effect is driven by the non-poor children closest to the welfare index cutoff for eligibility, i.e. the children of relatively poorer households among those that were ineligible for the program. Those children below the median welfare index level among non-poor children experienced an enrollment increase of 5.7 percentage points. Bobonis and Finan also estimate how the rise in the overall village enrollment rate affects the enrollment of non-poor children in treatment villages, instrumenting the village enrollment rate with PROGRESA treatment status. The instrumental variable estimates suggest that a 10 percentage point increase in village 33 enrollment rates increases enrollment of non-poor children by 5 percentage points. Again, the increase in enrollment rates was larger for children of households closer to the welfare index cutoff. There was no evidence of differential spillover effects between girls and boys (Bobonis and Finan, 2009 cited in Banerjee et al., 2013).

Also, utilizing PROGRESA, Lalive and Cattaneo (2009) estimate the role of social interactions in schooling decisions. The authors confirm Bobonis and Finan's findings by showing that

ineligible children attend school as a result of PROGRESA and that social interaction effect is as important as the cash transfer incentive.

A recent interesting body of evidence shows that in some Sub-Saharan African communities, households may resist to make profitable investments due to strong social pressure to assist kin and for fear of sanctions against those who violate sharing norms (Jakiela & Ozier, 2016). Because education is one of such profitable investments in the long run, some households might be discouraged to invest in education for fear of appearing to be better off in a community that harshly sanctions those who fail to make sufficient transfers to others (Platteau 2000, Hoff and Sen 2006, Di Falco and Bulte 2011, Comola and Fafchamps 2011 cited in Jakiela & Ozier, 2016). While this finding may be true in some Zimbabwean (Ibid) or Kenyan (Ibid) villages, cultures in the Democratic Republic of Congo celebrate individual achievements while encouraging solidarity without punishing those who contravene those values.

Nonetheless, the foregoing points to a differentiated assessment of the value of education in various African communities. The questioning of schooling is even more pronounced in rural areas where villagers "question whether there are any returns to education for children who do not leave the village and gain post-basic education" (Pryor & Ampiah, 2003). Those findings are similar to Liu's (2004) research results in two rural communities in northern china showing that "perceived future prospects (or lack of them), school failing to provide impetus/motivation for continued study and youngsters admiring the lifestyles of contemporaries who had already left" were among the main reasons put forward for dropping out of school (cited in Hunt, 2008). In most cases, parents encouraged youngsters to leave school since there was little hope of going to college or finding employment.

The above raises the issues of low quality and inadequacy of secondary education across Sub-Saharan Africa. The next section addresses this question as one of the supply-side determinants of the low secondary school participation in Africa.

2.3.2 Supply-side factors

Inadequate supply of schools

A vast literature documents the negative effect of insufficient number and low quality of schools on secondary school participation across the developing world, particularly in Sub-Saharan Africa. International and national based studies reveal that inadequate school infrastructure restricts access to education and negatively impacts on child retention, particularly among the most deprived regions and districts of the country (UNESCO. Report on Ghana, 2012). Reports show greater disparities in the distribution of schools between urban and rural areas ((Ravishankar et al. 2010; McAlpine 2009; Nkurunziza 2009). Kim et al. (2011) report that in countries such as South Sudan and Burundi, the number of schools is inadequate for the growing school population, with the demand outstripping the supply. A number of studies also charge that the expansion of free educational access for all to primary and secondary schools has brought with it a demand for schools, resources and trained teachers, for which some countries have failed to plan and have failed to adequately supply (Chapman et al. 2010). Lack of nearby schools forces youngsters to travel long distances to school, to even relocate or to consider boarding schools which, in many instances, are unaffordable (Verspoor & Bregman, 2008). Still, as shown earlier, long distances have been found to increase dropout rates and lower LSS participation particularly for girls in rural areas. Citing evidence from Chad and Senegal, the authors show that when distance to school is greater than 1 kilometer, enrollment rates are reduced to negligible levels (Lehman, 2003, cited in Inoue et al, 2015).

However, a growing body of research suggests taking into account the demographic differentials within certain areas, namely the urban slum, urban non-slum and rural divide and calling into question the notion that urban settlements are always advantaged (Oketch & Ngware, 2012). In a study on Kenya, Mugisha (2006) finds that secondary school enrollments in the urban slums are lower mostly because of limited access to secondary schools which are mainly non formal, and are generally characterized by staff shortages, crowded classrooms and lack of resources (Mugisha, 2006, cited in Hunt, 2008). In some cases, however, rural areas may offer better schooling opportunities than their counterpart urban slums (Oketch & Ngware, 2012).

Inadequate infrastructure and resources

The lack of adequate facilities and resources is also blamed for the low participation in secondary school in Sub-Saharan countries. Studies cite over-crowded and sub-standard facilities, lack of classrooms which means that classes are being held outside (Brophy2003; Bekalo et al. 2003; Ravishankar et al. 2010), lack of textbooks, desks, blackboards (Brock & Cammish, 1997; Molteno et al, 2000). Studies by UNESCO, UNICEF and the World Bank have clearly mapped the quality challenges facing secondary education across Sub-Saharan Africa. In most African countries, curricula have been obsolete for years or have rarely been "adapted to the…essential emerging life skills and the changing demands of a labor market for competencies relevant to participation in a technology-driven global economy" (Verspoor, 2008).

Additionally, availability of adequate sanitary facilities is particularly crucial to female retention as girls get older and start menstruation (Colclough et al, 2000; Fentiman et al, 1999; Lafraniere, 2005). Studies in Ghana and Nigeria as well as in Ethiopia showed that the lack of separate toilets for female students often puts girls at risk of dropping out (Hunt, 2008; McAlpine, 2009; Ravishankar et al. 2010; UNESCO, 2012).

In terms of human resources, reports point to insufficient numbers of trained teachers, leading to bigger class sizes and average pupil-teacher-ratios higher than any other region and still increasing (Verspoor, 2008). Relying on examples such as Mali, Guinea, Verspoor (2008) shows that gross enrollment rate increased more than twofold while the PTR grew by a factor of three or even more, resulting in class sizes of 50 or more. Other studies mention the inadequate supply of female teachers, which has been associated with safety concerns as well as with problems with the retention and inspiration of girls in schools (Aikman and Unterhalter, 2005, cited in UNESCO, 2014). Additional issues affecting the teaching workforce across SSA include absenteeism, poor salaries resulting in teachers either seeking a second job to supplement their income or leaving the teaching profession altogether for better paying jobs (Verspoor, 2008; UNESCO, Report on OOS, Eastern and Southern Africa, 2014). It follows that the combination of the above factors is likely to affect teacher productivity, lower the quality of education and eventually discourage parental investment in education.

Low quality education

The notion of the quality of education is usually associated with the quality of inputs (family inputs, health, qualified teachers, better infrastructure and teaching materials such as textbooks…), the quality of processes (pedagogy) and better outcomes (student achievement, school persistence and completion, job opportunities). However, how households perceive the quality of education that their children receive is crucial in the decision to keep their youngsters in school and for how long. In a recent World Bank-sponsored study, and relying on research by Hanushek, Lavy, and Hitomi (2006), Inoue et al. (2015) indicate that "when school quality is low, both parents and youth reduce the importance they attach to education". Using household data from 15 SSA countries, the authors show that quality concerns play a bigger role in dropping out of school as the youth become

older. Quality concerns include low learning levels, lack of academic or remedial support, failure as well as higher rates of repetition or detention at the same grade (Ibid.). In the face of those challenges, some parents have turned to private schools, which can also vary greatly, ranging from elite, high-cost, traditional to church –sponsored schools. Still, access to those private schools may be limited due to the cost structure in place. For example, in Kenya, tuition and fees could range from $66 to 6,618 per year in some of the nongovernment schools (Verspoor, 2008, p.168). Lower costs are associated with low quality, which fails to address the underlining concerns of the massive exodus from poorly functioning government schools. Without sufficient government funding, parents are forced to shoulder more than half of the total cost of their children's education (Lewin, 2008; World Bank, Congo DRC, 2005). As a result, only children from well-to-do families will reap the benefits of a better education while the majority of students from the poorest quintile will be excluded from school.

2.3.3 Contextual factors

Demand and supply-side factors interact within a social, political and economic context, which could restrict secondary school participation regardless of individual students' and household's positive attitudes towards education. Existing literature highlights the negative effect of armed conflicts and social instability, deficient labor market outcomes and misguided religious beliefs.

Armed conflicts and social instability

Citing studies by Sommers (2002; 2005) and O'Malley (2007), Hunt (2008) notes the obvious and logical difficulty for children caught up in situations of conflict and social emergency (civil war, political instability, social unrest) to remain in school. Such situations might cause internal or external displacements as families are forced to seek safer places for themselves. In the process,

households might experience an increase in poverty levels due to the loss of assets; opportunities for employment might be low and thus decrease the need for education (Sommers, 2005). Also, forced recruitment or voluntary enlistment of child soldiers (O'Malley, 2007) will prevent adolescents from going to school and push many boys to drop out. Yet, more than boys and for safety reasons, girls tend to experience intense pressure to withdraw from school in times of crises (Sommers, 2002; Sommers, 2005, cited in Hunt, 2008). Other studies show that, more than primary school enrollment, secondary school participation is greatly affected during the times of armed conflicts. Shemyakina (2006) cites, among other reasons, the level of specialized resources required for secondary education and which are more difficult to establish during or after conflicts, work or military opportunities which can be attractive to students of secondary school age. The author also mentions that in some countries, such as Rwanda, Cambodia and Somalia, the intellectual class was actively targeted during the conflicts, which can also decrease the average years of education for cohorts in time of conflicts.

On the supply side, schools might be either closed or destroyed during armed conflicts, and thus force teachers and students to stay at home or flee the affected area. Due to undue cost of war, teachers may receive little or no salary at all, which, as indicated earlier, is most likely to affect the quality of teaching and learning and eventually lead to higher dropout rates (O'Malley, 2007; Nicolai, 2003). Reports by UNESCO and the World bank on the impact of war on education confirm the above findings with statistics showing dismal rates of school participation all across African countries devastated by the ravages of civil war, ethnic conflicts and political unrest (UNESCO, 2010). In an empirical study aimed at exploring the pattern of education variables during periods of armed conflicts in 43 African countries from 1950 to 2010, Poirier shows a strong negative effect on the educational performances of the countries studied (Poirier, 2012).

Using a fixed-effect regression model, the author finds that rates of children not attending school, as well as secondary enrollment rates, seem particularly sensitive to periods of conflict.

Other studies find that although children in emergency situation may have access to education in refugee camps, the quality of teaching and learning may be problematic. Sommers' study on the provision of education in the southern Sudan refugee camp of Kakumu shows low student attendance, low teacher retention, high teacher-student ratios, lack of incentives for education, and gendered practices, which pushed girls from school (Sommers, 2005, cited by Hunt, 2008).

More studies point to the difficulty of school re-enrollment for the youth affected by armed conflicts (Rose and Greeley, 2006). Results from initiatives such as the demobilization and reintegration of child soldiers in Angola, El-Salvador and in Liberia show a myriad of obstacles to reinsertion in formal schooling including the cost of education (tuition, uniforms, supplies), lack of teachers or facilities, the unwillingness of school authorities to allow older former child soldiers to join the same level as younger children, the shame or resentment about going to school with much younger children and the high opportunity cost of attending school during the day since these former child soldiers must earn an income to support their families(Verhey, 2001). Without doubt, armed conflicts have far-reaching negative effects on both access to school and progress through the education system. According to the UNESCO's 2014 "Education under attack" report, those effects could include a persistent demotivation and distraction of students, teachers and other education staff by fear or psychological distress or trauma, a chronic disruption of attendance or permanent drop-out of students, teachers and other education staff (UNESCO, 2014).

Deficient labor market outcomes

A stagnant local economy in most Sub-Saharan African countries, offering limited employment opportunities to secondary school graduates, may also reduce the incentives to

progress through and complete secondary school[6]. In a study examining the relationship between sector-specific employment opportunities and educational enrollments in Thailand and Kenya, Buchmann and Brakewood show a statistically significant positive effect of the local manufacturing sector on male enrollment in secondary school and no effect on female enrollment in Kenya (Buchmann & Brakewood, 2000). The authors attribute the no-effect for female enrollment to fewer manufacturing employment opportunities for female graduates. Lack of employment opportunities is rampant across Sub-Saharan Africa, with the youth unemployment rate averaging 21 percent in 2003(ILO, cited in Verspoor, 2008). What is yet alarming is the finding that, in some Sub-Saharan African countries, "youth with secondary and tertiary education in Burundi, Cameroon, Côte d'Ivoire, Kenya, Madagascar, and Nigeria, for example, have higher rates of unemployment than youth with lower educational attainment"(Verspoor, 2008). The inability to find employment could thus lead to a poor perception of returns to educational investments and, as indicated earlier, discourage parents to keep their children in school.

Religious beliefs

Religion has also been faulted for the low participation in secondary school across SSA, though the available empirical evidence is quite scant and inconclusive. The aforementioned UNESCO-UNICEF joint study on out-of-school children phenomenon in West and Central Africa shows that, in the Democratic Republic of Congo, religion did not explain much of the variation in the dependent variable (secondary school participation), but showed varied effects based on geography and gender. For example, adolescent boys living in Kimbanguist[7] households were more likely to be out of school than their Catholic counterparts; adolescent girls living in

6 One would expect this scenario to reduce the opportunity cost of school attendance, with the effects going in either direction with respect to school participation. In the US, enrollments rise when unemployment is high. The SSA scenario could be predicated on the nature of employment crisis, whether it is long-term or cyclical.

7 A Christian sect founded by Simon Kimbangu in the Democratic Republic of Congo in April 1921.

households whose heads were members of an independent Christian church were also more likely to be out of school compared to their Catholic counterparts; adolescents from Jehovah witness and independent Christian church households were at much higher risk to be out of school than their Christian counterparts in the provinces of Katanga, North Kivu (UNESCO, DRC Report, 2013). Unfortunately, the study fails to shed light on the mechanisms through which those differences play out. Yet, in Nigeria, studies show that there are still communities in which western education is perceived as anti-Islam and therefore rejected, and in which Quranic education is offered to children instead (UNESCO-UNICEF, Nigeria Report, 2012). Studies by Okeke and Rufai (2004), SAGEN 1, (E- 2005), and Njoku (2007) show that there is a widespread belief that western-educated girls tend to be wayward and viewed as harlots and disrespectful or non-submissive to their husbands. Moreover, they are seen as incapable of raising children in Islamic tradition. Such prejudices are most likely to negatively impact parents' educational decisions about their children, particularly their daughters. Still, the extent to which those beliefs might have restricted access to education or caused a loss of schooling opportunities for the youth remains to be ascertained.

However, while fundamentalist Islam is widely blamed for recent terrorist attacks on schools and churches in Northern Nigeria, and thus, discouraging school participation (Onuoha, 2012; UNESCO Report), some studies on Somalia show that Koranic schools can be used to expand education in that country. Moyi (2012) shows that Koranic schools are "transforming themselves by adding Arabic, arithmetic and the Somali language to their curriculum"(Moyi, 2012).

It should be noted, however, that Moyi's analysis covers the pre- El-Shabaab period and may not uncover the trends in secondary school enrollment following the rise and the expansion of that

insurgent movement[8]. Further research is thus needed to shed light on the possible effects or impact of religious beliefs and sectarian conflicts on secondary school participation.

The following figure provides a synopsis of the results of the above analysis of the demand-side, supply-side and contextual factors of the low secondary school participation in Sub-Saharan Africa.

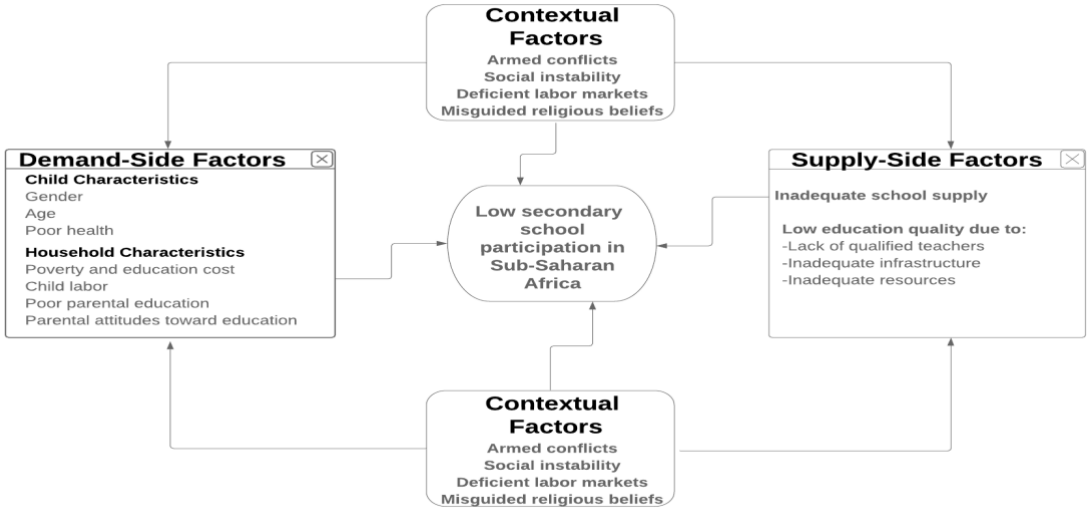


Figure 2. 5 Lucid Chart depicting the reasons for the low participation in secondary school in Sub-Saharan Africa

2.4. Concluding remarks

In this chapter, I set out to explore the reasons of the alarming low participation rates in secondary school across Sub-Saharan Africa. Following the classic demand and supply conceptual framework, this review has explored qualitative and quantitative studies, reviews and reports related to secondary education across Sub-Saharan Africa. I have confirmed and expanded on earlier findings that show that demand and supply-side factors, interacting within a particular

[8] See http://www.operationspaix.net/DATA/DOCUMENT/4039~v~Al_Shabaab.pdf.

political, economic, social and cultural context, could explain why there are so few African adolescents enrolled in secondary school. From the demand side, this review has singled out gender, age, child labor, orphanhood and health status as important individual characteristics. Age is associated with higher opportunity cost of attending secondary school if parents are poor. Parents might choose to keep their older children in household and agricultural labor on family holdings or send them to work to supplement their income and therefore increase household consumption. Gendered practices based on cultural norms, poor perception of returns of investing in girls' education, safety concerns exacerbated by conflicts and wars, early marriages, pregnancy…might also limit access to secondary education. Still, household characteristics play the most critical role in the parents' decision not to invest in their children's secondary education. This review has shown that household poverty levels and low parental education constitute the most important barriers to youth's access to secondary education. Although parents may value education, they are most likely to choose higher present consumption through child labor over delayed and uncertain gratification that schooling brings. From the supply side, this review has uncovered a number of obstacles to education including insufficient supply of schools, inadequate infrastructures and resources, and perceived low quality of education. From the context standpoint, the literature centers around the pernicious effects of conflicts and wars on education through various channels such as forced military recruitment of adolescent boys, decrease in school funding to support the wars, destruction of existing facilities as casualties of wars, targeting of the elite in some areas and thus discouraging school enrollments, internal displacements…Lack of employment opportunities for secondary school graduates who cannot afford college education as well as misguided religious beliefs, although not clearly documented, also appear in the literature as barriers to secondary school participation in Sub-Saharan Africa.

Although the above results point to a pessimistic outlook of the secondary education across SSA, several African governments have initiated policies aimed at reversing the current trends in secondary school participation. The next chapter reviews the literature on the effectiveness of those policies.

Chapter 3: Review of the effectiveness of policy interventions

3.1 Introduction

The push for expanding secondary education has gained traction in recent years as a result of the EFA movement, increasing primary school completion rates, the region's high population growth rate (Majgaard & Mingat, 2012), the accelerating economic growth and the social changes fueled by democracy, technology and global networks of production and trade (Verspoor, 2008). As Verspoor puts it, staying the course of sustained economic growth and development requires "a threshold level of "education stock" in the workforce, and continuous, ambitious investment in the improvement of human capital" (Ibid.) More and more African countries understand that expanding secondary education, once neglected (Caillods and Lewin, 2001), is a pre-requisite for successful participation in the technology-driven global economy.

Existing literature shows an increased interest by the World Bank and other international aid agencies in supporting Sub-Saharan African countries' efforts to expand secondary education participation. Those efforts can be classified as demand-side and supply-side measures at the national, regional and local levels (World Bank, 2008). According to the World Bank, examples of typical measures at those levels would include educational reforms in access regulations, extra funding for increased participation, and curricula reforms (national), construction of schools at different levels within acceptable distances for the population, adaptation of capacity in secondary school to the expected numbers of primary school graduates (regional) and building community-school partnerships to both strengthen school capacity and encourage the youth to enroll, persist in and complete secondary school (local). It goes without saying that those measures vary greatly in so far as they are targeted at correcting highly heterogeneous situations of secondary school exclusion. In their aforementioned study on the out-of-school youth in Sub-Saharan Africa, Inoue,

K. et al. (2015) make a series of recommendations targeting three categories of youth, those in school but at risk of dropping out, those already out of school but who could be reached through formal schooling reintegration or alternative education and, finally, those not likely to go back to school but who might increase their employability through practical training and experience (Inoue, K. et al., 2015).

In this section, I summarize the evidence on the effectiveness of selected measures on the demand (3.1.) and the supply (3.2.) sides. Context-related policy interventions are embedded in either side of the equation, along with direct reference to specific countries where empirical evidence is available. Section 3.3. provides some concluding remarks and precise direction of this dissertation.

3.2 Demand-side interventions

The literature identifies a whole range of policy interventions and projects that address the major barriers to secondary school participation, namely households' poverty and gendered stereotypes against girls' education. Such policy interventions include but are not limited to tuition and fees elimination policies, scholarship schemes, cash transfers and anti-child labor laws (Glewwe & Lambert, 2010; Banerjee et al., 2013)

3.2.1 Free Secondary School Delivery

This review has established that school user fees seriously limit school enrollment and persistence in low-income countries in general, and across Sub-Saharan Africa in particular. To counter the inhibiting effect of the direct and indirect costs of education and, therefore, increase secondary school enrollment and persistence and decrease school dropouts, several African governments including Uganda, South Africa and Ghana (since 2007), Kenya (since 2008),

Rwanda (since 2012) and Tanzania (since 2015) have implemented free secondary education delivery policies by eliminating secondary education tuition and fees (UNESCO, 2012).

To date, little to no hard empirical evidence is available about the effectiveness of such policies. For Kenya, few studies have sought to ascertain whether the Kenyan Free Secondary School (FSE) policy has had any impact on both educational (access, completion, academic performance) and non-educational outcomes (sexual behaviors, fertility and labor market outcomes). Using the 2014 Kenya Demographic and Health Survey (DHS) as well as the administrative test scores from the 2006-2015 Kenya Certificate of Secondary Education (KCSE) data, Brudevold-Newman shows that abolishing secondary school tuition and fees in 2008 increased the primary to secondary school transition rates and had no significant detrimental effect on secondary school completers' academic performance (Brudevold-Newman, 2017). The author also finds that exposure to the FSE results in significant delays in early marriage and in first intercourse and shifts the attentions of more young women from agriculture into more skilled work.

Ohba (2011) examines the transition rates from primary to secondary school by following 109 primary school leavers in rural Kenya after fee abolition starting in 2007. The study finds that the policy was not sufficient to ensure the expansion to the poor due to other direct costs and opportunity costs and to students' high time preference discount rate. While the study follows a qualitative approach which provides context and meaning to the findings of the surveys, one is left to question the reliability and the generalizability of the conclusions given, among other things, the small sample size used and perhaps a nonrepresentative context.

Cherotich et al. (2014) look at the gender equality effects of the policy in the Kericho county by comparing the pre and post-program gender parity indices. They find that the gender parity

index increased in 2011 after decreasing immediately following the abolition of tuition and fees. Unfortunately, the comparison is purely descriptive and does not take into account any unobservable factors in order to clearly disentangle the effect of the policy on gender parity index.

Other studies are more critical of the FDSE policy, claiming that it has not alleviated households' financial burden in their efforts to educate their children. Ohba (2009) provides a detailed analysis of such burden, which makes some critics wonder whether the FDSE should even be called "free". The author shows that although the FDSE reduced households' direct contribution to education by 19 and 16 percentage points for day and boarding schools respectively, the cost of sending a child to secondary school would still be prohibitive for most parents in rural areas: Ksh11,681 (US $186) per pupil for public day secondary school and Ksh23,095 (US $368) per pupil for public boarding secondary school. Those figures would be about 12 to 17 times the income of self-employed parents and 19 to 20 times the income of peasant parents engaged in casual work if they choose to send their child to a day secondary school. Yet, in the case of a boarding school, the cost would be about 23 to 33 times the income of self-employed parents and 38 to 40 times the income of peasant parents engaged in casual work (Ohba, 2009). Although the Ohba study's scope was very limited (it included only 101 households, 109 youth, and 24 secondary schools,) the results are indicative of a serious flaw in the design of the policy, which also limits its potential to effect the change it seeks. Mualuko and Lucy (2013) echo those sentiments when they charge that "the fund is horizontally equitably distributed to all students enrolled in schools irrespective of socio-economic backgrounds. This kind of distribution is limiting, and it does not in reality guarantee equity in that the rich and the poor or children from marginalized areas are given equal allocation, yet they are unable to top up the difference to cater for all school fees requirement" (Mualuko & Lucy, 2013). For Mualuko and Lucy, the Kenyan

policy is failing to take into account the individual students' financial needs in the distribution of government subsidies, thus placing poorer students at much higher disadvantage compared to the wealthier ones. Adan and Orodho (2015) corroborate this finding, showing that in its current design, the FDSE funding mechanism exacerbates vertical inequities between schools as it positions schools that are well-established and well-attended to receive more funds and develop faster economies of scale (Adan & Orodho, 2015). Meant to expand access to secondary education for the poor, the FDSE may, in the end, not be reaching its primary target, that is, the students from the most vulnerable households. In its 2012 Education for All monitoring report, UNESCO observes that "the US$164 that is allocated to compensate secondary schools for having abolished school fees is ten times the amount per pupil annually received by primary schools. Only a minority of children from poor rural households or urban slums make it to secondary school. The increased investment would be more equitably distributed if it were geared towards remote rural areas, slum settlements and pastoralist communities" (UNESCO, 2012).

For South Africa, two notable studies explore the effects of a targeted fee-elimination policy on school enrollment and education attainment (Borkum, 2009, 2012; Garlick, 2017). Announced in 2006 and implemented in 2007, the policy ordered to eliminate all enrollment and tuition fees for 40% of public school students in schools serving low-SES areas and to provide such schools with larger per-student grants. Schools were first divided into national quintiles using a poverty score based on the poverty of the surrounding community. The poorest quintiles of schools were then declared "no-fee", status which required them to eliminate school fees on a mandatory basis starting in the 2007 academic year. Using data from South Africa's Education Management Information System and following a standard fixed effects model as well as a regression discontinuity design, Borkum (2012) finds that the program increased enrollment by almost 2

percentage points at the secondary school level, an increase that was concentrated in earlier grades and driven by nearly 3.5 percentage points increase in the poorer of the treated quintiles (fixed effects model). However, the regression discontinuity estimates show no effect of the program on wealthy households near the cutoff poverty score. The 2009 version of this study shows little evidence of any impact of the fee-elimination policy on primary school enrollment, mostly because of the ceiling effect.

Using data from the 2003-2012 General Household Surveys, Garlick (2017) conducts a difference in difference analysis between fee-charging and fee-eliminating schools as well as a regression discontinuity analysis by comparing schools with poverty scores near the cutoff between quintiles two and three but focusing on the DID estimates because of their economic significance. The paper finds that following the elimination of school tuition fees, the enrollment rate increased by less than 1 percentage point in average school, and enrollment in secondary school rose by 2 to 3 percent while secondary school graduation rates fell. The author explores a variety of potential explanations of these results and concludes that low returns to education may explain the apparent price insensitivity of the demand for school in the treated neighborhoods. Perhaps the author could also have explored the possibility of including the level of schools' compliance with the policy as a determinant of enrollment.

For Uganda, the object of this dissertation, not enough evidence is available on the effectiveness of the policy. Further details are provided in section 4.5.

3.2.2 Scholarship schemes and Cash Transfers

Abundant international evidence exists on the impact of financial interventions on educational outcomes such as school enrolment and retention. A review of relevant research by Camfed (year) reports positive results of such interventions. For example, the Bangladesh's Female Stipend

Program is shown to have increased the girls' enrolment in secondary school to around double the national average (Ahmed and Ahmed, 2002; Chowdhury, Choudhury and Nath, 1999; Khandker, Pitt and Fuwa, 2003). In Colombia, the Voucher program shows a 25% increase in secondary school enrolment (Patrinos, 2007 in Camfed, 2012). In Kenya, Kremer et al. (2002) show that an RCT consisting of distributing free uniforms, textbooks, along with constructing new classrooms, increased years of schooling by 15%(Kremer, Moulin and Namunyu, 2002). Duflo et al. (2017) explore the effects of a 2008 experiment in Ghana in which 682 students were randomly selected from a sample of 2,064 carefully screened senior high students who were provided a scholarship to encourage them to enroll in and attend school. Paid directly to the school, the scholarship covered full tuition and fees for a "day student" for four years. Fees covered government-approved fees that are applied to all schools, PTA dues, other levies and all exam fees. Students were only responsible for the cost of transportation, school materials, feeding and boarding. Scholarship winners were assigned to the treatment group while the rest were assigned to the comparison group. Study participants were given a mobile phone as well as mobile phone credit twice a year for follow-up calls. Twice a year, researchers attempted to reach the students in order to update their contact information. The baseline survey was conducted in November and December 2009 and included questions on perceptions of education, guardian literacy, values and beliefs, as well as modules on members of the household, household living conditions, and assets. An in-person follow-up survey was administered in 2013 and included questions on schooling, occupation, cognitive skills, labor market expectations, reproductive health and fertility, as well as attitudes and values. Finally, in 2016, researchers conducted a callback survey focusing on major life outcomes. The authors report a range of findings using a simple regression model as well as an IV where scholarship assignment is used as an instrument for education. The results are disaggregated

by gender and by tracks chosen in secondary school, either academic or vocational. I focus on school completion, education attainment and academic performance. The study shows that the scholarship increased the secondary school completion rate by 26 percentage points, performance in Reading and Math by .15 standard deviation, secondary school education attainment by .126 years, and increased tertiary education enrollment by 3 percentage points for academic major compared to vocational major admits. Dulfo et al.'s study adds to the vast literature that shows large positive impacts of scholarship schemes on school completion, educational attainment and academic performance for marginal students while confirming the finding of wealth transfer for infra-marginal students. Moreover, high quality research shows that conditional cash transfers can significantly impact school enrollment. According to Fiszbein and Schady (2009), CCTs are programs that "transfer cash, generally to poor households, on the condition that those households make prespecified investments in the human capital of their children." (Fiszbein & Schady, 2009). Cash recipients must satisfy a series of health, nutrition and education conditions. Poor households are required to take their children to health clinics for regular health check-ups, growth monitoring, and vaccinations of children under the age of 5; mothers must also attend those clinics for perinatal care and periodic information talks. These households must enroll their children in school, ensure 80-85 percent attendance on school days and occasionally sit tests for academic performance evaluation. Most CCT programs transfer the money to the mother or to the student (Fiszbein & Schady, 2009). To date, CCTs are found in more than 40 countries where they vary in size and scope. One notable example of CCTs is the Mexican program called PROGRESA/OPPORTUNIDADES. Created in Mexico in 1997, PROGRESA aims to improve the health and nutrition of low-income families while increasing the educational attainment of children in those families. Eligible families receive bi-monthly cash payments as long as they

satisfy certain conditions: the family must attend a health clinic regularly and children must maintain regular attendance in school. Failure to satisfy those conditions means that transfers will be withdrawn until they are satisfied. The checks are substantial and can account for as much as 20 percent of family monthly income. The amounts vary by grade (three times as much in ninth grade compared to third grade). They also vary by gender, with girl enrollment receiving a slightly greater payoff than boys. Families are also given a grant to buy school supplies as well as a monthly food grant.

In their evaluation of PROGRESA, Simon and Parker (2001) found that the program increased enrollment in secondary schools by 6 and 9 percentage points for boys and girls, respectively. For girls, who often dropped out before secondary school, the transition rate to secondary school rose by 5 percentage points. Also, using a randomized control trial, Schultz (2003) shows that, under PROGRESA, girls' enrolments improved, especially for children finishing primary school and entering secondary school. The most significant increase (15%) was for girls completing grade six (Schultz, 2003).

Besides Progresa, CCT programs in other countries (e.g., Colombia and Turkey) have been successful in improving enrollment rates, particularly at the secondary level (Schady & Araujo, 2006). In Malawi, a two-year (2007-2009) cash transfer experiment targeting adolescent girls explored the difference between conditional cash transfers (CCT) and unconditional cash transfers (UCT) in their impact on school enrollment and attendance, and long-term outcomes such as human capital formation (cognitive skills, test scores in English and Math), marriage and childbearing (Baird, McIntosh and Özler, 2011). The findings show that CCT largely outperformed UCT in terms of school enrollment, yet modestly improved learning. However, compared to CCT, UCT fared well in delaying fertility and early marriage by 27 % and 44% respectively at the end

of the program. Inoue et al. (2015) provide a summary of their detailed review of ten cash transfer and scholarship programs in more than 20 SSA countries. While the outlook on all those programs is largely positive, none of the analysis contains hard empirical evidence on their effectiveness (Inoue et al. 2015).

However, despite the overwhelming evidence of the positive impact of conditional cash transfer programs on school enrollment, some critics question the very concept of conditionality from a human rights-based approach. They charge that while reducing poverty in general, conditional cash transfers have shown to often exclude those who need it the most, violating the human rights principle of non-discrimination and equality (Kunneman, R. & Leonhard, R., 2008). Perhaps, some of the neediest households might find the conditions too costly to comply with (perhaps the clinics are too far away or that the need for child help in harvesting a living from the land is too pressing). This could deter those families from taking the benefits due to the conditions attached to the programs. Therefore, conditions might exclude the people the programs aim to reach.

Additional research explores the design and the implementation of conditional cash transfers in Africa. Schubert and Slator (2006) raise four concerns which are in the form of questions that need to be answered when designing CCT. Firstly, they wonder whether low-income African countries have the service-delivery systems large enough to accommodate the increased demand for additional services (health and education) when additional households try to meet the conditions. Secondly, they point out the implementation-capacity constraints associated with introducing complex cash transfer programs, particularly when those programs are scaled up. To them, imposing conditions on cash payments might overburden those nations because of the capabilities required to monitor the compliance and to respond to cases of non-compliance.

Thirdly, they wonder whether a rigorous cost-benefit analysis would justify additional administrative costs associated with conditional cash transfers. Finally, they are not that convinced with the political economy argument for using conditions. They are not so sure whether policy-makers and taxpayers hold the same views or attitudes towards conditions as it is the case in Latin America or North America. It follows that a careful approach to conditionality with proper targeting is needed to insure that the social protection of the most marginalized categories is guaranteed. For example, an analysis of the Ambassador's Scholarship program in Djibouti and Sierra Leone shows that some scholarship recipients might have continued in secondary school even without the scholarships (Chapman and Mushlin, 2008, cited in Camfed, 2012).

The literature also includes holistic approaches taken by some countries and international agencies to expand access to secondary education. Some of the most promising approaches with a financial component explored by the World Bank's report on transitions in secondary education in Sub-Saharan Africa include the "Girls' Project" in Namibia (1995) and the "Donkey Canvas in Eritrea" (1999) (World Bank, 2008). The report indicates that although fieldwork with "Girls' Project" has reported positive results in terms of fewer pregnancies, more time spent in school and secondary school completion, its impact has yet to be fully evaluated and its effectiveness clearly ascertained through rigorous empirical quantitative methodology. The report also shows that the "Donkey Canvas Project" which provides donkeys and plastic barrels to families for transportation and storage of water supply in Eritrea so as to save girls' energy and free up the needed time for school (World Bank, 2008) does seem to have had limited impact. Although fieldwork has reported positive results in terms of performance at school, building stronger and more intimate relationships between the NUEW and the village communities, many youngsters still walk long distances to school and, in some instances, the donkeys have been used for other purposes or even

sold (Ibid.). Here again, a quantitative evaluation is needed to isolate the impact of the project on female participation in secondary school in Eritrea[9].

Comparable interventions have been initiated by the Campaign for female education (CAMFED) in Ghana, Malawi, Tanzania, Zambia and Zimbabwe. An internal review of such interventions shows that, although it may be difficult to disentangle the effect of the scholarship on enrollment, the results are promising. In Ghana, for example, in schools where CAMFED was well established between 2007 and 2009, enrollment increased by 17%; completion rates have increased by 18% and progression into the next grade has increased by 22% (CAMFED, 2012). The Forum of African Women Educationalists (FAWE) also has a scholarship component in its interventions (Esi Sutherland-Addy, 2008). A review of its evaluation is provided in subsequent section 3.2.1.4.

As this review suggests, scholarships and stipends have proven to be one of the most effective tools to expand educational access. However, they are likely to yield the best results when they are used "in conjunction with careful selection criteria (wealth and gender, and with community consultation), conditions (attached to attendance etc.), and in combination with other strategies, especially ones that may target gender equity in the classroom and beyond"(CAMFED, 2012). Those results are summarized in Table 3.1.

9 A parent project called "Donkeys for schools" was implemented between 2009 and 2010 at the primary school level. An evaluation commissioned by UNICEF in 2011 found that the project increased enrollment and attendance, and reduced drop out rates, which, in turn, improved girls' academic performance (UNICEF, 2011).

Table 3. 1: Evidence on financial interventions

Intervention	Country	Target	Results	Author(s)
Female stipend program	Bangladesh	Secondary school girls	Positive	Ahmed and Ahmed, 2002 Chowdhury, et al., 1999 Khander, et al., 2003
Voucher Program	Colombia	Secondary school enrollment	Positive	Patrinos, 2007, cited in Camfed, 2012
Free uniforms and textbooks	Kenya	Primary school students	Positive	Kremer, Moulin, Namunyu, 2002
Scholarships	Ghana	Secondary school students	Positive	Duflo, etal., 2017
Conditional cash transfers	Mexico	Primary and secondary school students	Positive	Schultz, 2003
	Malawi	Secondary school girls	Positive	Baird, McIntosh and Özler, 2011
Ambassador scholarship program	Sierra Leone Djibouti	Secondary school enrollment	Mixed	Chapman and Mushlin, 2008, cited in Camfed, 2012
Girl's Project	Namibia	Secondary school girls	To be determined	World Bank, 2008
Donkey Canva	Eritrea	Secondary school girls	To be determined	World Bank, 2008
CAMFED	Ghana Malawi Tanzania Zambia Zimbabwe	Secondary school girls	To be determined	CAMFED, 2012

3.2.3 Anti- Child Labor Policies

A significant body of research has looked into whether and how eliminating child labor would affect educational outcomes. A distinction is made between coercive and collaborative measures. One the one hand, coercive measures ban or punish child labor through national (for example, the

1802 Robert Peel's Factories Act in Great Britain, the 1938 Fair Labor Standards Act in the US, the 1991 Child Labor Provisions in China) and/or international legislation (for example, the ILO minimum age convention (C138) of 1973 & Worst Forms Convention 182 of 1990, the UN Convention on the Rights of the Child of 1990). On the other hand, collaborative measures alter the economic environment of decision makers in a household through interventions such as unconditional income subsidies to poor households, rewarding children who go to school instead of working (Progresa in Mexico, Food for education programs in Bangladesh, Red de Protección Social in Nicaragua,…), improving credit and market insurance.

Although some evidence suggests that anti-child labor legislation by establishing a minimum age of employment reduces child labor rates (Fasih, 2007 in Heymann et al., 2013), some critics suggest that such measures may in fact have unintended consequences such as reducing household income and forcing the youth into illegal forms of employment(See summary in Heymann et al., 2013). Others find conventional legislation ineffective particularly for girls who are engaged in unpaid household chores (Assaad et al., 2010; Basu & Tzannatos, 2003; Blanco Allais, 2009; de Silva-de-Alwis, 2007; Gunnarsson, Orazem, & Sanchez, 2006 cited in Heymann, 2013). In their study, Heymann et al. (2013) explore in detail the relationship between minimum age of employment of 15 or higher legislation and enrollment in secondary school on a global scale, for males, females and overall. Based on information on child labor provisions in 185 countries between 2008 and 2012, and using OLS regressions while controlling for national economic wealth, level of urbanization, and compulsory lower secondary education policies, the authors find a positive association between a minimum age of employment of 15 or higher with increased secondary enrolment for girls, boys and overall (Heymann et al., 2013). The authors do acknowledge that further studies are needed to provide better evidence of causality by using

longitudinal databases and exploiting how changes in policies over time might impact educational outcomes.

As shown earlier, collaborative measures that are tailored to the incentives and constraints faced by the child laborer are most likely to impact school participation in the most effective ways. In their evaluation of PROGRESA, Simon and Parker (2001) found that the program increased school attendance and reduced work activities as well as in domestic chores for girls. Edmonds (2006) uses a regression discontinuity design to study the response of schooling and child labor to the timing of income by comparing child activities in households that are eligible for the South African Old Age Pension program to households that are nearly eligible. Exploiting the 1999 survey data on youth activities (age 13-17) in Africa, the author finds an increase in schooling for older children. However, the increase does not necessarily translate into decline in child labor, rather in hours worked. The study also corroborates earlier findings that credit constraints may lead to an under-investment in education, and that receiving large cash transfers weakens credit constraints, and, hence, children work less and attend school more (Edmonds, 2006). These results are summarized in Table 3.2.

Table 3. 2: Evidence on anti- child labor measures

Intervention	Results	Author (s)
Minimum Age Law	Reduced child labor in Pakistan	Fasih, T., 2007
	Unintended consequences	Asaad, et al., 2010
	Illegal forms of work	Basu & Tzannatos, 2003
	Ineffective for girls	Blanco Allais, 2009 De Silva-de-Alwis, 2007
	Positive for girls	Gunnarson, et al., 2006
		Heymann et al., 2013
PROGRESA, Mexico	Increased attendance and reduced work activities	Simon & Parker, 2006
South Africa Old Age Pension Plan	Increased school attendance Decline in hours worked	Edmonds, 2006

3.3 Supply-Side policies

The literature centers around constructing new schools, improving the quality of education and initiatives to reduce hindering factors to secondary education, counseling, support for girls' education through international agencies such as USAID and UNICEF as well as initiatives such as CAMFED and FAWE (Esi Sutherland-Addy, 2008). It is, however, important to note the paucity of extensive quantitative studies that provide empirical evidence on the impact of such policies on access to secondary education in Sub-Saharan Africa. The literature abounds with descriptive reports on local and small-scale practices (Ibid.).

3.3.1 School construction

Glewwe et al. (2014) identified 18 papers that have explored the impact of school and teacher characteristics on time-in-school variables, such as daily attendance, current enrollment and years in school. The authors found a more consistent set of findings, namely that building new schools

increases enrollment and years of completed schooling. Yet, their review neither sheds light on the impact of building new schools on school enrollment by level of education nor does it specify the countries/region where the policy has been implemented. Filmer (2007) uses 24 data sets from 21 low-income countries to uncover the relationships between school enrollment and distance to primary and secondary school and simulates the effect of large reductions in distance to school on enrollments. He finds that "while school availability is often statistically significantly associated with the probability of enrolment, the magnitude of the association is small" (Filmer, 2007). Simulation scenarios also show that increasing school availability might be a limited tool to increase secondary school enrollment of girls relative to boys and that, in some countries, such policy might exacerbate social inequalities (Filmer, 2007), with richer children being the first to take advantage of more school availability. The author shows that, in Mali "the marginal effect of a one kilometer reduction in the distance to the nearest primary school is associated with a 1.3 percentage point increase in the enrolment of poorer girls but a 2.5 percentage point increase in the enrolment of richer girls"(Filmer, 2007). It should be noted, however, that Filmer's simulations are not based on girl only schools. A review of a policy that consisted of building such schools in Pakistan was found effective at increasing girls' enrollment in that country (Filmer, 2007). Comparable studies are thus needed to provide hard empirical evidence on the effectiveness of such policy in Sub-Saharan Africa.

3.3.2 Improving school quality

Interventions to improve school quality have also been found to have an impact on school enrollment. In Filmer's review (2007) of the existing literature, the availability of blackboards and desks (Lavy, 1996),the number of trained teachers (Handa, 2002), the perceived quality of mathematics instruction (Bommier and Lambert, 2000), and the quality of the school environment

and staff (Younger, 2000, 2003) are associated with higher school enrollment (Fimer, 2007). The 2004 World Bank report also confirms those findings in the particular context of Ghana, showing that several indicators of classroom quality are associated with a lower dropout probability (Filmer, 2007).

Additional studies in Filmer's review show that a differential treatment of girls relative to boys in Kenya contributes to differential dropout among boys and girls (Lloyd et al. 2000) and that school environment, teacher qualifications and some measures of teacher behavior are significantly associated with grade attainment of adolescent girls in Egypt (Lloyd et al., 2003). Of particular interest are incentive-based policies that aim at modifying teachers' behavior by paying them on the basis of their students' academic performance. Glewwe et al. (2014) note that such policies provide "them an incentive to improve the quality of their teaching and thereby increase their students' learning" (Glewwe et al., 2014). However, the Glewwe and Kremer study in Kenya found that teachers seem to have taught to the test, so the academic gains were not found when a different test was used (Glewwe et al., 2010). Although limited, studies in this area have mostly targeted primary schools and focused on the effects of such policies on student learning as measured by test scores. Only one study by Burde and Linden (2012) explores the incentive effects on primary school enrollment rates in Afghanistan. In randomly selected villages, the program provided educational material and training to locally recruited educated individuals to serve as teachers in village-based schools. The authors show that the program increased enrollment by 42% and that the effect on enrollment was stronger for girls than for boys.

Unfortunately, this review concurs with earlier observations (Deacon, 2012) on the paucity of hard empirical evidence on the effects of teacher's pay for performance in general and on enrollment rates in Sub-Saharan Africa in particular.

Other school quality interventions include improving school monitoring, accountability and community involvement. Hunt's review of the literature on this point shows "that forms of community involvement with schools can improve educational access, reduce dropouts and improve teacher attendance (Birdsall et al, 2005 cited in Hunt, 2008). Moreover, involving parents in school processes regarding curriculum reforms and accountability mechanisms is also likely to positively impact school access. Unfortunately, examples of such interventions in Sub-Saharan Africa as well as hard empirical evidence of their effectiveness are hard to come by in the literature.

3.3.3 Counseling

Counseling is imbedded in a number of initiatives that seek to help individual students to make the right educational choices. The aforementioned initiatives such as "Girls' project" in Namibia and "National Union of Eritrean Women" as well as USIKO in South Africa provide such opportunities to the youth. While most of the interventions tend to enhance girls' education, South Africa's USIKO targets boys and young men and serves as a rite of passage to manhood for young men at risk in challenging communities. Mature male volunteers serve as mentors to the young and provide strong, positive, supportive male role models in the community (World Bank, 2008). Although the literature fails to provide empirical evidence on the effectiveness of the program, the World Bank review shows that USIKO has had positive effects by encouraging dropout youth to return to school. The program has also expanded and inspired the launch of a parent program called "girl to woman" which targets young girls (Ibid.) as part of a growing campaign aimed at expanding girls' education.

3.3.4 Support for Girls' Secondary Education

The literature points to a large number of girls' education programs that include mentoring, tutoring and peer support and are supported through local government support and international

agencies' sponsorship such as UNICEF, USAID, CAMFED, UNESCO, FAWE (Esi Sutherland-Addy, 2008)[10]. The most recent review of those programs finds very little available evidence on their impact (CAMFED, 2012). Some studies even question the effectiveness of "girl-friendly environment" interventions on attendance, retention, learning, attainment and empowerment. If there is any qualitative evidence, it remains anecdotal as shown in World University Services of Canada's 2011 evaluation report of Uniterra Girls' Education project in Ghana. That reports finds no "statistical hard evidence" showing that the project did improve transition, retention and completion rates for basic schools and SHS, particularly for gender disaggregated data (WUSC, 2011 cited in CAMFED, 2012). Also, a report on FAWE's Centers of Excellence[11] in Kenya shows that enrolment has increased for girls from 46% to 229% at SHS level between 2001 and 2008 (and for boys from 49% to 171%). Completion rates have increased from less than 10% in 2001 to 98% as at 2008. The center's performance ranking in the district has moved from 30th position to the top 5 positions out of 40 schools (CAMFED, 2012). Unfortunately, the report fails to provide any hard empirical evidence to suggest that those results can be attributed to the implementation of the program in Kenya.

3.5 Concluding remarks

This review has uncovered a series of demand and supply-based policy interventions aimed at expanding secondary school participation across Sub-Saharan Africa. Unfortunately, empirical evidence on their effectiveness is hard to come by. On the demand side, the existing thin body of empirical evidence shows that eliminating tuition and fees, scholarship schemes and stipends, whether embedded in conditional cash transfers or other holistic approaches (targeting girls'

[10] CAMFED: Campaign for female education. FAWE: Forum for African Women Educationalists.
[11] Government schools, which receive investment to make them gender-responsive and thus provide a "girl-friendly environment.

education), tend to increase school enrollment, attendance, persistence and completion. Yet, better policy design and targeting is warranted for sustainable success of the interventions. On the supply side, the literature shows that building new and high quality schools, providing counseling to students, improving the quality of education through adequate infrastructures, material (classrooms, blackboards, desks…) and human (trained teachers) resources, monitoring systems and accountability measures, building partnerships between schools and communities, are among the many steps to be taken that could improve secondary school participation across Sub-Saharan Africa.

It should be noted, however, that the above results only partially help to explain why there are so few adolescents in secondary school in Sub-Saharan African countries and why we know so little about the effectiveness of policies aimed at reversing the current trends. The following three reasons may account for the limitations of this review. Firstly, the economic research on secondary education across Sub-Saharan African countries is very limited. Following decades of neglect (Verspoor, 2008), interest in secondary education has gone up only since 2003 with the World Bank's first conference on secondary education in Africa (Bregman, 2005). Secondly, existing research tends to center around primary and tertiary education. One has to sift through the literature on either sector to decipher any pertinent analysis pertaining to secondary education. Some research wrongly assumes that primary education-related analysis could be easily applied to secondary education. Thirdly, the literature abounds with descriptive studies and anecdotal evidence on the effectiveness of policy interventions aimed at expanding secondary school participation. Wide gaps in the research call for more rigorous empirical studies to shed light on what works to expand secondary school participation in Africa.

This dissertation addresses those gaps by exploring the effectiveness of one notable policy intervention, namely the elimination of school tuition and fees at the lower secondary school level in the specific context of Uganda's rural and poor urban areas. The next chapter introduces and discusses that policy known as the Universal Secondary Education or USE.

Chapter 4: Universal Secondary Education in Uganda: Background and Effectiveness

4.1 Introduction

This chapter provides an overview of the Ugandan Universal Secondary Education (USE) policy (history and rationale) and discusses the evidence of its effectiveness based on the existing literature and government reports. The chapter is structured as follows. In the next section, I describe the Ugandan education system (4.2.); I then explore the USE policy background and underpinnings (4.3) and discuss its implementation in section 4.4. Going beyond government reports, I summarize, in section 4.5, the evidence from the existing body of research on the effectiveness of the USE. I conclude the chapter with a summary of the key findings from the above discussion in section 4.6.

4.2 Ugandan Education System

The Republic of Uganda runs a 7-4-2-4 education system which mirrors the British education system. Introduced during the colonial time, the system has not changed that much since Uganda gained its independence from Britain in 1962. School starts at a tender age of 2 with the non-compulsory and non-regulated pre-primary education. A typical school year starts in February and ends in November, for a total of 260 days of instruction, leaving 104 days of vacation. A normal school day must start at 8:00 AM and end not later than 5pm[12].

Primary education starts at age 6 and consists of seven years of schooling. Grades are referred to as P1-P7. The first three years may be taught in a local district language while P4-P7 are taught in English. The primary education ends with the Primary Leaving Exam (PLE) in four subjects including Math, Science, English and Social Studies. The best score one student can achieve is

[12] See Government of Uganda, Ministry of education and sports

aggregate 4, which constitutes the collection of 4 distinctions in all four subjects, while the worst score is aggregate 36, which is the collection of 9 failures in all four subjects. In 1997, the government of Uganda introduced the Universal Primary Education (UPE) to encourage broader participation in primary education. The policy has been widely acclaimed as a success and credited for a spectacular expansion of primary education participation, with the gross primary school enrollment rate exceeding 105% on average for the past 10 years (World Bank Data, 2017). Repetition, over-age and underage enrollment might explain the enrollment rate of above 100%. Successful completion of primary school leads to either a three-year craft course in a technical school or to secondary education, which consists of six years. There are public and private secondary schools scattered throughout the country. Yet, the private sector dominates the secondary education sub-sector, with 1,672 schools against 1,023 public secondary schools (Republic of Uganda. Ministry of Education, Education Statistical Abstract, 2015), which, nationally, represents 62% of the market.

The secondary education system is divided into four years of lower secondary education, also called the Ordinary Level, followed by two years of upper secondary education, called Advanced Level. At the end of the four years of ordinary level, students must sit and pass the O'level exams for the Uganda Certificate of Education (UCE). Students are tested in eight subjects (English, Math, Biology, Chemistry, Physics, Geography, History & Literature) and two optional for a total of 10 subjects. The best score one student can get is aggregate 8, which is the collection of 8 distinctions in all 8 subjects while the worst score is 72, which is equivalent to 9 failures in all 8 subjects.

Successful completion of the O'level leads to four possible outlets: proceed to Advanced Secondary Education, join a two-year advanced craft course in technical institutes, join a two-

year grade III primary teaching program or join any of the government's departmental programs such as agriculture, health, veterinary, and cooperatives. The same scenario applies after the completion of the Advanced Secondary Education. Students can proceed to University, enroll in a two-year training program leading to a diploma in teacher education, technical education, business studies or join a departmental program.

The chart below best illustrates the progression through the Ugandan Education System:

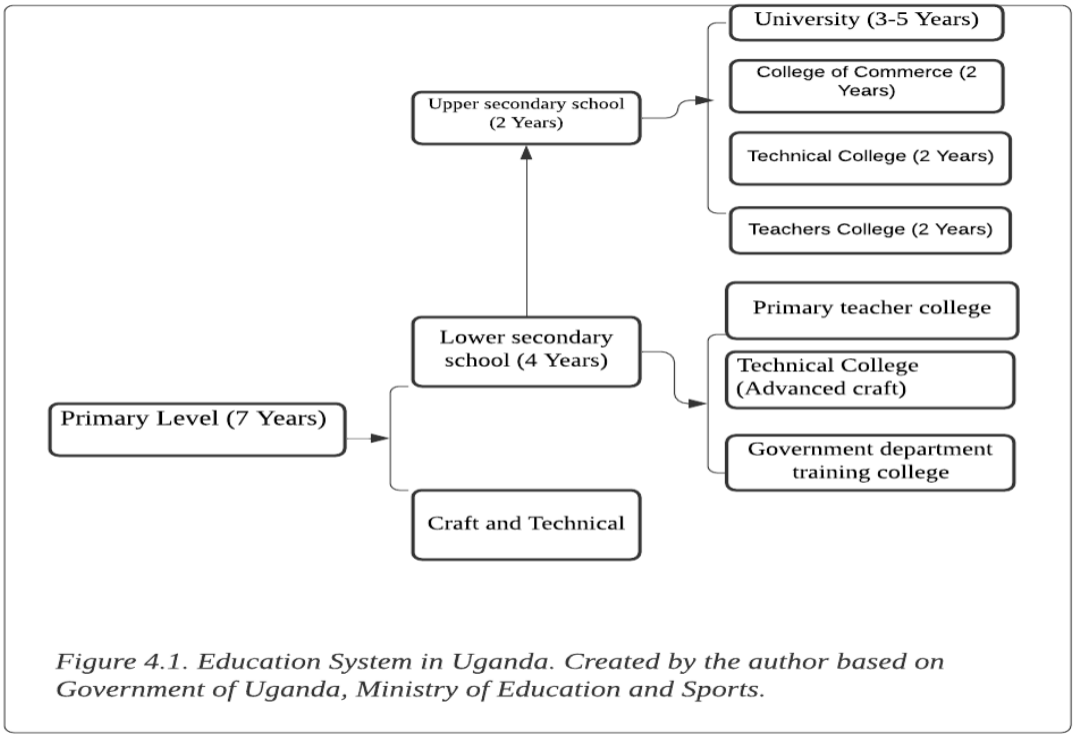


Figure 4.1. Education System in Uganda. Created by the author based on Government of Uganda, Ministry of Education and Sports.

Figure 4. 1: Education system in Uganda

Secondary school grades are called “Seniors”, ranging from S1 to S4 (O-Level) and S5-S6 (A-Level). O-Level education caters to students aged 13-17 while students in the A-Level are around 18-19 years old. English is the language of instruction throughout the system.

Over the years, although still lagging behind many African countries, secondary school enrollment has seen a remarkable growth, rising from the paltry GER 4% in 1970 to GER 23.2% in 2015 while the lower secondary education completion rate increased from 4.3% in 1976 to 29.7% in 2014 (World Bank Data, 2017).

Government as well as numerous reports attribute Uganda’s secondary education expansion to several measures taken to attract the youth to and keep them in school, particularly the Universal Secondary Education (USE) policy inaugurated in 2007 (Uganda National Bureau of Statistics, Statistical Abstract 2007-2016). The next point explores the available evidence on the effectiveness of this policy.

4.3. Universal Secondary Education

In 2007, Uganda became the first Sub-Saharan African country to implement the Universal Secondary Education/Universal Post Primary Education and Training (USE/UPPET), with a clearly stated objective to increase access to quality secondary education for all eligible students regardless of their socio-economic background (Government of Uganda - Ministry of Education and Sports, National Headcount Exercise, 2013; Barungi, 2015). Yet, as Chapman et al. (2010) put it, the policy was prompted by three main factors, namely, the need to consolidate Universal Primary Education gains, the need for a more highly educated workforce and the 2006 presidential campaign promise of expanding free-tuition education delivery to the secondary education level (Chapman, et al., 2010). During the presidential campaign, incumbent president Museveni promised to provide free post-primary education for all students who were qualified to enter

secondary school. Following the election, the Ministry of Education granted President Museveni's wish by rolling out the universal secondary education policy, defined as the "equitable provision of quality secondary education to all Ugandan students who have successfully completed the primary leaving exam" (Lewin, 2006, p. 10). Successful completion of the primary school was defined as scoring between 4 and 28 on the primary leaving exam. Also, the USE policy was rolled out only in public and private secondary schools that had school tuition and fees under UShs 70,000[13] per term (see Huylebroeck, L & Titeca, K, 2015). Therefore, the secondary education sector is divided between USE and non-USE schools. Under the USE/UPPET policy, the government would subsidize secondary education by "paying school fees, providing textbooks and other instructional materials for both students and teachers, meeting the costs of co-curricular activities, school administration and maintenance" (Government of Uganda, Ministry of Education and Sports, 2013). Since 2007, the per-student capitation grant has remained fixed at UGX 41,000 and UGX47,000 per term for students registered in public and private secondary schools respectively[14].

The 2008 Education Act affirmed the USE/UPPET in its Art. 13, section 9, clearly prohibiting charging of fees in any primary or post-primary institution implementing the UPE or the UPPET and expelling students for failing to pay tuition and fees and declaring any violation of those dispositions a legal offense, punishable by imprisonment or fine (Uganda Education Act 2008). While prohibiting the levying of any tuition and fees in the USE/UPPET schools, the policy leaves ample room for parental responsibility in the education of the children, namely providing accommodation, lunch, uniforms, medical care and scholastic materials (Asankha &Takashi,

[13] The equivalent of $US 40 based on February 2007 exchange rate.
[14] The equivalent of $US 23.5 and $US 27 in 2007 and $US11.34 and $US 13 in 2016.

2011; Chapman, D.W. et al., 2010). Under the USE policy, the government disburses the funds at the beginning of each school term directly to USE schools through the district education office based on the number of qualified students. Again, qualified students are those who score between 4 and 28 on the primary leaving examinations. Parents are notified about these funds the Annual Principal's report at the Teacher-parent Association meeting. Only students who started their secondary school education in 2007 and onward would benefit from the policy. Students are allowed to transfer between USE schools whereas transferring from a USE to non-USE school would forfeit the subsidy.

The hope was that through this policy, school tuition and fees would no longer be a barrier to secondary school participation, particularly for students from poor households. Based on Liang's 2002 post-primary education sector report, which estimated the total unit direct cost of education at UGX 490,000, the subsidy provided under the USE policy covers only 28.7% of the total unit direct cost of education (Liang, 2002). Hailed within the country, the policy has also drawn positive reviews from the international community and has been applauded as a positive step toward the realization of the Education for All and Millennium Development Goals (MDG).

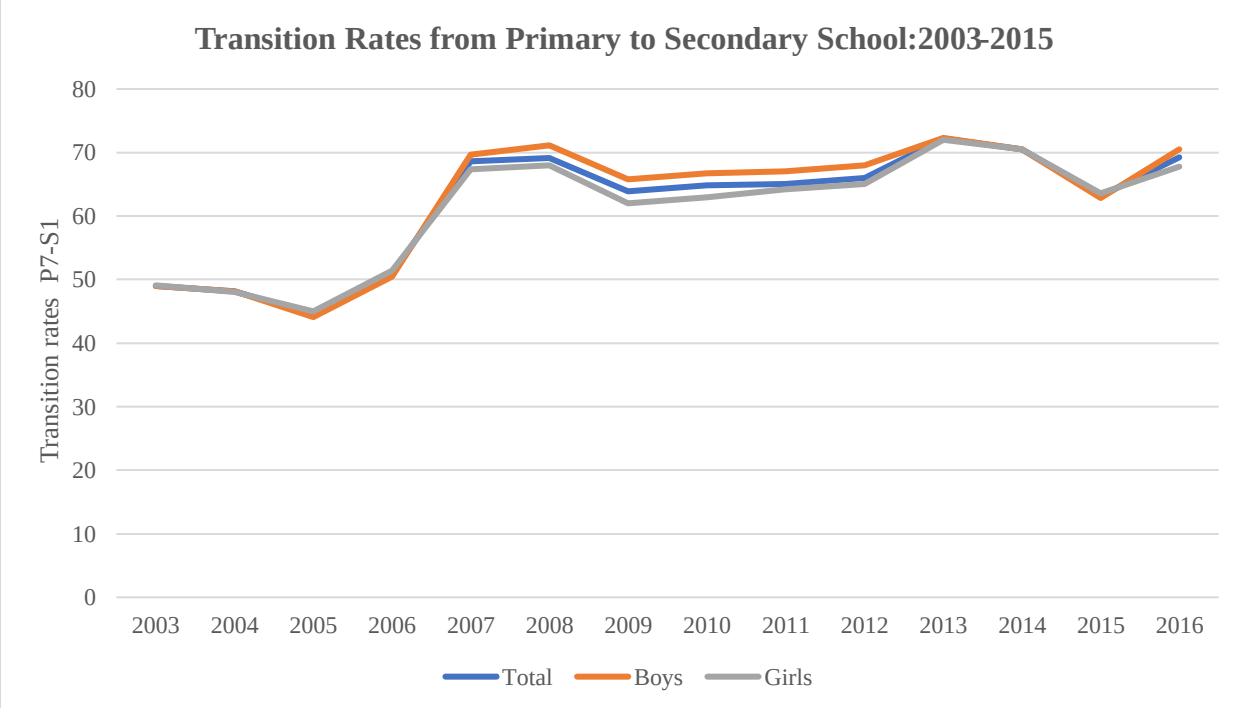
4.4 USE implementation and results

Ten years into its implementation, the Universal Secondary Education/Universal Post Primary Education policy continues to be at the center of policy debates, most of which center around its implementation and effectiveness, which I discuss in the next section.

4.4.1 Transition from P7 to S1 trends

Up to two years prior to the USE policy implementation, transition rates from primary to lower secondary school had been declining from 56.1% in 2002 to 44.5% in 2005. During that time, there was an upward trend in dropout rates between P6 and P7, meaning that the survival rate to the last year of the primary school was low. Data[15] show that between 2002 and 2005, more than 35% of P6 pupils dropped out of school each year, thus leading to lower transition rates from primary to LSS. That downward trend reversed in 2006 with 6 percentage points gain, followed by an 18-point gain in 2007 when the rate reached 68.6%. Since that time, the trend has either been flat or slightly increasing or decreasing, yet still above the pre-policy numbers.

Figure 4. 2 Transition rates from primary to secondary school



(Source: Government of Uganda, Ministry of Education, Fact Booklet 2016).

[15] Uganda Bureau of Statistics, 2007 Statistical Abstract.

4.4.2 GER and NER Trends

Trends in Uganda's gross and net enrollment rates seem to mirror the transition rates from primary to lower secondary school trends from 2002 to 2015. While gains have been made, enrollments remain significantly low, with gross enrollment rates increasing from 19.6% in 2002 to 24.5% in 2015 and net enrollment growing from 16.7% to almost 22% over the same period. As mentioned earlier, these numbers are surprisingly low compared to the rest of Sub-Saharan Africa where secondary school enrollment rates hover above 40%.

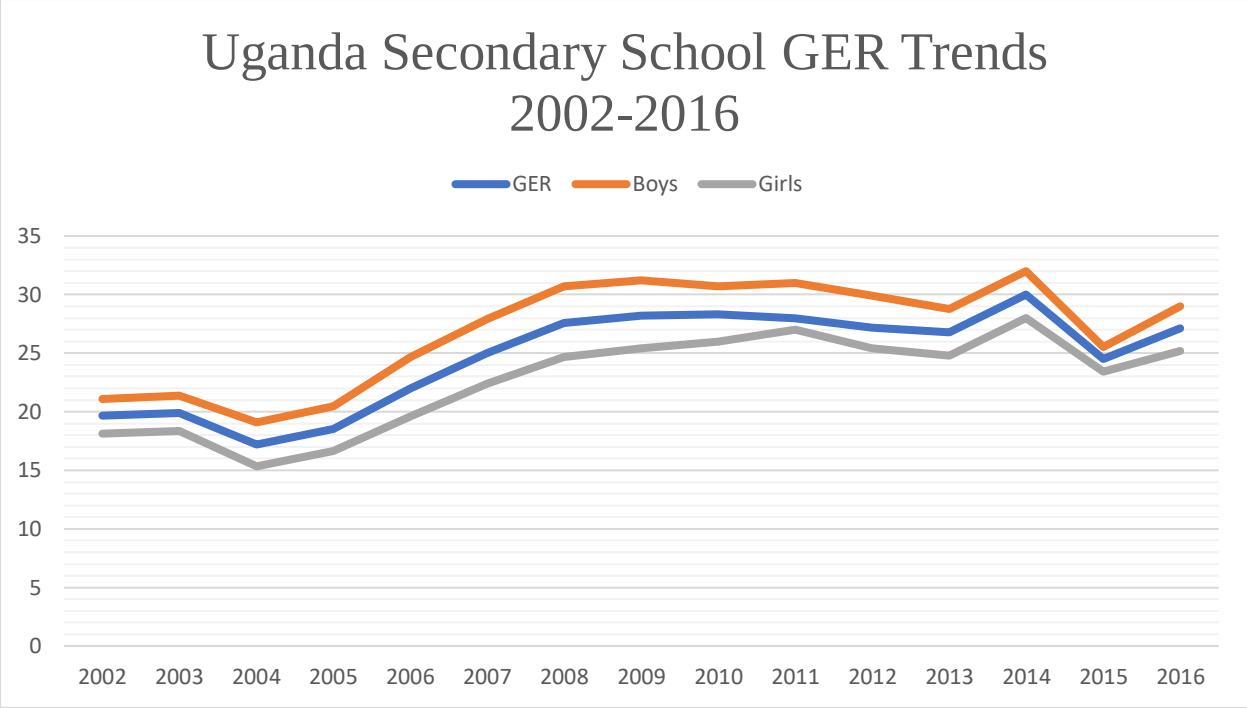


Figure 4. 3: Uganda Secondary school GER trends 2002-2016 (Source: Government of Uganda, Ministry of Education, Fact Booklet 2016).

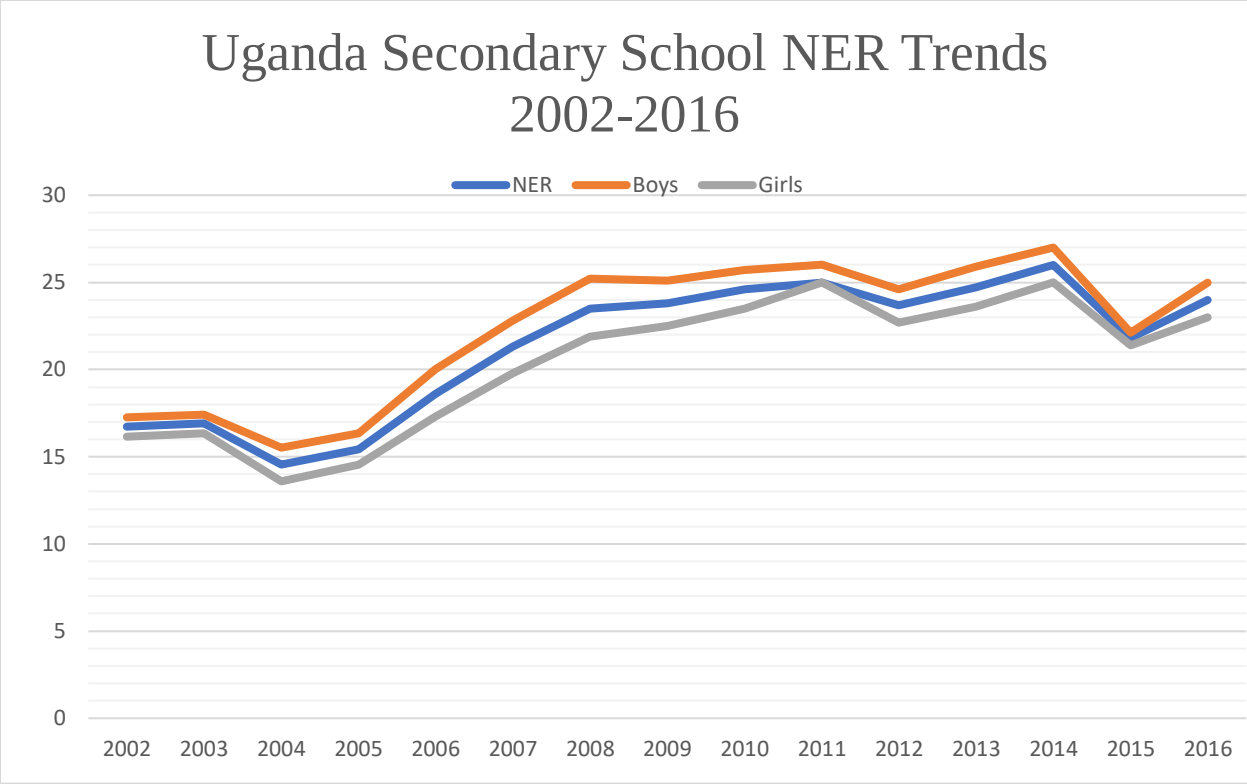


Figure 4. 4: Uganda secondary school NER trends 2002-2016 (Source: Government of Uganda, Ministry of Education, Fact Booklet 2016).

4.4.3 Lower Secondary School Completion Rate Trends

Since the USE policy was implemented in 2007, we would expect to see the effects of the policy on the cohort of students completing lower secondary school in 2010. The chart shows that LSS completion rates reached their highest point in 2010, with 39%. The second cohort had the lowest completion rate of 33%. Overall, more students have been able to complete lower secondary school since the implementation of the USE policy, increasing from 22% in 2002 to 36.2% in 2015.

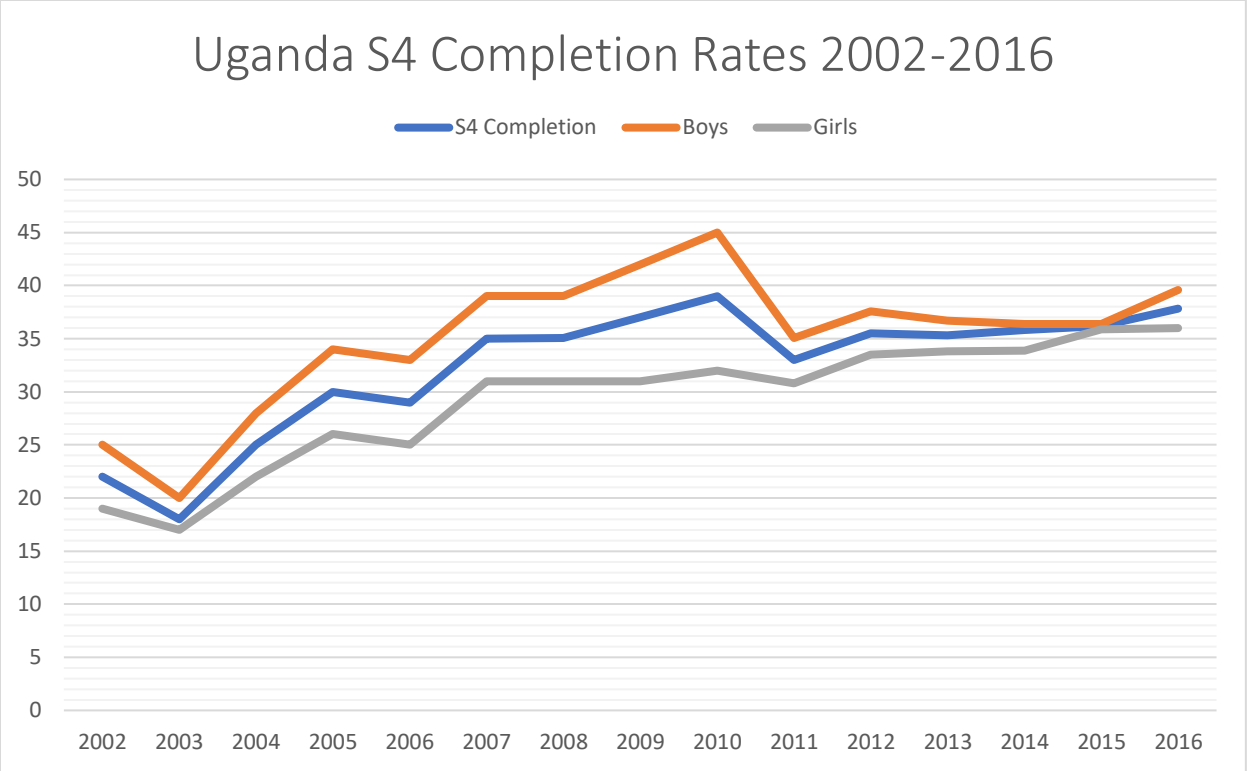


Figure 4. 5: Uganda LSS Completion Rates 2002-2016 (Source: Government of Uganda, Ministry of Education, Fact Booklet 2016).

Various reports from the government of Uganda laud the expansion of the secondary education sector following the introduction of the Universal Secondary Education policy in 2007. Annual school census reports show that secondary school enrollment increased from 814,087 in 2006 to 1,284,008 in 2015, which represents a 6.4 percent annual growth rate (Government of Uganda, 2006-2014, table 1). However, it is worth remarking that in that period, net enrollment rate stood at or below 26% while gross enrollment rarely reached 30% (Ministry of Education and Sports, 2015). Those figures constitute, unfortunately, an underperformance compared to the rest of Sub-Saharan African countries where gross enrollment rates hovered above 40% on average (World Bank, 2014). Without discounting the progress achieved over the past ten years in expanding secondary school participation, it appears that Uganda has yet to educate a sizable proportion of its youth population.

4.5 Evidence on USE Effectiveness

From a quantitative standpoint, and perhaps due to the relative infancy of the USE policy, the empirical evidence on its effectiveness is astonishingly scant. Using household panel data collected in 2005 before the policy was implemented and in 2009, two years following the introduction of USE, and following a multinomial logit estimation, Asankha, P. and Takashi, Y. (2011) found that eliminating school fees has considerably increased secondary school participation in Uganda, particularly for girls, who were 49% more likely to enroll in secondary school after the policy was introduced. The study also found that the proportion of girls from the lowest quintile attending public secondary school increased in 2009 compared to 2005. However, there was no statistical evidence that boys benefited from the policy or that private secondary school enrollment rates were impacted in any way.

Barrera-Osorio et al. (2015) explored the impact of the public-private partnership on the performance of participating private secondary schools in the USE. Using a randomized phased-in design, they worked with the Ministry of Education and Sports to randomly assign applicant private schools to one of two subsequent USE treatment groups: one that received the USE in one academic year and one that received it the following academic year. From 250 private schools that applied to participate in the USE policy in 2011, the authors selected 100 schools that met the criteria. Then, from that group, 50 schools were randomly assigned to one group (treatment group) that implemented the USE policy in 2011 and the other 50 schools to another group (control group) that was invited to implement the policy in 2012. Impact was estimated along three sets of characteristics: school characteristics, accountability mechanisms and student body characteristics. Baseline information was collected at the end of 2010, prior to randomization, from 119 and 105 teachers and from 944 and 801 students in treatment and control schools, respectively. Three

follow-up interviews, called checks, were conducted in July 2011, September 2011 and February 2012. To monitor student performance, the authors relied on the National Assessment of Progress in Education, a mid-year test in English, Math and Biology conducted by the Uganda National Examination Board. The test results in all three subjects were collected in July 2011 and July 2012. The authors found that total enrollment increased by over 100 students after one year of participation in the USE policy, the survival rate of PPP schools was considerably larger, with 10% of non-participating schools closing compared to just under 4% of PPP schools, and the policy did not affect school governance in any systematic way. Yet, more importantly, the authors found that students in participating schools achieved higher scores in English, Biology and Mathematics, with gains in English and Math ranging between .2 and .25 statistically significant standard deviations in English and Math, and but not in Biology. One possible explanation of the gains in participating schools could be that the subsidies might have enabled students to spend more time in school and on studying. While the study uses a rigorous approach in assessing the impact of the USE policy, it fails to provide any comparison with policy effects on public schools. The approach does also seem problematic from the group composition standpoint. At the third check, the authors interviewed 1,467 and 1,261 students in treatment and control schools, respectively. How similar were the additional students to the original ones? Any potential differences could cast doubt on the credibility of the results and wrongly attribute the observed gains to the policy.

Omeova, C. and Gale, C. (2016) explore the household level effects of the Universal Secondary Education policy, including school attendance, household expenditure on education, (particularly for the lowest income groups) and student retention throughout the secondary school. Relying on data from the Uganda National Panel Surveys conducted in 2009-2010 and 2011-2012 and using a set of regression models with interactions terms as well as a logit model, the authors

found results ranging from mixed to inconclusive. The authors found that although official reports claim that school enrollment has increased since the introduction of the USE, attendance has remained flat. Moreover, they showed that the government capitation grant was associated with lower household education expenditure, though education costs have gone up while the subsidy has remained flat. Finally, the study showed a lack of difference in the USE impact by wealth status as well as inconclusive results on the USE impact on school retention.

Though informative, other studies (Chapman, D. W. et al., 2010; Molyneaux, K., 2011; Huylebroeck, L & Titeca, K, 2015; Barungi, 2015) are either descriptive/qualitative in nature or simply broad in their assessment of USE. Ogawa, K. and Wokadala, J. (2011) used EMIS data and found an increase in enrollment for S1 from 209,000 in 2006 to 292,000 in 2008 (p. 112), which they attribute to USE rollout. At the same time, they showed a persistence in gender inequalities despite the introduction of USE and offered evidence for a host of factors in determining gender inequalities in lower secondary schools, including household spending on education and inadequate resources at school.

Huylebroeck, L & Titeca, K. (2015) used data from semi-structured interviews conducted in the Masaka district and Kampala from August to October 2014, with various factors at both the local and national levels, to assess the impact of the USE on school enrollment and student performance. Without providing the number of participants in the interviews, the authors claim that educational attainment has remained slow and that student performance has declined since the introduction of USE. They caution against taking the national statistics on school enrollments at face value and interpreting the massive increases in enrollments as a sign of the USE success for various reasons: between 2007 and 2013, the number of USE schools has increased by 664, from 1,155 to 1,819; inaccurate headcount reports by school principals showing higher than actual

numbers of students in order to bring in more government subsidies. Yet, more importantly, the authors show that when the net enrollment rates are taken into account, Uganda is still performing below the Sub-Saharan average. That finding, as they correctly state, comes as a shocking surprise since Uganda has been portrayed as a pioneer in implementing reforms to expand educational access.

Chapman et al. (2011) explore the extent to which head teachers were involved in the design and implementation of the Universal Secondary Education policy and the resulting impact of that involvement on the success or lack thereof of the USE. Using structured and semi-structured interviews with 256 USE and non-USE secondary level head teachers and deputy head teachers from all four regions (Central, Western, Northern and Eastern), the authors show both a largely positive reception of the concept of the USE and a generally negative perception of its implementation. The study revealed that head teachers were ill-prepared and needed more training in how to implement the policy, the funding was inadequate, teaching loads would increase, funds were mismanaged at the Ministry of Education and Sports, and the policy would lead to teacher shortages.

Molyneaux, K. (2011) focuses on the gender differences in the impact of the USE policy implementation on teachers and moonlighting activities[16]. The author works on the premise that the USE policy has led to a loss of income for teachers and thus has led them to take on additional teaching and non-teaching jobs in order to strengthen their financial stability. In the pre-USE era, teachers supplemented their government-paid income through PTA funds, tutoring, marking

[16] "Moonlighting activities" refers to the fact that teachers take on several teaching and non-teaching jobs to ensure personal financial stability

examinations and small business/farming activities (Mulkeen et al, 2007, cited in Molyneaux, K. 2011). Unfortunately, under the new policy, PTA funds as well as any other non-authorized school fees are forbidden in all USE schools, thus reducing teachers' income and opening the door to moonlighting activities. Using data from field work conducted from September 2008 to May 2009 in a suburban school, just 10 miles outside the city of Kampala, Molyneaux shows that the USE had led to an increase in moonlighting activities and to problems of poor service delivery such as widespread teacher absenteeism. More importantly, the author contends that, compared to female teachers, male teachers were more likely to engage in moonlighting activities and even secure higher paying teaching jobs at other schools. Female teachers tend to be limited by family obligations, the nature of the subjects taught (mostly arts and humanities) and the fear of being demoted or transferred to a village as a punishment while male teachers were in high demand because of their sought-after subjects (Math and Sciences) and ability to move around. Although informative, Molyneaux's findings may be hard to generalize due to the very limited sample of the study.

4.6 Concluding remarks

As the foregoing suggests, the current literature on the USE policy fails to offer a clear picture of its effectiveness. Judging by the quality of the studies surveyed above, it is difficult to attribute the absolute growth levels of secondary school enrollments to the Universal Secondary Education policy. As many have suggested, the aforementioned growth could be related to the increasing demand for secondary education resulting from the Universal Primary Education policy, or simply to population growth (Omeova, C. & gale, C., 2016; Huylebroeck, L & Titeca, K., 2015). Moreover, existing studies explore the impact of the policy on school participation and show limited interest in education quality as measured by student performance on national assessments.

With only one study using a randomized controlled trial (Barrera-Osorio, F. et al., 2015) and only one relatively rigorous study using a quasi-experimental approach limited to household level (Asankha, P. & Takashi, Y. (2011), the current research body is thin and calls for more robust quantitative studies to provide additional evidence on the effectiveness of the tuition free delivery of education at the secondary school level in Uganda.

Chapter 5: Macro-effects of the USE policy: A synthetic control approach

5.1 Introduction

In an effort to disentangle the effects of the Universal Secondary Education policy in Uganda, a simple comparison between the pre- and post-policy school participation indicators would suffice if the components of an ideal experiment were available: successful random assignment to either the control or the treatment group[17], baseline survey on school participation indicators for both groups. Taking the difference on those school participation indicators before and after the implementation of the program and comparing them between the treatment and the control groups would show the effect of the policy (Murnane & Willett, 2010).

Unfortunately, the peculiar setting in which the Universal Secondary Education policy was implemented in Uganda does not lend itself to such a straightforward identification. Instead, this study uses two quasi-experimental approaches to ascertain the effectiveness of the Ugandan USE policy. In this chapter, I use a synthetic control method (SCM), introduced by Abadie and Gardeazabal [2003], Abadie et al. [2010] and Abadie et al. [2015], to answer the first research question. My outcome of interest is the aggregate enrollment ratios at the lower secondary school level in Uganda. I will seek to ascertain how much of the change (growth or redistribution) in LSS enrollment could be attributed to the USE policy since its implementation in 2007.

This chapter is structured as follows. In the next section, I provide the rationale behind the synthetic control method (5.2.), followed by the techniques used in the construction of the synthetic control group and treatment estimation (5.3) and the inferential procedures (5.4). Using the

17 A successful random assignment would mean that: 1) both treatment and control groups were balanced in pre-treatment characteristics i.e. the groups were equal in expectations; and that 2) assignment to the treatment group was independent of the characteristics (Murnane &Tyler, 2010).

techniques described above, I implement, the synthetic control method in section 5.5. and close the chapter with some concluding remarks in section 5.6.

5.2 Synthetic Control Model: Rationale

In a synthetic control approach, the impact of a program is evaluated by comparing "outcomes between units representing the case of interest, defined by the occurrence of a specific event or intervention that is the object of the study, and otherwise similar but unaffected units "(Abadie et al., 2010) as in a typical difference-in-differences analysis. However, one of the key elements of the synthetic control method is that the comparison group "is selected as the weighted average of all potential comparison units that best resembles the characteristics of the case of interest" (Abadie et al., 2010). The premise is that a combination of comparison units tends to do a better job at reproducing the characteristics of the unit of interest than a single comparison unit alone. More importantly, the result of this combination, hence the term "synthetic" is intended to reproduce the counterfactual of the case of interest in the absence of the event or intervention under scrutiny (Abadie et al., 2010). Taking the difference between the treated group and the counterfactual - synthetic group- would ideally yield the estimated effect of the program. The identification assumption is that if the synthetic control group provides a good approximation of the outcome for the treated unit in the pre-treatment period, then any subsequent difference between the treated and control units can be attributed to the effect of the intervention (policy) on the outcome (Ibid.)

In the context of this study, I seek to isolate the effect of the USE policy by comparing the lower secondary school enrollment ratios in Uganda and in the synthetic Uganda that will be constructed based on the characteristics of other Sub-Saharan African countries that did not implement a tuition-free or universal secondary education policy pre-2007.

5.3 Constructing Synthetic Control Group and Treatment Effect Estimation

Building a credible comparison group is key to the synthetic control method. Based on their 2010 study, Abadie et al. (2010) formalize their approach as follows:

a) Suppose we observe $J + 1$ units over $t = 1, \ldots T$ periods, with unit one being the case of interest and unit j=2 to $J + 1$ being potential comparison units. Unit 1 is considered "treated" while units *"J+1"* constitute the "donor pool", that is a reservoir of potential comparison units.

b) An "intervention" occurs at period $T_0 + 1$, $1 < T_0 + 1 < T$, that affects unit one only, and leaves the other J units unaffected during the post intervention period. It is also assumed that the intervention does not affect the outcome of interest during the pretreatment period[18]. The authors suggest to restrict the "donor pool" to units "with outcomes that are thought to be driven by the same structural process as for the unit representing the case of interest and that were not subject to structural shocks to the outcome variable during the sample period of the study"(Abadie et al., 2010). In other words, units in the donor pool must mimic the trajectory of the outcome in the unit of study as closely as possible prior to the policy of interest.

c)Since the purpose of the analysis is to measure the impact of the policy on the treated unit, the authors define the outcomes as follows:

- Let $Y_{it}^N \equiv$ outcome for unit i at time t in the absence of intervention *I*.
- Let $Y_{it}^I \equiv$ outcome for unit i that would be observed in time t if unit i was exposed to the intervention.

[18] This would be referred to as anticipation effects. Units might modify their behavior in anticipation of the announced policy and therefore lead to biased estimates.

- The estimated effect of the intervention over time for the treated unit is defined as:

$$\hat{\alpha}_{it} = Y_{it}^{I} - Y_{it}^{N} \quad (1)$$

Since Y_{it}^{I} is observed, one would have to estimate the unobserved counterfactual Y_{it}^{N}.

d) The counterfactual is the synthetic control which, as stated earlier, is built by taking the weighted average of the units in the donor pool based on their pre-intervention characteristics which closely approximate the characteristics of the treated unit. The synthetic control is thus represented by a (J X 1) vector of weights $W = (w_2, \ldots w_{J+1})'$, with $0 \leq w_j \leq 1$ for $j = 2, \ldots J$ and $w_2 + \cdots + w_{J+1} = 1$.

e) Let X_1 be the characteristics of the treated unit that we aim to match as closely as possible.

f) Let X_0 be the (k × J) matrix containing the values of the same variables for the units in the donor pool.

g) The authors suggest selecting the value of W* that minimizes the difference between the preintervention characteristics of the treated unit and the synthetic control ($X_1 - X_0W$). They operationalize the procedure as follows:

for $m = 1 \ldots k$, let X_{1m} be the value of m-th variable for the treated unit and let X_{0m} be the (1 X J) vector containing the m-th values of the variable for the units in the donor pool. W* is therefore used as the value of W that minimizes:

$$\sum_{m=1}^{k} v_m \left(X_{1m} - X_{0m}W\right)^2 \quad (2)$$

Where v_m represents the weight that reflects the relative importance assigned to the m-th variable in both the treated unit and units in the donor pool. Abadie et al. (2010) have written the software package ***Synth*** which solves for the matrix W* of optimal weights to minimize the distance $||X_1 - X_0W||_V$, which they define as:

$$\left|\left|X_1 - X_0W\right|\right|_V = \sqrt{(X_{1-} X_0W)'V(X_1 - X_0W)} \qquad (3)$$

Where V is a (k x k) symmetric, positive, semidefinite matrix of weights that allows different predictor variables to have varying levels of influence on the outcome of interest. By default, the software package Synth chooses the V matrix which minimizes the mean squared prediction error over the pre-intervention period (Abadie et al., 2011). Moreover, Synth allows the researcher to choose the matrix V when prior knowledge of the assumed predictive power among the variables is preferred. Abadie et al. (2015) recommend assigning the highest weights to the variables assumed to have the large predictive power (Abadie et al., 2015).

To assess the closeness of the match between the treated unit and the synthetic control unit in the pre-intervention period, the authors propose the root mean squared of the prediction error defined as:

$$RMSPE = \sqrt{\frac{1}{T_0}\sum_{t=1}^{T_0}(Y_{1t} - \sum_{j=2}^{j+1} W_j^* Y_{jt}\ )\text{^}2} \qquad (4)$$

This expression is the averaged difference between the outcome measure of the treatment and weighted mean outcome of the synthetic control over all time points up to T_0, the final time point prior to the treatment. As Johnson puts it, the "researcher's goal is to add pretreatment time points, select observable covariates, and remove weak comparison units to find the closest matched synthetic control" (Johnson, C., 2013). It follows that such closeness can be achieved through a reduced RMSPE over the pretreatment period.

- Equation (1) becomes:

$$\hat{\alpha}_{it} = Y_{1t}^{I} - \sum_{j=2}^{j+1} w_j * Y_t^j \qquad (5)$$

• Equation (5) yields the synthetic control estimator by comparing postintervention outcomes between the treated unit, which is exposed to the intervention, and the synthetic control, which is not exposed to the intervention, $Y_1 - Y_0 W^*$. As stated earlier, these outcomes are predicted by variables in X_1 and X_0., which are not, themselves, affected by the intervention. Abadie et al. are aware that their method may be limited by the presence of both unmeasured factors affecting the outcome and the heterogeneity in the effects of observed and unobserved factors (Abadie et al., 2010). However, they argue that if the data contains a large number of preintervention periods, matching on pre-intervention outcomes helps control for the unmeasured factors and for the heterogeneity in the effects of the observed and unobserved factors on the outcome of interest. Their intuition is straightforward: "Only units that are alike in both observed and unobserved determinants of the outcome variable as well as in the effect of those determinants on the outcome variable should produce similar trajectories of the outcome variable over extended periods of time. Once it has been established that the unit representing the case of interest and the synthetic control unit have similar behavior over extended periods of time prior to the intervention, a discrepancy in the outcome variable following the intervention is interpreted as produced by the intervention itself"(Abadie et al., 2015). Like in a difference-in-difference approach, the treatment effect is obtained by differencing out the actual outcome of the treatment unit to the estimated outcome in the synthetic control unit. Yet, unlike in a difference-in-difference setting which assumes no variation of the treatment effect, the synthetic control method allows the treatment effect to vary with time.

5.4 Statistical Inference with Synthetic Control Method

Abadie and Gardeazabal (2003), and Abadie et al. (2010, 2015) acknowledge that the use of the traditional inferential techniques in the synthetic control method setting is difficult because of the small sample nature of the data, the absence of randomization and the fact that sample units in the comparison group are not selected using a probabilistic sampling. To remedy these limitations and ascertain the credibility of the results, the authors suggest alternative inferential techniques known as "Placebo studies" or "falsification exercises." These "placebo tests" follow the classic framework for "permutation inference" by applying the synthetic control method to every potential control in the sample (Abadie et al., 2010). The authors explain that this alternative inferential technique is based on the premise that the validity of the synthetic control estimator would be severely undermined if the "placebo studies" yield "effects of similar or greater magnitudes in cases where the intervention did not take place"(Abadie et al., 2015). They propose two types of placebos studies, namely the "in-time" and "in-space" placebos tests. The former includes time periods where the intervention did not occur whereas in the latter, the intervention is artificially assigned to regions in the donor pool. In the case of the Ugandan Universal Secondary Education policy that occurred in 2007, running an "in-time placebo" would entail testing whether the method, as explained above, produces effects before 2007. If we find effects that are similar to or larger than the ones estimated for 2007 and onward, then our confidence that the effect estimate for the 2007 USE could be attributed to USE itself would be greatly diminished. Additionally, running an "in-space placebo" will consist of testing whether similar or larger effects arise when the USE is artificially assigned to SSA countries that did not implement a universal secondary education policy. Failing to reject such hypothesis would seriously undermine our confidence in the unbiasedness of the synthetic control estimator.

Abadie et al. (2015) also suggest that, since applying the synthetic control method to every potential unit in the donor pool leads to a distribution of placebo effects, p-values could be constructed for each placebo effect and interpreted as the "probability of obtaining an estimate at least as large as the one obtained for unit representing the case of interest when the intervention is reassigned at random in the data set"(Abadie et al.,, 2015). The authors insist that with these inferential exercises the researcher seeks to test whether the effect of the actual intervention is large compared to the distribution of placebo studies.

5.5 Implementation

5.5.1 Data and Sample

Using the technique described in 5.3, I build the Synthetic Uganda to replicate the lower secondary school enrollment that Uganda would have experienced if it had not implemented the Universal Secondary Education policy.

My study period is 1992-2015, with fifteen pre-USE data points, which is large enough to track Uganda's characteristics and the lower secondary education enrollments trends prior to the enactment of the USE policy. Moreover, I include eight post-intervention data points assuming that the effect of the USE policy might emerge gradually after the intervention or change overtime (Abadie et al., 2014). As the following figure shows, the change could be immediate, resulting in the overall change in mean or in level(a); the change could be gradual, resulting in the overall change in trend or slope (b), in both level and slope(c), delayed in slope(d), temporary in level (e), temporary in slope but leading to a level change (Bernal et al., 2016; Olivier et al, 2013).

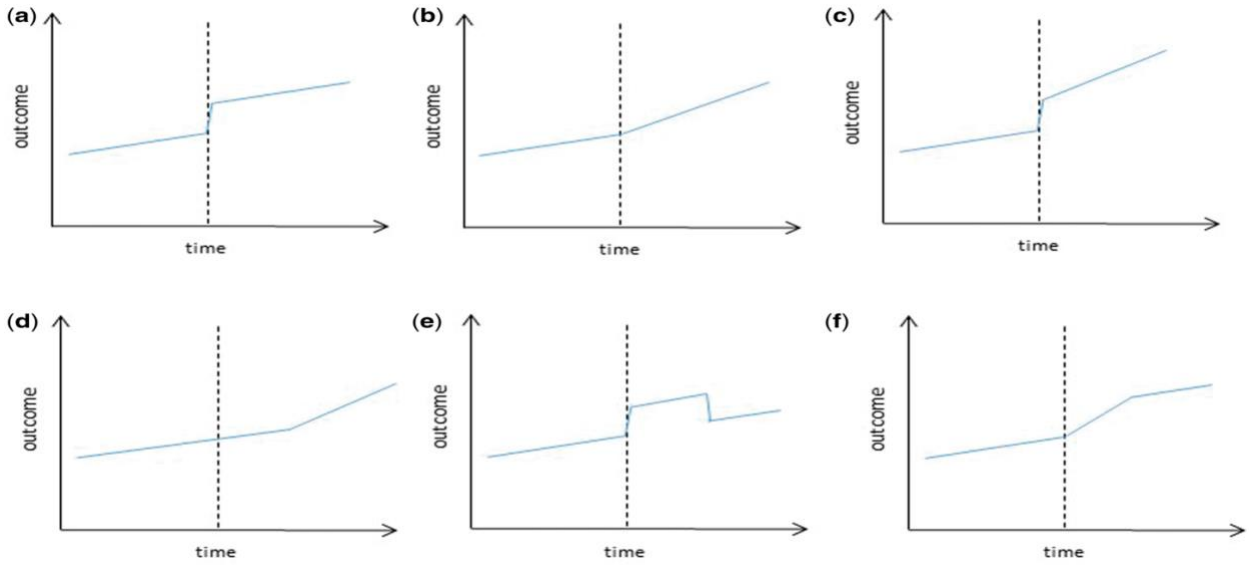


Figure 5. 2: Potential policy effects (from Bernal et al., 2016)

My donor pool includes 17 Sub-Saharan African countries that did not implement a free tuition secondary education policy during my study period (1992-2015) and for which lower secondary school enrollment trends were somewhat similar or close to Uganda's before the USE policy was implemented in 2007. Countries such as Ghana, Kenya, Nigeria, Rwanda, South Africa, and Tanzania, which adopted secondary school tuition elimination policies during my study period are therefore excluded from the donor pool. My additional inclusion criteria include country classification by income level and the absence of serious structural shocks (such as prolonged civil wars that took place in Liberia, Sierra Leone, Democratic Republic of Congo, Somalia, Rwanda) that could potentially affect lower secondary school participation. The list is therefore limited to low income Sub-Saharan African countries of Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Gambia, Guinea, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Senegal, Togo and Zambia.

To carry out my analysis, I use several sources of administrative aggregate data on some of the most important determinants of secondary school participation in Sub-Saharan Africa. The Ugandan Ministry of Education and Sports provides publicly available data on school enrollments based on annual school census conducted since 1963[19]. The World Bank and the UNESCO Institute of Statistics maintain rich and diversified datasets on education and world development indicators[20]. I merge data from those sources to obtain a country-panel data for the period of 1992-2015. My study period starts in 1992, only two years after the launch, in Jomtien (Thailand), of the Education for All movement, an international initiative aimed at bringing the "benefits of education to every citizen in every society" (UNESCO, 1990). The Millennium Development Goals framework adopted at Dakar in 2000 endorsed the EFA movement, which, since 2015, has been incorporated into the UN's Sustainable Development Goals and 2030 Vision framework for education. Using 2015 as the limit of this study would allow me to plausibly assess the effectiveness of Uganda's USE policy for at least six generations of students who started and completed the O'level education under the new policy.

My outcome of interest, Y_{jt} ,is the gross enrollment rate at the lower secondary school level in a country *j* at time *t.* I use the gross enrollment rate to capture the overall picture of the lower secondary school participation at the country level. For the pre-Ugandan Universal Secondary Education characteristics in X_0 and X_1, I include country-level variables that best capture the salient demand and supply-side as well as contextual factors of lower secondary school participation in Sub-Saharan Africa as documented in the literature review in chapter 2. GDP per capita and three measures of the proportion of the population living on $1.90, $3.20 and $5.50 a day are used as proxy for household poverty. GDP is the Purchasing Power Parity (PPP)-adjusted and measured

[19] Reports available at http://www.education.go.ug/statistics-abstract/#eluid8ccca8dc
[20] Available at https://databank.worldbank.org/home; : http://data.uis.unesco.org/# respectively.

in 2005 US $. Literacy rate for the population ages 25-64 is used as proxy for parental education. Adolescent fertility rate (births per 1000 women ages 15-19) is used as one of the factors that could hinder lower secondary participation through early pregnancies. Percent of the population ages 10-24 (male and female) is included in the study as a proxy for lower secondary school-age going population. Although the official lower secondary school going age is 13-16 in Uganda, I use the 10-24 age group to account for possible underage and/overage enrollment. HIV prevalence across several Sub-Saharan African countries is used to account for a youth or parental health status as one of the individual or household characteristics of access to education. Population growth and unemployment rates account for contextual factors that seriously affect school participation in Sub-Saharan Africa. Government expenditure on education as a percent of GDP as well government expenditure on education as a percent of total government expenditure represent the national effort on education that is also critical to expanding education access. Finally, primary school completion and transition rates from primary school to lower secondary school are used as direct determinants of gross enrollment rates in lower secondary school. Summary statistics of these variables grouped by country are provided in appendix ii.

Table 5. 1: Summary Statistics- Individual and household factors

Variables	N	Mean	St. Dev
LSS gross enrollment rates	504	32.98	21.01
LSS transition rates	504	69.43	23.97
Primary School completion rates	504	49.68	20.75
Percent of LSS female population age 10-14	504	12.50	.70
Percent of LSS female population age 15-19	504	10.67	.64
Percent of LSS female population age 20-24	546	8.93	.59
Percent of LSS male population age 10-14	504	12.95	.78
Percent of LSS male population ages 15-19	504	11.11	.67
Percent of LSS male population age 20-24	546	9.04	.65
Adolescent fertility (births per 1000 women ages 15-19)	484	137.15	40.19

Sources: https://databank.worldbank.org/home; http://data.uis.unesco.org/#; www.education.go.ug
Calculated by the author.

Table 5. 2: Summary Statistics- Household Factors

Variables	N	Mean	St. Dev
Literacy rates population age 25-64	504	44.77	21.63
Literacy rates, female population age 25-64	504	34.36	22.11
Labor force, female participation	504	46.02	5.46
Poverty rate- $1.90 a day	481	59.40	20.09
Poverty rate- $3.20 a day	481	78.22	15.46
Poverty rate- $5.50 a day	481	91.31	9.73
HIV Prevalence rate	504	4.80	5.44

Sources: https://databank.worldbank.org/home; http://data.uis.unesco.org/#; www.education.go.ug
Calculated by the author.

Table 5. 3: Summary Statistics – Contextual Factors

Variables	N	Mean	St. Dev
GDP per capita PPP (2005 US$)	504	1374.88	735.70
Unemployment- both sexes	504	4.98	3.55
Population growth	504	2.81	.64

Sources: https://databank.worldbank.org/home; http://data.uis.unesco.org/#.
Calculated by the author.

It is worth noting that data from the Demographic and Health Survey (DHS) could have been used for this analysis. Unfortunately, DHS datasets provide individual level data, which are not appropriate for the version of SCM used in this study. Moreover, using DHS would have yielded an unbalanced country panel dataset: the surveys are not conducted for all countries in the same year and surveys are not available for each year. This detail is critical to capturing the overall trend of the outcome of interest in the pre- and post-treatment period. For example, while Uganda has DHS data available for 1988, 1995, 2000-2001, 2006, 2011 and 2016, several countries in my donor pool have fewer than 4 four data points in the pre-treatment period. Togo has DHS data available for 1988, 1998 and 2013-2014; Niger has data available for 1992, 1998, 2006, 2012 and 2017; Mozambique has data available for 1997, 2003 and 2011; Mauritania's completed DHS data are available for only 2000-2001, etc. Due to these data limitations, I discarded DHS data in favor of yearly reported data provided by the World Bank, UNESCO and Uganda's National Bureau of Statistics and Ministry of Education and Sports.

5.5.2 Results

Using the techniques described in 5.3, I construct the synthetic Uganda control group that mirrors the values of the predictors of the lower secondary school enrollment in Uganda prior to the implementation of the Ugandan Universal Secondary Education (USE) policy in 2007. Due to data limitations and inconsistencies, and to avoid overfitting, I exclude, from my analysis, the literacy rates for the female population ages 25-64 as well as primary school completion rates. I estimate the effect of the USE policy on lower secondary school enrollment as the difference in the aggregate lower secondary school enrollment ratios between Uganda and its synthetic control versions in the years following the implementation of the USE policy. I then evaluate the credibility of my results by performing a series of in-space placebo tests as described in section 5.4.

Constructing Synthetic Uganda

Table 5.4 displays the weights of each country in the synthetic Uganda. As explained earlier, the Synth software helps to build the Synthetic Uganda using the cross-validation technique. According to Abadie et al. (2010), this procedure assigns weights to the predictors so that the resulting synthetic "minimizes the root mean square prediction error (RMSPE)" over the pre-intervention period. The weights reported in this table show that the lower secondary school enrollment trend in Uganda prior to the implementation of the Ugandan Secondary Education policy is best approximated by the combination Burundi (.321), Chad (.241), Madagascar (.142), Cameroon (.115), Niger (.108) and Mauritania (.073). The remaining countries in the donor pool are assigned zero weights while the RMSPE for the Synthetic Uganda is estimated at 1.07.

Table 5. 4: Country weights in Synthetic Uganda

Country	Weight	Country	Weight	Country	Weight
Beni	0	Gambia	0	Niger	.108
Burkina Faso	0	Guinea	0	Senegal	0
Burundi	.321	Madagascar	.142	Togo	0
Cameroon	.115	Malawi	0	Zambia	0
Central African Republic	0	Mali	0	Mauritania	.073
Chad	.241	Mozambique	0		

Table 5.5 compares the characteristics of Uganda to those of the Synthetic Uganda prior to the implementation of the universal secondary education policy. Overall, the results in table 5.5 indicate that the real Uganda and the Synthetic Uganda are closely matched. Both units appear to be similar in terms of outcome lags (lower secondary school gross enrollment ratios for the year 1992, 1997, 2002 and 2006), lower secondary school-age population, GDP per capita PPP (2005 US $), female participation in labor force and poverty rate based on headcount ratio at $3.20 and $5.50 a day.

Table 5. 5: LSS GER Predictor Means before the implementation of USE for the combinations of control units

Predictors	Treated	Synthetic	Predictors	Treated	Synthetic
Gross enrollment rates (1992)	17.04	17.77	LSS male population ages 20-24	8.85	8.70
Gross enrollment rates (1997)	18.34	10.14	Literacy rates population 25 plus	59.79	53.02
Gross enrollment rates (2002)	19.64	19.18	Adolescent fertility (women 15-19)	170.75	147.57
Gross enrollment rates (2006)	22.00	22.26	Unemployment rate	2.26	6.40
Transition to LSS female	44.46	56.04	GDP per capita PPP (2005 US $)	822.38	841.39
Transition to LSS male	36.76	58.30	Gov exp on ed as % gov exp	7.02	11.95
LSS male population ages 10-14	13.33	13.31	Population growth	3.29	2.39
LSS male population ages 15-19	10.88	10.97	Poverty rate - $1.90 a day	62.72	67.86
LSS female population ages 10-14	13.10	12.96	Poverty rate - $5.50 a day	94.52	95.57
LSS female population ages 15-19	10.74	10.71	Poverty rate - $3.20 a day	84.71	86.60
LSS female population ages 20-24	8.76	8.60	HIV prevalence rate	7.81	2.80
Female population ages 25-29	7.11	6.88	Labor force, female participation	46.75	46.70

Estimating the effect of the USE policy

Figure 5.2. displays the trend in the lower secondary school gross enrollment ratios in Uganda relative to its synthetic counterpart during the period 1992-2015. Except for the years 2004 and

2005, the Synthetic Uganda almost closely reproduces the trajectory of the lower secondary school gross enrollment ratios in real Uganda during the pre-treatment period. Combined with the close matching results on outcome lags, lower secondary school-age going population, poverty rate and GDP per capita provided in Table 5.5, figure 5.2 suggests that Synthetic Uganda provides a reasonable approximation to the gross enrollment ratios that would have been observed in Uganda in 2007-2015 in the absence of the current Ugandan Universal Secondary Education policy. I estimate the effect of Uganda's Universal Secondary Education policy by taking the difference between the gross enrollment ratios in Uganda and its synthetic counterpart after the enactment of the Universal Secondary Education policy in 2007. The identifying assumption is that of no interference between units (Rosenbaum, 2007 cited in Abadie et al., 2010). I assume that LSS gross enrollment ratios in the untreated unit (synthetic Uganda) were not affected by the USE policy intervention implemented in Uganda.

Figure 5.2 shows that the treated Uganda line is slightly above the Synthetic Uganda's for two years, suggesting a positive effect for the first two years of the USE policy. However, from 2009 onward, both lines begin to diverge quite noticeably. While gross enrollment ratios at the lower secondary school level continued their steady upward trend for the Synthetic Uganda, real Uganda experienced a sharp decline. The discrepancy between the two lines is quite large, suggesting a negative effect the USE policy on gross enrollment rates.

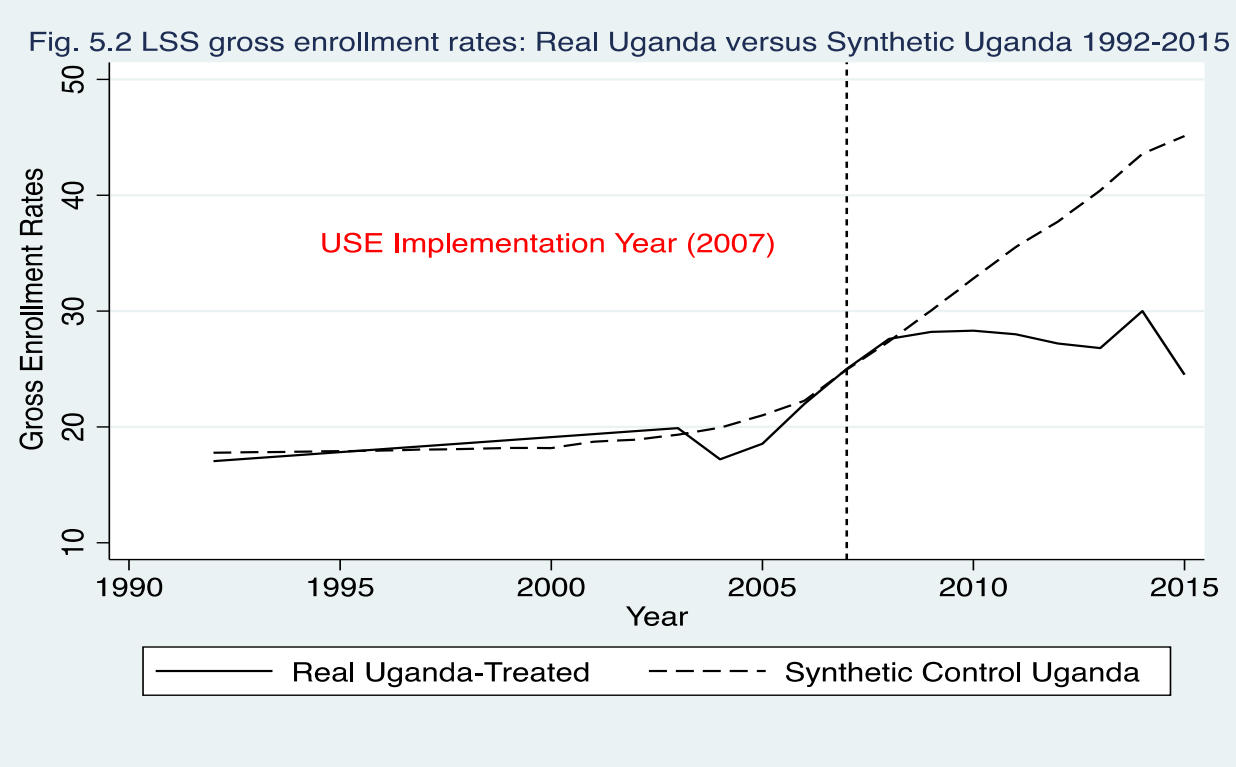


Figure 5. 3: LSS GER: Real Uganda vs Synthetic Uganda 1992-2015

In figure 5.3, I plot the yearly impacts of the USE, that is the gaps in lower secondary school enrollment ratios between the real Uganda and its synthetic version. The figure shows that, for two years, the USE policy had a positive effect before sharply declining between 2009 and 2015, the end of my study period. My results show a small positive effect (.04 percentage points) in 2007, almost doubling in 2008 (.22 percentage points), then a decaying trend from 2009 onward. My estimates[21], as shown in Table 5.6, suggest that over my study period, gross enrollment rates growth at the lower secondary school level in Uganda was reduced by approximately 8 percentage points on average per year. During that time, real Uganda's lower secondary school enrollment

[21]These estimates do not include confidence intervals due to the synth software restrictions and to the standard SCM design. Instead of these traditional inferential techniques, SCM uses placebo tests (permutation tests) which are provided later in the sub-section "Evaluating the credibility of the USE effect: Placebo Tests", pp.99-104.

ratios were 29% lower than its counterpart on average. In 2015, lower secondary school enrollment ratios were 45.6 percent higher than in the actual Uganda.

Table 5. 6: Effect of the USE Policy

Year	Real Uganda-Treated Unit	Synthetic Control Unit	USE Effect
2007	25.00	24.96	.04
2008	27.60	27.38	.22
2009	28.20	30.05	-1.86
2010	28.30	32.81	-4.51
2011	28.00	35.53	-7.53
2012	27.20	37.72	-10.52
2013	26.80	40.41	-13.61
2014	30.00	43.57	-13.58
2015	24.50	45.11	-20.61

Although the above findings are predicated upon Rosenbaum's "no interference between the units" assumption (Rosenbaum, 2007 cited in Abadie et al., 2010) as indicated earlier, I am

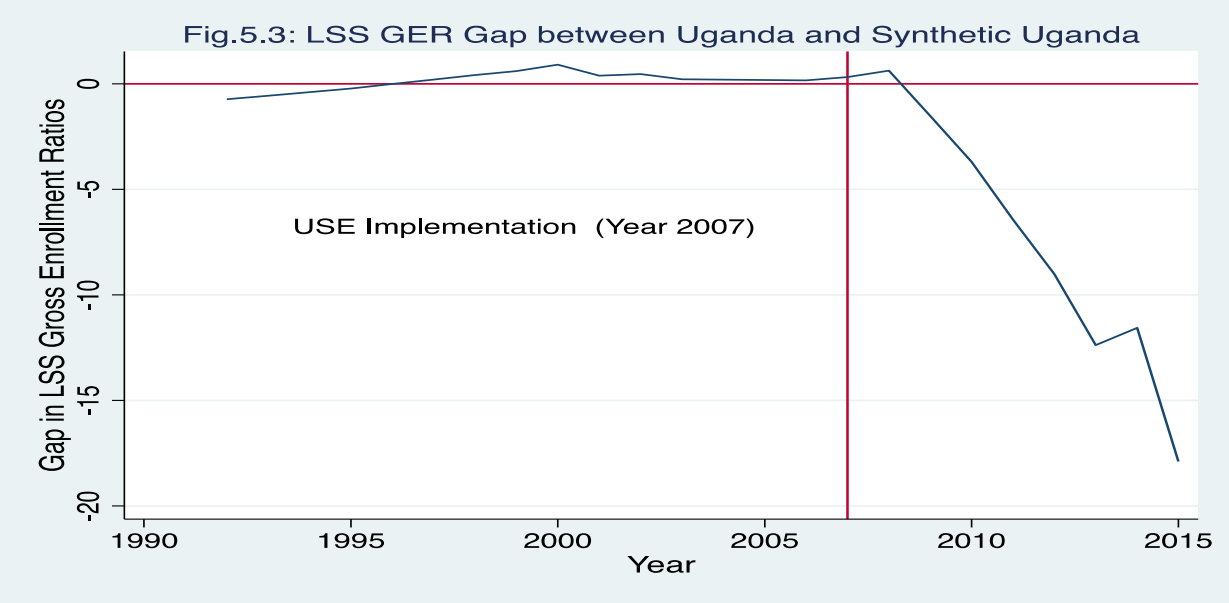


Figure 5. 4: LSS GER Gap between Real Uganda and Synthetic Uganda

worried that that assumption could be violated in the context of this study. I excluded from this study low-income SSA countries that did implement similar tuition elimination policies during my study period. However, some of the countries included in the donor pool could have successfully

implemented some otherwise effective educational policies that might have affected lower secondary school enrollment. This concern is less critical given the gross enrollment trend in the synthetic control which fails to show any jump, but rather a smooth upward trend from 2007 onward. Another source of concern is the lack of close matching on some of the pre-intervention predictor variables used to construct the synthetic Uganda. Such discrepancies, as shown in Table 5.2, could lead to interpolation biases in my results. Fortunately, as shown in appendix (3), matching on predictor variables with nearly identical means (outcome lags, GDP per capita, poverty ratio, lower secondary school-age going population and female participation in the labor force) leaves my results unaffected.

Evaluating the credibility of the USE effect: Placebo Tests

Although the concerns about the soundness of the above results seem allayed, the next step in the analysis is to assess whether or not these results are driven by chance. Following Abadie et al. (2010, 2014) and Galiani & Quistorff (2016), I run a series of placebo tests to determine the statistical significance of my results. To conduct these tests, I iteratively apply the synthetic control method used to estimate the effect of the USE policy in Uganda to every other control unit (country) in the donor pool. In each iteration, I reassign in my data the USE intervention to one of the 18 control countries, shifting Uganda to the donor pool. I proceed as if one of the 18 countries in the donor pool would have passed a Universal Secondary Education policy in 2007, instead of Uganda. I then compute the estimated effect associated with each placebo run. This iterative procedure provides me with a distribution of estimated gaps for the countries where no intervention took place. This inferential exercise allows me to examine whether or not the estimated effect of the actual intervention is large relative to the distribution of the effects estimated for the regions not exposed to the intervention. A placebo effect similar to or as large as the estimated effect would

undermine the credibility of my findings. The procedure described here is an "in-place placebo test."

Figure 5.4 displays the results of the in-space placebo tests. The thick dark blue line denotes the gap in LSS gross enrollment ratios estimated for Uganda during the period 1992-2015. The remaining lines denote the gaps associated with each of the 18 iterations of the test for each of the 18 countries in the donor pool. The gaps are the placebo effects calculated as the difference in the annual LSS gross enrollment ratios between each country in the donor pool and its respective synthetic version. The figure shows that, except for one country, the estimated gap for Uganda is large relative to the distribution of the gaps for the control units in the donor pool. The visualization indicates that the Synthetic Uganda provides a good fit for LSS gross enrollment in real Uganda in the years leading up to the passage of the USE policy in 2007. The preintervention mean squared prediction error (MSPE) for Uganda (the average of the squared differences between LSS gross enrollment ratios in Uganda and its synthetic version during the period 1992-2006) is about .80, which is quite small. Equivalently, the pre-USE median MSPE among the 18 countries in the donor pool is also small (4.92). However, figure 5.4. shows that the LSS gross enrollment ratios trajectory during the period 1992-2006 cannot be well reproduced for some countries. The country with the worst fit is Gambia, with a MSPE of 829.47. This finding is supported by the data that show Gambia with the highest LSS gross enrollment rate of 54% on average during my study period, more than the double of Uganda's. Consequently, there is no possible combination of countries in my sample that could best reproduce Gambia's LSS gross enrollment rates before 2007. Abadie et al. (2010) caution against relying for significance tests on placebo runs with poor pre-intervention fit because those placebos do not provide useful information to measure "the relative rarity" of estimating a large post-intervention gap for a unit that was well fitted prior to the intervention. A

poor fit would make the comparators less comparable. Therefore, such units, with poor pre-intervention fit, should be excluded from the analysis.

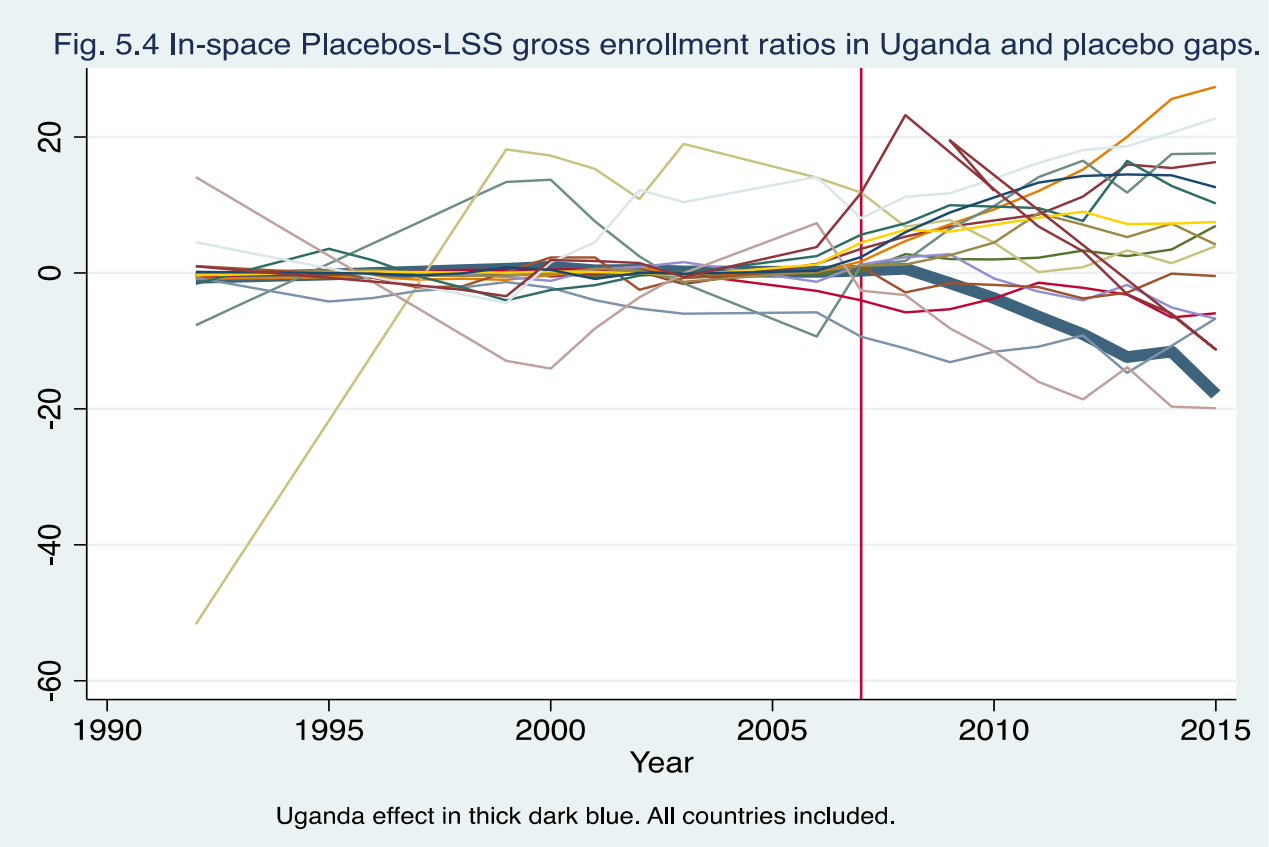


Figure 5. 5: In-space placebos - LSS GER in Uganda and placebo gaps

Following Abadie et al.'s (2010, 2014) recommendation, I exclude countries that had a pre-USE MSPE of more than 20 times the MSPE of Uganda. I therefore discard five countries with the worst pre-USE fit including Gambia (829.47), Burundi (18.3), Cameroon (250.20), Malawi (287.43), Niger (17.52) and Togo (118.46). The result is shown in figure 5.5. As the figure shows, there still remain countries with poor pre-USE fit, with one line suggesting a placebo effect worse than Uganda's. Such result would undermine the credibility of the results obtained through

the synthetic control method. However, I am unable to make any inference based on this plot due to the large pre-USE discrepancies between units.

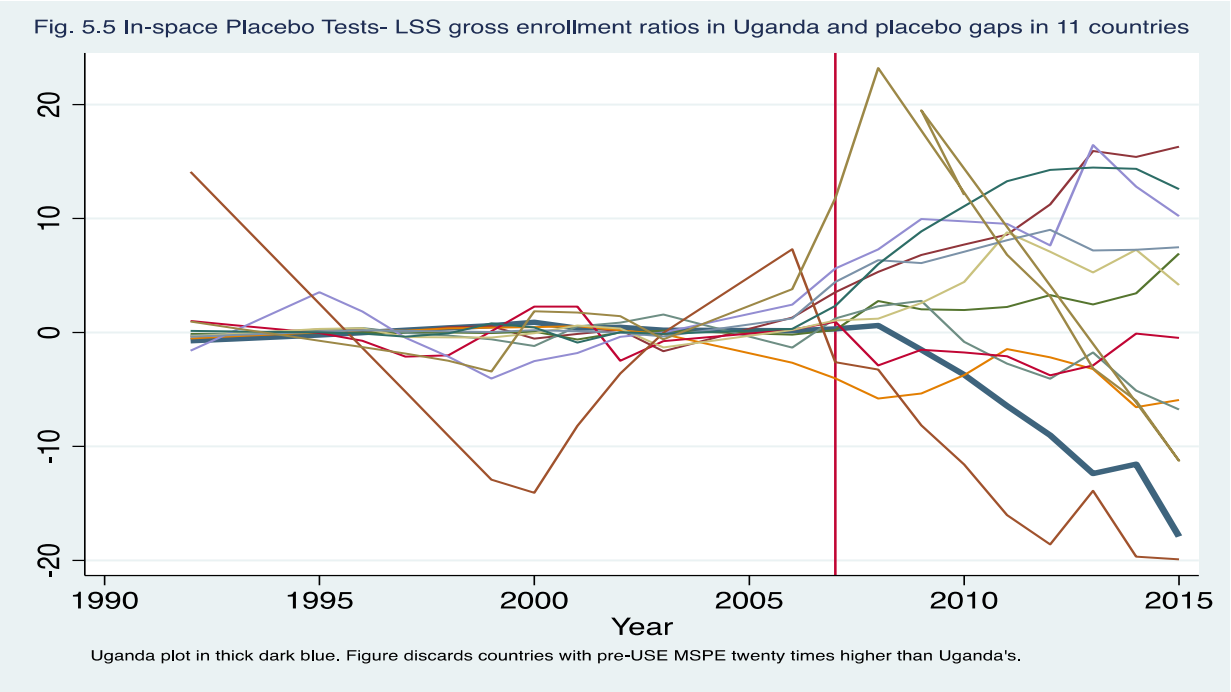


Figure 5. 6: In-space placebo Tests - LSS GER in Uganda and placebo gaps in 11 countries

In figure 5.6, I exclude countries with a pre-USE MSPE more than five times the MSPE of Uganda, namely Mozambique (8.23), Guinea (4.92), Mali (3.73) and Zambia (3.61). Uganda's line is now clearly the most unusual line for almost the entire post-treatment period.

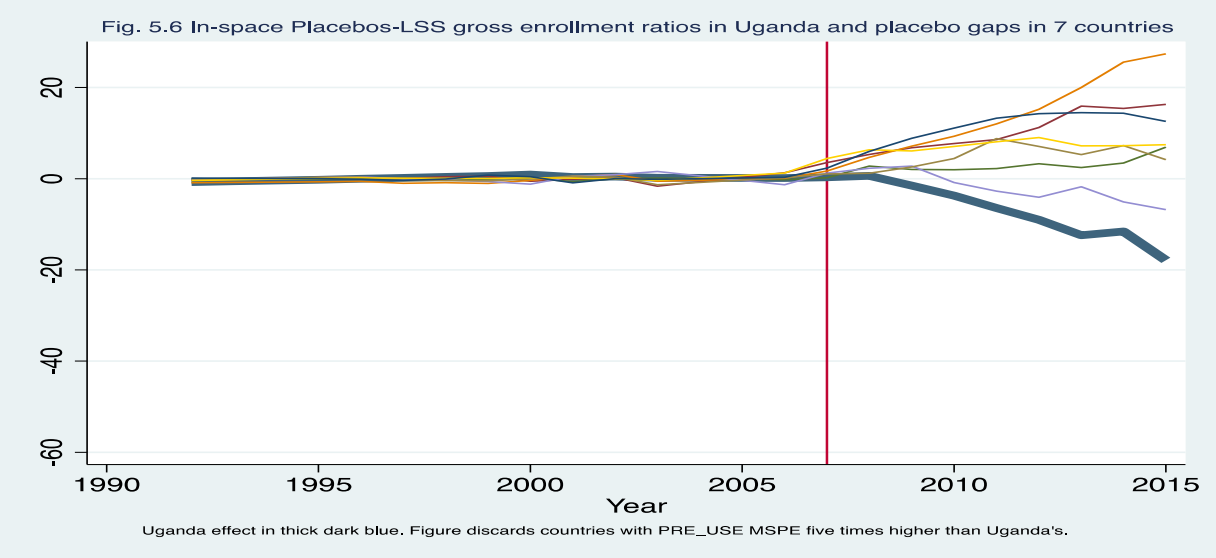


Figure 5. 7: In-space placebos -LSS GER in Uganda and placebo gaps in 7 countries

In figure 5.7, I lower the threshold and include countries that seem to track closely Uganda's LSS gross enrollment ratios trajectory between 1992 and 2006. I focus on countries with pre-USE MSPE not higher than twice the pre-USE MSPE for Uganda. Clearly, none of the placebo gaps is similar to or as large as the actual gap for Uganda. This finding increases my confidence in the results presented in the above section.

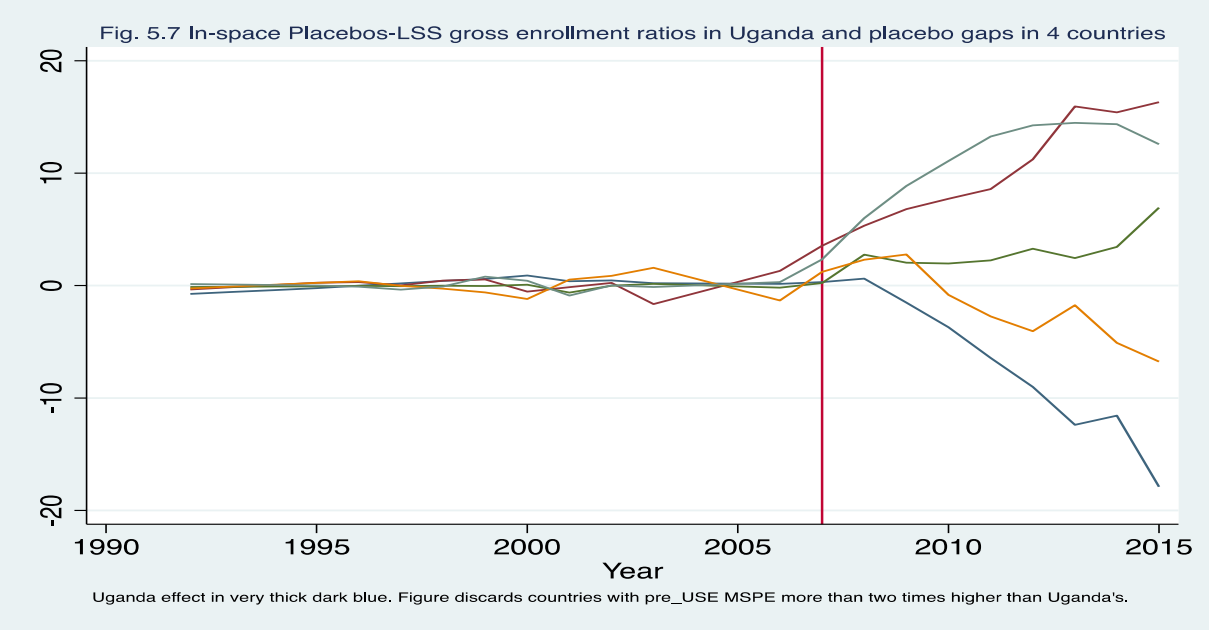


Figure 5. 8: In-space Placebos - LSS GER in Uganda and placebo gaps in 4 countries

Robustness Test

In this section, I run a robustness check to assess the sensitivity of my main results to changes in the country weights, W^*. As explained and shown earlier, I constructed the Synthetic Uganda as a weighted average of decreasing weights of Burundi (.321), Chad (.241), Madagascar (.142), Cameroon (.115), Niger (.108) and Mauritania (.073). I now iteratively re-estimate the baseline model to build a synthetic Uganda by omitting in each rerun one of the countries that received a weight higher than .1. Although I would sacrifice some goodness of fit by excluding countries with stronger weights from the model, I am able to evaluate the extent to which my findings are driven by any particular control country.

Table 5.7 reports the results from the robustness check, and figure 5.8 plots the robustness gaps against Uganda's. Both the table and the graph show that the results from the above main analysis are fairly robust to the exclusion from my small sample of most countries

with stronger weights. The only leave-one-out synthetic control that yields the smallest negative effect is the one that excludes Madagascar. However, leaving Niger out produces the worst effect of -10.21 percentage points on LSS gross enrollment rates. Of all the countries that weigh heavily in the construction of the Synthetic Uganda, Niger's lower secondary school enrollment rates increased from 14.79 percent in 2007 to 26.5 percent in 2015, an approximate 76 percent growth that is quite large compared to Uganda's 11.3 percent growth rate during the same time period. The remaining leave-one-out synthetic controls show closely similar effects compared to the main analysis.

Table 5. 7: Robustness Check – Leave-one-out

	Mean	Std. Err.	[95%_Conf	Interval]
USE Effect – All Countries	-7.99	2.32	-13.51	-2.82
USE Effect – Chad out	-9.54	2.70	-15.76	-3.33
USE Effect – Burundi out	-8.79	2.73	-15.08	-2.51
USE Effect – Madagascar out	-7.97	2.27	-13.21	-2.74
USE Effect – Niger out	-10.21	2.70	-16.42	-4.01
USE Effect –Cameroon out	-8.20	3.00	-15.13	-1.27

Note: Robustness check using a leave-one-out approach. USE effect calculated as the difference in lower secondary school enrollment rates between Uganda and the corresponding leave-one-out synthetic control versions.

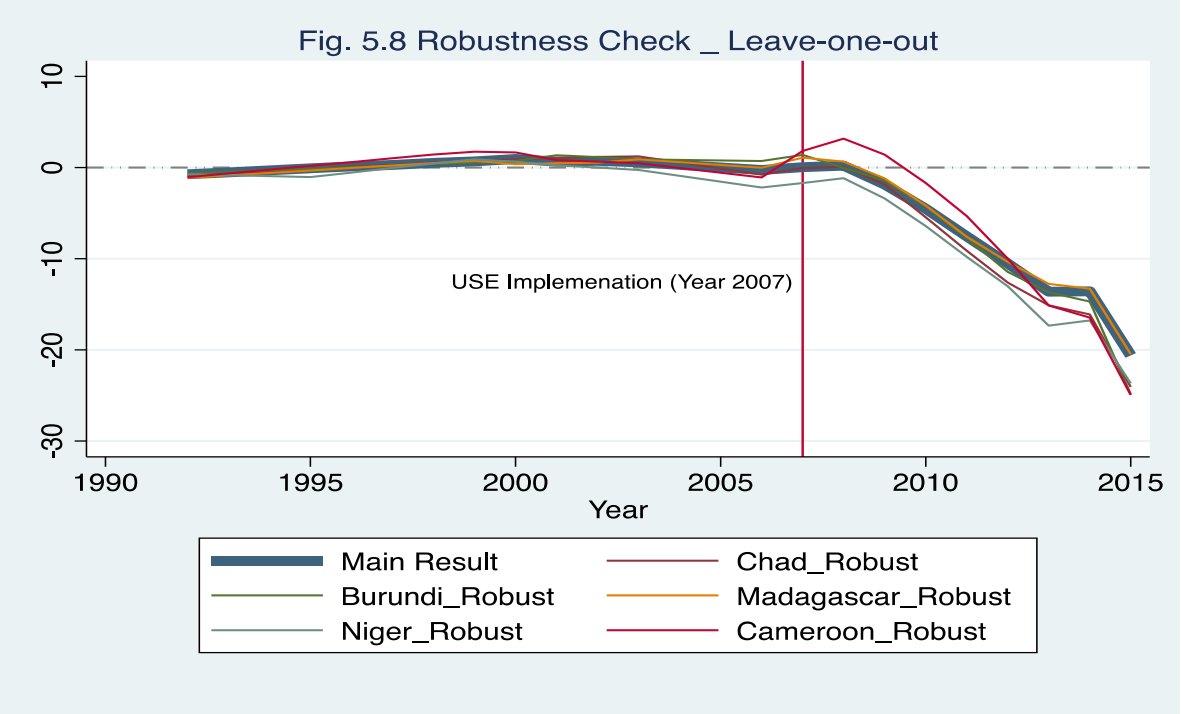


Figure 5. 9: Robustness Check: Leave-one-out

Interpreting the Macro-effect results and possible mechanisms

The analysis carried out in this chapter shows that real Uganda's LSS gross enrollment rates growth lagged behind the LSS gross enrollment rates in its synthetic version during the period 2007-2015. It should be noted, however, that these results do not suggest that LSS gross enrollment rates decreased or that the USE caused a sharp decline in Uganda's LSS gross enrollment rates during the period 2007-2015. The graphs provided in chapter 4 show that during my study period, LSS gross enrollment rates followed an upward and zigzagging trend and remained above the pre-USE level. Nonetheless, the story behind our results is that, compared to the synthetic Uganda, the LSS gross enrollment rates in real Uganda should have grown by a yearly average of 8 percentage points from 2007 to 2015.

Some of the potential causes for the above results, which are discussed at length in chapter 7, include but are not limited to the USE policy design and implementation limitations, the size of the government capitation, inconsistent transition rates from primary to lower secondary school and higher private costs of education which could have hindered school participation during my study period.

However, additional causes could be methodological in nature. Firstly, the data used in this study came from several sources with potential quality concerns. One of the quality concerns could be the lack data coherence defined as the "degree to which data item value and meaning are consistent over time and comparable to similar variables from other routinely used data sources" (Rothbard, 2015). It is highly likely that due to multiple education reforms in several Sub-Saharan African countries, the development of lower secondary school may not have been consistent over time for all the countries included in my donor pool. Additionally, and in several instances, data from World Bank and UNESCO were either missing for several years or replaced with estimates. Moreover, data from Uganda's Ministry of Education and Sports might not have been reliable enough due to self-reporting and lack of wide school participation in the annual census[22].

Secondly, the country-panel dataset used for the synthetic control analysis does not include any inter-country cultural and institutional differences that could influence secondary school participation. For example, due to data limitations, variables such as the number of available secondary schools, teacher-pupil ratios, child labor prevalence rate were not included in the

[22] Every year, the Ministry of Education and Sports conducts a census to determine the number of students, teachers, schools. Unfortunately, not all schools participate in the census, which could lead to under-reporting of the annual statistics.

analysis. Additionally, as shown in figure 5.2., the pre-intervention fit between real and synthetic Uganda is not as close as it should have been expected to be. As shown in appendix v, lower secondary school gross enrollment rates were on different paths in some countries compared to Uganda prior to the implementation of the USE policy. Larger increases in LSS enrollments in the control units compared to Uganda could have biased my results downward, thus resulting in the negative effects. It is therefore possible that my implementation of the synthetic control method may not have properly accounted for heterogeneity and uncertainty in the data.

5.6 Concluding remarks

The purpose of this chapter was to ascertain the effectiveness of Uganda's USE policy at the country level. Specifically, I sought to determine whether and to what extent did Uganda's decision to eliminate tuition and fees at eligible public and private secondary schools affect gross enrollment rates at the lower secondary school level during the period 2007-2015. To that end, I used the synthetic control method, which extends the classic difference-in-differences design with some novel features. Instead of using one control group, the synthetic control method allows for multiple control units, generates a weighted average of the untreated units that closely match the treated unit on some predictor variables in the pre-treatment period. Outcomes for this synthetic control (weighted average of untreated units) are then projected into the post-treatment period using the weights identified from the pre-treatment period comparison. This projection is used as a counterfactual for the treated unit, and the effect is calculated as the difference in the outcome of interest between the treated unit and its synthetic counterpart in the post-treatment period (Abadie et al., 2010, 2014; Galiani & Quistorff, 2016).

In this study, I restricted my control units to Sub-Saharan African countries that had not implemented education policies similar to Uganda's USE during my study period (2007-2015). Such countries also needed not to have experienced socio-economic and political shocks that could have undermined lower secondary school participation between 1992 and 2015. Moreover, country classification by income level was used an inclusion criterion. This elimination process allowed me to include in my donor pool 17 countries, namely Benin, Burkina Faso, Burundi, Cameroon, Chad, Central African Republic, Gambia, Guinea, Madagascar, Mauritania, Malawi, Mali, Mozambique, Niger, Senegal, Togo and Zambia.

To construct my synthetic control unit (also known as Synthetic Uganda), I used a wide range of predictor variables identified in the literature review (chapter 2), as the main determinants of lower secondary school enrollment rates (my outcome of interest). From the list of the control units provided above, only six countries (Burundi, Cameroon, Central African Republic, Chad, Madagascar, Mozambique and Niger) received discernible weights needed to construct the synthetic Uganda. In other words, based on the data, only those countries provided the combination that could best approximate the trajectory of the LSS gross enrollment rates in Uganda prior to the USE implementation. The outcome for the synthetic Uganda was then projected into the post-USE period and used as a counterfactual for the real Uganda, that is, the lower secondary school enrollment that could have been experienced in the absence of the USE policy. I estimated the effect of the USE as the difference in the LSS gross enrollment rates between the real Uganda and its synthetic counterpart in the post-USE period. My analysis shows that the USE did not have any positive impact on LSS gross enrollment rates between 2007 and 2015. Instead, during that time, LSS gross enrollment rates growth was reduced by 8 percentage points per year on average. The analysis does show that the USE had some positive effects in 2007 (.04) and 2008 (.22) before

seeing a sharp decline starting in 2009. To evaluate the credibility of those results, I ran a series of in-space placebo tests and none of them was similar to or as large as my results. Finally, I conducted a robustness check using a leave-one-out approach and determined that the results from the above main analysis were fairly robust to the exclusion from my small sample of most countries with stronger weights.

As the above analysis has shown, the synthetic control method presents some attractive computational features and relative advantage over the well-established and standard quasi-experimental approaches such as the difference-in-differences design. Athey and Imbens (2017) call the synthetic control method "arguably the most important innovation in policy evaluation literature in the last 15 years" (Athey & Imbens, 2017). I used it because of its suitability for studies involving small samples such as evaluating population-level policies based on aggregate data (Bouttell et al. (2017). My study is based on a small sample of countries in Sub-Saharan Africa and is limited to the period 1992-2015. Moreover, the synthetic control method relaxes the parallel trends assumption, which underpins the difference-in-differences design and which, in many instances, could be implausible. This could be the case when "the treated and the control group are different in the distribution of attributes that are known or suspected to affect the outcome trend" (Abadie & Cattaneo, 2017). However, and more importantly, the synthetic control method allows for the effect of both observed and unmeasured confounders to vary over time whereas the traditional difference-in-differences model restricts the effect of such confounders to be constant in time so they can be eliminated by taking time differences (Abadie et al., 2010). It follows that the SCM assumptions are more realistic and less stringent than the DID requirement of common trends.

Additional advantages of the synthetic control method include transparency of the fit and of the counterfactual as well as no extrapolation (Abadie, 2019). In terms of the transparency of the fit, the results in Table 5.5. show the actual discrepancy and closeness between the treated Uganda and its synthetic version in terms of pre-intervention outcomes. The comparisons in columns (1) and (2) make clear the extent to which the observations in the synthetic Uganda approximate the trajectory of the real Uganda in the pre-USE period. Although there is no consensus on the value of the "good fit" defined as the magnitude of the RMSPE, a clear and large discrepancy between the treated unit and the control units would have cast serious doubt on the validity of this study. In terms of the transparency of the counterfactual, the results from Table 5.4 show the contribution of each control unit to the construction of the Synthetic Uganda, which is the counterfactual of interest. The counterfactual for Uganda is given by the weighted average of Burundi (.321), Chad (.241), Madagascar (.142), Cameroon (.115), Niger (.108) and Mauritania (.073) with weights in parentheses. It helps to note that countries such as Burundi and Chad, which are closer to Uganda, have stronger weights compared to faraway countries such as Mauritania, Niger and Cameroon. Madagascar is an exception in this list. Burundi and Uganda, which are both located in East Africa, might be exposed to equivalent regional shocks, which could explain their closeness in terms of lower secondary school enrollment. However, these countries are far enough from each other that the implementation of the USE in Uganda could not have impacted secondary participation in those countries. In terms of no extrapolation, the weights in Table 5.4. are non-negative and sum to 1. This precludes any extrapolation of the coefficients of the synthetic control (weights) outside the support of the data. Abadie et al. (2015) show that regression-based weights are not restricted to the [0,1] interval and that they can extrapolate outside the support of the data, leading to biased results. However, they also show that even though the synthetic control weights

fall within the [0,1] interval, interpolation biases might still exist and be severe in cases where the donor pool contains units with characteristics that very different than those of the treated unit (Abadie et al. 2015). The results from Table 5.4 do not suggest any interpolation biases.

Still, and though unexpected, the findings of my analysis seem consistent with the overall observation that despite its effort to expand school participation, Uganda continues to lag behind the majority of Sub-Saharan African countries in terms of secondary school participation in general and lower secondary school in particular (see fig.1.1). My findings also warrant further investigation at the micro-level by looking at the impact of the USE on households' schooling decisions for their children. Holding other factors constant, do households' decisions to enroll or not to enroll their youth in LSS depend at all on the USE? Answering that question will help to complement the macro-analysis provided in this chapter.

Chapter 6: Micro-effects of the USE policy: A Linear Probability Model approach

6.1 Introduction

The purpose of this chapter is to answer the second research question of this dissertation by determining whether the USE policy has affected the Ugandan households' schooling decisions for their secondary school-age youth. I seek to ascertain whether, and to what extent, controlling for other household characteristics, the Ugandan households' probabilities to enroll or not to enroll their teenage children in lower secondary school depend at all on the implementation of the Universal Secondary Education policy. By analyzing these decisions, I am able to extract the micro-effects of the USE policy and thus to complement the findings of the previous chapter which assessed its macro-effects.

To date, only one aforementioned study by Asankha and Takashi (2011) has attempted to document, through a multinomial logit analysis, the impact of the USE on secondary school enrollments using household panel data. Unfortunately, some limitations cast doubt on their study. Firstly, Asankha and Takashi rely on two data points pre (2005) and post (2009) USE policy respectively. The pre-USE data do not provide enough information to map out the trend in household schooling decisions. Additionally, it might have been premature to use 2009 data in an effort to explore the impact of the USE. Some policy impacts could be abrupt and decaying over time, others could be temporary while some others could be delayed and improving over time (Bernal et al., 2016; Olivier et al, 2013). My study uses data collected in 2012-2013, three years after the first cohort of students who benefited from the USE policy should have completed the lower secondary school level (O'Level). Secondly, and this is perhaps the biggest concern, Asankha's and Takashi's data do not specify whether the schools the adolescents attended were USE or non-USE or whether those students received a government subsidy through the USE. They only distinguish between public and private secondary schools and find statistically significant large positive marginal

effects for girls' enrollments in public secondary schools after the implementation of the USE policy while they see no statistically significant marginal effect on private school enrollments for neither boys nor girls. The authors' inference does not seem to be warranted by their data which do not provide the needed information on students who benefited from the USE policy. Moreover, since both public and private secondary schools could be exposed to the policy, one can validly question the credibility of Asankha's and Takashi's findings as well as their inference.

In this chapter, my study departs from Asankha and Takashi and centers on Ugandan households' response to the USE policy by fitting a linear probability model (LPM) into a rich dataset with relevant information. The chapter is structured as follows. First, I provide a brief description of the rationale and statistical as well as identification problems in using the LPM as an empirical strategy (6.2.), then describe the data (6.3.) and the methodology (6.4.) and finally discuss the results (6.5.). Some concluding remarks presented in the final section (6.6.).

6.2 Linear Probability Model: Rationale and Identification problems

Since the USE policy was designed to expand the lower secondary school participation for all eligible students regardless of their socio-economic background (Government of Uganda - Ministry of Education and Sports, National Headcount Exercise, 2013; Barungi, 2015), I am interested in modeling parents' choice to enroll or not to enroll their secondary school age-going youth in lower secondary school. I am therefore modeling a binary dependent variable, which takes the value of 1 if parents choose to enroll their child or the value of 0 if parents choose not to enroll their child in lower secondary school. However, this response is a probability of enrollment (success) that is conditional both on the receipt of the government subsidy through the USE and on other child and household characteristics. The equation to be estimated can be written as a regular multiple linear regression model as follows:

$$Y_i = \beta_{0+} \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + \mu \qquad (1)$$

where Y is a dichotomous variable taking the value of 1 if a youth is enrolled in school or 0 otherwise, and x stands for all explanatory variables. The key point here is that since Y is a binary variable,

$$P(y = 1|x) = E(y|x). \quad (2)$$

In other words, the probability of success (y=1) ,i.e. the probability of enrollment is the same as the expected value of y (Woolridge, 2006). We can therefore derive the following equation to be estimated:

$$P(y_i = 1|x_i) = \beta_0 + \sum_{i=1}^{k} \beta_k x_k \quad (3)$$

Equation (3) says that the probability of success, say, $p(x) = P(y = 1|x)$, is a linear function of the variables X_k. The coefficient β_k measures the change in probability of success (enrollment) when X_k. changes, holding other factors fixed (for continuous variables) or it is the difference in the probability of success (enrollment) relative to the base group for dummy independent variables (Wooldridge, 2006).

Although the LPM lends itself to easier interpretation of its coefficients (McGarry, 2000; Fairlie and Sundstrom, 1998), its use in the literature is rather scarce, and nonlinear approaches such logit and probit are widely used. Chatla and Shmueli (2016) provide an extensive review of the literature that addresses the main criticisms of the LPM. They mention four limitations, the non-normal error term, the non-constant error variance, the unconstrained response function and the functional form (Maddala, 1986 cited in Chatla & Shmueili, 2016). Firstly, the non-normal error term limitation is a violation of the assumption that the error term in OLS is normally distributed in order to perform the post-estimation tests. Since the error term of an LPM has a binomial distribution instead of a normal distribution, the traditional t-tests for individual

significance and F-tests for overall significance are invalid. Secondly, the non-constant error variance is a violation of the homoscedasticity assumption that is required to prove that the OLS estimators are sound. In an LPM, the error-term variance is not constant; it depends on the values of independent variables. The presence of heteroscedasticity means that the usual OLS *t* statistics no longer have t distributions, F statistics are no longer F distributed and the OLS estimators are no longer BLUE (best linear unbiased estimators)(Wooldridge, 2006). Thirdly, the unconstrained response function is a violation of the basic probability law that states that the probability of an event occurring must be contained within the interval [0,1]. This limitation means that in practice, some of the LPM predicted probabilities may follow outside the unit interval, with probabilities either being less than 0 or greater than 1. Finally, critics charge that the LPM impose an unrealistic functional form. Since the LPM linear, one would assume that a unit increase in one of the covariates x_k is interpreted as a constant change of the coefficient in the probability of an event, holding the remainder of the covariates constant. It would be unrealistic to assume the magnitude of the change to be constant regardless of the current value of x_k.. As Chatla and Shmueli write, "in general, when the outcome is a probability, it is reasonable that the effects of the covariates will diminish as the predicted probabilities approaches 0 or 1"(Chatla & Shmueli, 2016).

Due to the aforementioned problems with the LPM, generalized linear models with logit or probit with link functions have gained traction as the common choice for modeling binary outcomes. However, proponents of the LPM have called into question the four issues discussed above in attempt to salvage the empirical power of the LPM. Aldrich and Nelson (1984) and Long (1997) contend that the non-normal error term limitation can be remedied with large samples where OLS provides estimates that are asymptotically normal under general conditions. Secondly, textbooks show that the non-constant error variance limitation can be addressed by substituting

OLS estimation with weighted least squares (WLS) for estimating the model (Goldberger, 1964, cited in Chatla & Shmueli, 2016). However, Friedman (2012) suggests using heteroscedasticity-robust standard errors, which can now be calculated with most statistical software packages. Thirdly, proponents of the LPM argue that, in practice, fewer observations have predicted probabilities that fall outside the unit interval. As the proportion of those observations increases, the potential bias of the LPM results will also increase. Horace and Oaxaca (2006) suggest an LPM trimming rule that would exclude observations whose predicted probability lies outside the unit interval to reduce possible finite sample bias. Long before Horace and Oaxaca, Mukras (1993) had suggested replacing values above 1 with 1 and values below 0 with 0. Aldrich and Nelson (1984) had also suggested replacing predictions above 1 with 0.999 and predictions below 0 with 0.001, a procedure that the logit and the probit models seem to follow by default. Nonetheless, Friedman et al. (2009) suggest that if the LPM produces too many unbounded predictions, it might indicate either an under-specification or the inadequacy of the LPM (Friedman et al., 2009, cited in Chatla & Shmueli, 2016).

However, as Wooldridge advises, "if the main purpose is to estimate the partial effect of [the covariate] on the response probability, averaged across the distribution of [the covariates], then the fact that some predicted values are outside the unit interval may not be very important" (Wooldridge, 2010). Moreover, Hippel (2015) suggests plotting "the relationship between probability and log odds over the likely range of probabilities in (…) data" as a basic diagnostic to check whether the data are candidates for a linear probability model. If the relationship is nearly linear, then a linear probability model will fit[23]. As shown in the figure below, my data lend

[23] Hippel, P. (2015). When can you fit a linear probability model? More often than you think. Retrieved from https://statisticalhorizons.com/when-can-you-fit

themselves to a linear probability model. The details of the analysis are provided in the next subsection.

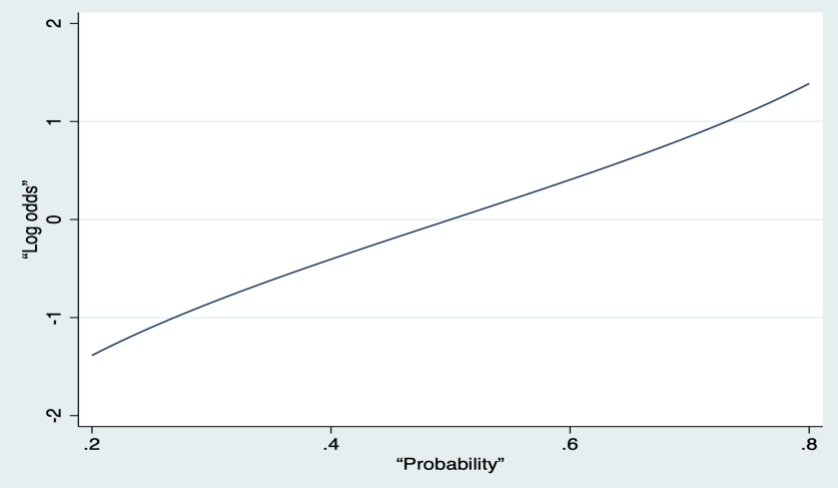


Figure 6. 1: Test for LPM suitability

6.3 Data

The analysis in this chapter is based on data from the 2012-2013 Uganda National Household Survey (UNHS) conducted by the Uganda Bureau of Statistics (UBOS) from June 2012 to June 2013. According to the UBOS, the 2012-2013 UNHS "was designed to allow for reliable estimation of key indicators at the national, rural-urban, region levels and separately for 10 sub-regions"[24] using a two-stage stratified sampling design. At the first stage, Enumeration Areas (EAs) were grouped by districts and rural-urban location, then drawn using Probability Proportional to Size (PPS). At the second stage, households, the ultimate sampling units, were selected using Systematic Random Sampling. The 10 sub-regions included all Ugandan districts, and 750 EAs were selected, with the target of interviewing 10 households per EA. However, taking into account the cost and the operation limitations, the efficiency of the survey design as well as the degree of precision desired for the survey estimates, the actual sample covered by the 2012-

[24] (https://www.ubos.org/wpcontent/uploads/publications/04_20182012_13_UNHS_Final_Report.pdf

2013 UNHS was 6, 887 households and 36,606 people. The survey was organized in four modules including the socio-economic, the labor force, the community as well as the market price modules (UBOS, 2014).

1) The socio-economic module gathered information on household characteristics including individual characteristics (education, literacy, health status), housing conditions, household assets, incomes, loans, household expenditure, welfare indicators, cultural participation of household members and non-crop enterprises.
2) The labor force module focused on indicators such as the activity status of household members aged 5 years and above, hours of work, earnings and care labor activities.
3) The community survey module collected information on the general characteristics of the community such as access to community facilities, community services and other amenities, economic infrastructure, agriculture and markets, availability of education and healthy infrastructure.
4) The market price module was used to provide standardized prices of units sold in the markets through a weighing scheme (UBOS, 2014).

In this study, the socio-economic, the labor force and the community modules were used to extract useful information on household members (age, gender, educational attainment, school enrollment status, whether household member is receiving government subsidy through Universal Secondary Education policies, parental level of education, poverty status, work status) as well as on community characteristics (electricity, drinkable water, access to credit markets, distance and time to school).

The student-level outcome variable used in this analysis is “enroll”, which takes the value of 1 if a secondary school-age is enrolled in the lower secondary school, and the value of 0 if

otherwise. This variable is constructed based on the "current grade" variable provided by the survey. The data show that only 3883 were of the lower secondary school age, with only 600 youth attending lower secondary school. Since I am interested in the gross enrollment rates at the lower secondary school level, I extend my age-population bracket to household members aged between 12 and 23 years of age to account for the under-age and/or over-age enrollment status. I thus obtain a total of 9544 youth of whom only 1429 adolescents, representing 14.97%, were enrolled in lower secondary school in the school year 2012-2013. Of that group of 9544 youth, 4311 (45%) adolescents were still in primary school, 276 (2%) were in upper secondary school, 257 (2%) were in post-primary or vocation school while 3230 youth were out of school.

The main independent variable used in this analysis is the variable "government subsidy" which is defined as the receipt of a government subsidy aimed at expanding secondary school participation through the Universal Secondary Education policy. The dataset contains information on school enrollment status and on whether a household member is receiving a government subsidy to go to the lower secondary school. The data show that out of the 1429 who were enrolled in lower secondary school in 2013, 640 students (43.5%) received a government subsidy through the USE. The government subsidy variable is therefore a dummy variable taking the value of 1 if a secondary school age-going youth receives a subsidy or 0, otherwise. The sub-sample of these 640 government subsidized students includes 368 boys and 272 girls, with 485 students (76%) coming from rural areas against 155 students (24%) from urban centers.

The data show the average distance to school in all 101 districts of Uganda, defined as the Euclidian distance from the center of a household district to the exact location of the school, is 1.96km, with a 2.8 SD. Using 2km as the approximate average distance to school, it appears that only 21% of students attend a school that is within a 2km radius while 79% of students travel more

than 2 km to attend school. The data do not show any difference between urban and rural areas where the majority of schools are located within a radius greater than 2km.

Related to distance to school is the time to school, which is estimated at 36.11 minutes on average, with some students spending as much as 3 hours to arrive to school.

The literature has shown that child labor can be associated with lower enrollment rates. Using the secondary school age-going population (12-23 years of age), the data show that only 972 youth (10.1%) out of 9544 adolescents reported having worked for a wage, salary, commission or any payment in the past 12 months prior to the survey. The estimate is far lower when I restrict the base to lower secondary school age-going group, showing that only 211(5.4%) out of 3882 youth worked for a wage or any form of payment.

Parental education has been shown to be strongly associated with school enrollment. The 2012-2013 UNHS data show that fathers had more exposure to schooling and reached higher levels of education than mothers. While 13% of fathers had completed lower secondary school and above, only 5.63% of mothers had reached that level. The majority of mothers (41.87%) had completed some primary school compared to 36.70% of fathers. Surprisingly, the data do not show any notable difference in parental literacy, defined as the ability to read and to write. About 49% of fathers were found able to read and to write in any language compared to 47.4% of mothers. The following table offers a side by side comparison of fathers' and mothers' education level.

Table 6. 1: Parental Highest Education Level

Highest Education Level	Father	Mother
No formal education	18.95	22.96
Some primary education	36.70	41.87
Completed primary education	9.70	8.31
Some LSS education	12.18	9.01
Completed LSS and above	12.50	5.63
Other (Vocational education)	0.32	0.27
Don't know	9.65	11.92

Other individual, household and community characteristics include whether a child is orphan, suffers from any illness and whether a household is located in a rural or urban area, owns land, has access to loans/credits, is far from or close to school, etc. Table 6.2 describes the variables used in chapter while Tables 6.2.a and 6.2.b provide their summary statistics as described above.

Table 6. 2: List of variables used in the Models

Category	Variables	Measurements/Comments
Student Level Outcome	LSS enrollment status	Dummy variable 1=Yes; 0=No
Individual Characteristics	USE Receipt	Dummy variable 1=Yes; 0=No
	Gender	Dummy variable 1=Male; 0=Female
	Age	Discrete
	Secondary school age	Dummy variable 1=Yes; 0=No
	LSS working status	Dummy variable 1=Yes; 0=No
	Orphan status	Dummy variable 1=Yes; 0=No
Household Characteristics	Mother's highest education level	Categorical variable
	Father's highest education level	Categorical variable
	Poverty level by quintiles	Categorical variable
	School expenses	Continuous
Community Characteristics	Location	Dummy variable 1=Urban; 0=Rural
	Distance from school	Dummy variable 1=Close; 0=Far

Table 6.2.a: Descriptive statistics of observations at the individual youth level

Variables		Enrollment in Lower Secondary School		
Youth's Age		No	Yes	Total
	12	1242	21	1263
		98.34	1.66	100.00
	13	995	57	1052
		94.58	5.42	100.00
	14	922	115	1037
		88.91	11.09	100.00
	15	742	195	937
		79.19	20.81	100.00
	16	623	233	856
		72.78	27.22	100.00
	17	478	248	726
		65.84	34.16	100.00
	18	544	207	751
		72.44	27.56	100.00
	19	478	140	618
		77.35	22.65	100.00
	20	690	108	798
		86.47	13.53	100.00
	21	452	49	501
		90.22	9.78	100.00
	22	522	37	559
		93.38	6.62	100.00
	23	427	19	446
		95.74	4.26	100.00
Whether a child is receiving government subsidy for LSS				
	No	4713	789	5502
		85.66	14.34	100.00
	Yes	3402	640	4042
		84.17	15.83	100.00
Whether a child is an orphan				
	No	4972	863	5835
		85.21	14.79	100.00
	Yes	30	6	36
		83.33	16.67	100.00
Whether a child is working				
	No	2677	686	3363
		79.60	20.40	100.00
	Yes	5438	743	6181
		87.98	12.02	100.00
	Total	8115	1429	9544
		85.03	14.97	100.00

Source: UNHS 2013. Calculations by the author.

6.2.b: Descriptive Statistics of observations at the household and community levels

Variables	Freq.	Percent	Cum.
Father's highest level of education			
No formal education	1459	18.95	18.95
Some Primary	2826	36.70	55.64
Completed Primary	747	9.70	65.34
Some O' Level	938	12.18	77.52
Completed O' Level and above	963	12.50	90.03
Other (specify)	25	0.32	90.35
Don't Know	743	9.65	100.00
Mother's highest level of education			
No formal education	1011	22.96	22.96
Some Primary	1844	41.88	64.84
Completed Primary	366	8.31	73.15
Some O' Level	397	9.02	82.17
Completed O' Level and above	248	5.63	87.80
Other (specify)	12	0.27	88.08
Don't Know	525	11.92	100.00
Quintile 1	8703	23.79	23.79
Quintile 2	6430	17.58	41.37
Quintile 3	6491	17.75	59.12
Quintile 4	6717	18.36	77.48
Quintile 5	8237	22.52	100.00
School is far (> 2kms)	28964	79.13	79.13
School is close (<2 kms)	7640	20.87	100.00
Rural	27663	75.63	75.63
Urban	8915	24.37	100.00

Source: UNHS 2013. Calculations by the author.

The 2013 UNHS partially mirrors the DHS in its design and some of its content. Unfortunately, the DHS dataset does not provide information on whether a household member

receives a government subsidy to attend lower secondary school. If it did, it would have been ideal for the micro-effect analysis.

6.4. Methodology

The basic model of the impact of the USE on parental decision to enroll or not to enroll their adolescent boys and girls in lower secondary school is defined by the following relationship:

$$Y_{ijd} = \alpha_0 + \alpha_1 USE_{ijd} + \sum_{k=1}^{m} \beta_k I_{kd} + \sum_{k=1}^{n} \delta_k X_{kd} + \sum_{k=1}^{p} \gamma_k D_d + \epsilon_{ijd} \qquad (4)$$

where Y_{ijd} is the dummy student-level outcome variable describing the conditional probability of enrollment in lower secondary school for a adolescent i form a household j located in a district d. This variable takes the value of 1 if a youth is enrolled in LSS or 0, otherwise. USE_{ijk} is a dummy variable taking the value of 1 if an adolescent i from a household j in a district d is receiving a government subsidy through the USE, or 0 otherwise. I_{kd}, X_{kd} and D_d are vectors of individual, household and district characteristics described in table 2 respectively. ε_{ijd} is the idiosyncratic error term.

In this model, α_1 is the coefficient of interest for my analysis. It provides the estimated probability of enrollment in lower secondary school if a youth i from a household j in a district d receives the government subsidy through the Universal Secondary Education policy while holding other individual, household and district characteristics constant. I run multiple models, starting with a model with the treatment variable (USE) as the only independent variable, then, in a sequence, I add the individual, household and district characteristics. I also construct several interaction terms between the variable USE and several other relevant variables to test the variation in the outcome variable. I therefore interact USE with gender, parental education level, being from an urban center, being an orphan, being a working adolescent and poverty level ranking.

However, I am worried that given the binary nature of the outcome y, my model violates the homoscedasticity assumption which is crucial for justifying the classic and traditional t and F statistics. Wooldridge (2006) shows that by definition, when y is a binary variable, its variance, conditional on x, is defined as

$$Var(y|X) = p(x)[1 - p(x)] \quad (5)$$

where p(x) is the probability of success: $p(x) = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k$. Because there must be heteroscedasticity in my model, the standard errors in equation (4) should be taken with caution. As discussed earlier, I compute heteroscedasticity-robust statistics in order to obtain the BLUE[25] coefficients. Since some of my fitted values lie outside the unit interval, I am not able to use a weighted least squares regression (see Wooldridge, 2006).

Moreover, I am concerned about the endogeneity of the USE variable due to potential omitted variable and self-selection threats. Students who receive the subsidy should have obtained a score between 4 and 28 on the Primary Leaving Exam (PLE). It goes without saying that ability, intelligence, perseverance, discipline, passion, competitiveness are among other things which are not measured but might have affected a youth's participation in the USE. Also, through anticipation effects, these students who receive the government subsidy might have worked harder to meet the USE criteria and therefore receive the subsidy.

Under these conditions, receiving the USE is self-selected and driven by unmeasured factors, thus leading to some potential identification issues. The OLS estimate α_1 from equation (4) which is the difference in probability of $P(y = 1|USE = 1)$ and $P(y = 1|USE = 0)$ is still derived from:

$$\bar{\bar{Y}}_1 - \bar{\bar{Y}}_0 = (\alpha_0 + \alpha_1 + \bar{\varepsilon}_1) - (\alpha_0 + \bar{\varepsilon}_0)$$

$$= \alpha_1 + (\bar{\varepsilon}_1 - \bar{\varepsilon}_0)$$

[25] BLUE: Best Linear Unbiased Estimator.

If USE is endogenous i.e. is correlated with the error term, the quantity $(\bar{\varepsilon}_1 - \bar{\epsilon}_0) \neq 0$, then $\bar{\bar{Y}}_1 - \bar{\bar{Y}}_0$ does not estimate α_1 but rather a different quantity. In other words, if USE is correlated with the error term, α_1 is not an unbiased estimator.

To account for these potential biases, I exploit an exogenous variation in the level of schooling decisions to which Ugandan households are exposed because of the USE implementation. I posit that, although the USE subsidy is provided equally to schools for students who obtained a PLE score ranging between 4 and 28, the receipt of this financial assistance would induce a variation in the schooling decisions households might make based on the extent to which the government subsidy affects the total expected school expenses. Households that would have kept their youth out of school due to economic hardships would be induced to enroll their children in school as a result of the USE implementation. Additionally, households faced with serious economic hardships might still be prevented from enrolling their children in school if the government subsidy is not adequate enough to reduce the cost of schooling. However, those households that would have been indifferent to school expenses and would have kept their children in school anyway might experience a zero impact of the USE on their schooling decisions. The impact of the USE policy would therefore be felt most likely by those marginal students from the very poor households. It follows that being eligible for the receipt of the USE subsidy does not necessarily increase the probability of enrollment in lower secondary school due to the level of direct schooling costs households incur. As shown in appendix vi, there is considerable variation in school expenses not only across the districts but also within districts. For instance, in 2013, total annual expenses for students enrolled in lower secondary school stood at UGX 181,702 ($70) on average, ranging from UGX 9021.52($3.51) in the Kween district to UGX 820000 ($320) in the Adjumani district.

This variation in school expenses allows me to distinguish between high and low school expenses districts relative to the national mean.

Unfortunately, the above distinction between high and low school expenses districts fails to help in the analysis. Therefore, following the intuition in Kane (1994), I define a dichotomous variable EXP as equal to 1 if a household's schooling expenses are above the district mean and zero otherwise. I then interact this variation with USE as the main independent variable in the expanded equation (6).

$$Y_{ijd} = \alpha_0 + \alpha_1 USE_{ijd} + \propto_2 Exp_d + \alpha_3 USE_{ijd} * Exp_d + \sum_{k=1}^{m} \beta_k I_{kd} + \sum_{k=1}^{n} \delta_k X_{kd} + \sum_{k=1}^{p} \gamma_k D_d + \varepsilon_{ijd} \quad (6)$$

Where α_3 is the estimated change in the effect of the USE policy on the probability of enrollment in the lower secondary school conditional on whether a youth *i* from a household *j* is located in either a high or low schooling expense district *d*. The unique effect of USE is now represented by $\alpha_1 + \alpha_3 * Exp_d$. I also expand this model by interacting the variation in household schooling expenses with the receipt of the USE subsidy and with the rest of the individual, household and community characteristics.

Finally, I enrich the above model by including household fixed effects in order to capture and control for unobserved heterogeneity across households.

6.5 Results

Table 6.3 presents the results from the main specifications in equation (4). Due to the inherent heteroskedasticity threat outlined above, robust standard errors have been used in all models. All models show a statistically significant but changing association between the receipt of the

government subsidy and the probability of being enrolled in lower secondary school. In model 1, the probability of being enrolled in lower secondary school accounts for 13.3 percentage points for students who receive the government subsidy compared to their counterparts. Models 2-4 add three individual characteristics, namely gender, whether a youth is working and whether he or she is an orphan. Adding gender and the working status to the equation leaves the magnitude of the association between the receipt of the USE subsidy and the probability of enrollment in lower secondary school quasi unchanged and statistically significant at the 1percent level. However, when accounting for whether a youth is an orphan, the probability of enrollment in lower secondary school decreases to 7.6 percentage points for students while remaining statistically significant at the 1percent level. Unfortunately, due to data limitations, I am unable to ascertain which of the maternal or paternal orphanhood is driving this probability change. In their study on the effects of oprhanhood on human capital in Tanzania, Beegle et al. (2010) acknowledge the considerable heterogeneity across different types of orphans and the potential pathways through which losing one or both parents can adversely affect schooling outcomes. Orphans' time could be used in home production as a substitute for adult labor; they could be discriminated against and become victims of favoritism shown to biological children if they are "fostered out." Additionally, losing a parent could result in trauma or stigma (if one or both parents died of HIV-AIDS), which could lower investment in education (Beegle et al., 2010). Models 5 and 6 add parents' highest education level, using parents without formal education as the base category. In both models, receiving the USE subsidy increases the probability of enrollment in lower secondary school by 9.3 percentage points. In either specification, the association is statistically significant at the1percent level. Models 7 and 8 add distance to school and whether a youth is from a rural or urban area. Both specifications show a statistically significant association between the receipt of the USE subsidy and the

probability of being enrolled in lower secondary school. Finally, when all individual, household and community characteristics are included in the full specification (Model 9), the probability for LSS enrollment increases by 9.8 percentage points, slightly lower than in Model 1. Nonetheless, the relationship between the probability of enrollment in lower secondary school and the receipt of the USE subsidy remains statistically significant at the 1% level.

Table 6. 3 LPM Results: Basic specification

VARIABLES	(1) LSS enroll	(2) LSS enroll	(3) LSS enroll	(4) LSS enroll	(5) LSS enroll	(6) LSS enroll	(7) LSS enroll	(8) LSS enroll	(9) LSS enroll
USE Receipt	0.133***	0.132***	0.132***	0.076***	0.093***	0.093***	0.098***	0.098***	0.098***
	(0.006)	(0.006)	(0.006)	(0.005)	(0.009)	(0.012)	(0.014)	(0.014)	(0.014)
Gender		0.005**	0.005**	-0.004	-0.007	-0.007	-0.007	-0.004	-0.002
		(0.002)	(0.002)	(0.003)	(0.005)	(0.008)	(0.008)	(0.008)	(0.008)
Youth working status			-0.002	0.009	0.004	0.004	-0.007	-0.025	-0.029
			(0.007)	(0.015)	(0.018)	(0.023)	(0.025)	(0.025)	(0.025)
Orphanhood				0.038	0.035	0.029	0.029	0.033	0.032
				(0.035)	(0.036)	(0.042)	(0.042)	(0.042)	(0.041)
Father's highest education level									
Some primary education					0.020***	-0.012	-0.01	-0.01	-0.015
					(0.005)	(0.011)	(0.011)	(0.011)	(0.011)
Completed primary education					0.038***	0.01	0.011	0.007	-0.002
					(0.009)	(0.016)	(0.016)	(0.016)	(0.016)
Some LSS education					0.060***	0.042**	0.045**	0.036**	0.028
					(0.010)	(0.018)	(0.018)	(0.018)	(0.018)
Completed LSS					0.078***	0.052**	0.055**	0.043*	0.03
					(0.010)	(0.022)	(0.022)	(0.022)	(0.022)
LSS and above					0.142*	0.114	0.112	0.108	0.091
					(0.075)	(0.109)	(0.107)	(0.106)	(0.108)
Mother's highest education level									
Some primary education						0.020**	0.020**	0.013	0.011
						(0.009)	(0.009)	(0.009)	(0.009)
Completed primary education						0.038**	0.038**	0.027	0.022
						(0.018)	(0.018)	(0.017)	(0.017)
Some LSS education						0.067***	0.068***	0.052***	0.044**
						(0.019)	(0.019)	(0.019)	(0.019)
Completed LSS						0.079***	0.078***	0.052*	0.037
						(0.028)	(0.028)	(0.028)	(0.028)
LSS and above						0.013	0.006	-0.036	-0.057
						(0.094)	(0.093)	(0.091)	(0.093)
Distance from school							-0.028***	-0.034***	-0.032***
							(0.009)	(0.009)	(0.009)
Location: Urban								0.079***	0.063***
								(0.012)	(0.012)
Quintile 2									0.007
									(0.010)
Quintile 3									0.01
									(0.011)
Quintile 4									0.026**
									(0.011)
Quintile 5									0.068***
									(0.014)
Constant	0.025***	0.023***	0.023***	0.032***	0.006	0.009	0.016*	0.006	-0.005
	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.009)	(0.009)	(0.009)	(0.008)
Observations	36,605	36,517	36,517	20,062	7,701	3,439	3,439	3,437	3,437
R-squared	0.045	0.045	0.045	0.02	0.039	0.047	0.05	0.069	0.077

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These results only begin to tell the story of the impact of the USE policy on the lower secondary school participation in Uganda; they do, however, call for further model specifications and precision.

Table 6.4. presents the results from equation (4) but enriched with several interaction terms as explained above. Model 1 uses the receipt of the USE subsidy as the main predictor variable as in the above basic specification. Model 2 interacts the USE receipt with individual characteristics such as the youth's gender, working status and whether they are orphan. The model shows no statistically significant gender difference in the probability of enrolling in lower secondary school for students who receive the USE subsidy. Additionally, there is no statistically significant difference between orphans and biological children in their probability of enrolling in lower secondary school if they all receive the USE subsidy. However, all other factors being held constant, the effect of the USE subsidy on the probability of enrollment in LSS decreases by 5.6 percentage points when a youth is working for wages. The resulting effect (.019=.075-.056), although positive and statistically significant, is consistent with existing literature that shows adverse impact of child labor on schooling. In model 3, the USE subsidy is interacted with the father's highest education level, using fathers without formal education as reference category. The model shows that, all other factors being held constant, the USE effect on the probability of LSS enrollment increases by 9.7 percentage points for the youth whose fathers have completed the primary education compared to the youth whose fathers have no formal education. The difference is statistically significant at 1 percent level. Also, having a father who has completed some LSS education increases the USE effect on the probability of LSS enrollment by 6.2 percentage points. And better yet, having a father who has completed LSS and above increases the USE effect on the LSS probability by 14.6 percentage points compared to youth with formally uneducated fathers. The difference, as in the previous case, is statistically significant at 1 percent level. The main effect of the USE subsidy in these cases is respectively.146 (fathers with completed primary education), .111(fathers with some LSS) and .21(fathers with LSS and above). However, the model shows that

having a father with some informal or vocational education decreases the effect of the USE subsidy on the probability of LSS enrollment by 23.8 percentage points, which results in an overall .287 negative effect of the USE subsidy on the probability of LSS enrollment. Model 4 adds interaction terms between the receipt of the USE subsidy and mothers' highest education levels, using mothers without formal education as reference category. Surprisingly, none of the coefficients on the interaction terms are statistically significant. In this model, however, having a father who has completed LSS education and above is associated with a. 134 chance of enrolling in LSS for the youth who receive the USE subsidy compared to their counterparts with formally uneducated fathers. Holding other factors constant, the main effect of the USE, which is statistically significant at the 1 percent level, accounts for 19.8 percentage points. It could be that the highly patriarchal family structure in most of Sub-Saharan Africa, which results in men being largely the household heads, could explain why a father's education seems to matter in this and the previous models. This finding is somewhat consistent with existing literature that shows no consensus on which parent's level of education matters the most and for which child (Hunt, 2008). Model 5 interacts the receipt of the USE subsidy with a household's poverty status, using the first quintile (or the poorest) as reference category. The model shows that the USE effect on the probability of enrolling in LSS increases by 6.2 percentage only for students from the second quintile. The difference between such students and those from the poorest households is statistically significant at the 10 percent level. In this model, however, the USE effect on the probability of enrolling in LSS increases by 17.4 percentage points for youth with a mother who has completed an LSS education and above compared to the youth with formally uneducated mothers. The difference is statistically significant at the 1 percent level and is slightly bigger for fathers with comparable education (12.5 percentage points). Model 6 interacts the receipt of the USE subsidy with distance to school and

shows that being far school decreases the USE effect on the probability of enrolling in LSS by 17.1 percentage points, which nearly nullifies the overall USE effect (-.171+.172). Moreover, in this model, holding all other factors constant, receiving the USE subsidy increases the probability of LSS enrollment by 18.7 and 14.1 percentage points for students with both mother and father who have completed an LSS education and above respectively. The difference is statistically significant at the 1percent level. In the full model (7), I interact the USE receipt with location and find that living in a city increases the probability of enrolling in LSS by 7 percentage points for students who receive the USE subsidy compared to students who live in rural areas. In this model, distance from school still has a statistically significant adverse effect on the receipt of the USE subsidy. Additionally, having a mother who has completed an LSS education and above increases the effect of the USE subsidy on the probability of LSS enrollment by 18 percentage points while a father with a comparable education level contributes only 14.9 percentage points. This finding is consistent with the existing literature that shows a positive relationship between educated parents and their children's educational attainment (Ainsworth et al, 2005; Chevalier, 2004; Hunt, 2008).

Table 6. 4 LPM Results: Interaction specifications

Table 6.4. LPM Results: Interaction specifications

	Dependent Variable: Probability of enrollment in LSS						
		USE Receipt x individual and household characteristics				USE x distance and location	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
USE Receipt	0.133***	0.075***	0.049***	0.064**	0.045	0.172***	0.165***
	(0.006)	(0.008)	(0.017)	(0.030)	(0.031)	(0.040)	(0.039)
USE x Gender		0.005	0.001	0.008	0.008	0.002	0.005
		(0.011)	(0.017)	(0.024)	(0.024)	(0.023)	(0.023)
USE x Youth working status		-0.056*	-0.028	0.022	0.047	0.06	0.08
		(0.030)	(0.038)	(0.056)	(0.057)	(0.055)	(0.054)
USE x Orphanhood		0.081	0.074	0.006	0.005	0.008	0.007
		(0.095)	(0.096)	(0.104)	(0.104)	(0.102)	(0.101)
USE Receipt and Father's highest education level							
			(0.008)	(0.014)	(0.014)	(0.014)	(0.014)
USE Receipt x Some primary education			0.024	-0.007	-0.014	-0.012	-0.008
			(0.019)	(0.033)	(0.034)	(0.034)	(0.033)
USE Receipt x Primary education			0.097***	0.063	0.056	0.076	0.079
			(0.034)	(0.051)	(0.052)	(0.052)	(0.051)
USE Receipt x Some LSS			0.062*	0.035	0.036	0.033	0.031
			(0.033)	(0.052)	(0.052)	(0.052)	(0.052)
USE Receipt x Completed LSS and above			0.161***	0.134*	0.125*	0.141**	0.149**
			(0.043)	(0.071)	(0.072)	(0.070)	(0.070)
USE Receipt x Other			-0.238***	-0.266*	-0.285*	-0.235	-0.191
			(0.087)	(0.137)	(0.147)	(0.148)	(0.145)
USE Receipt and Mother's highest education level							
USE Receipt x some primary education				-0.003	-0.007	-0.005	-0.015
				(0.027)	(0.028)	(0.027)	(0.027)
USE Receipt x completed primary education				0.057	0.049	0.034	0.023
				(0.057)	(0.058)	(0.055)	(0.055)
USE Receipt x some LSS				0.04	0.041	0.039	0.031
				(0.064)	(0.065)	(0.064)	(0.062)
USE Receipt x completed LSS and above				0.149	0.174*	0.187*	0.180*
				(0.105)	(0.104)	(0.101)	(0.100)
USE Receipt x Other (vocational)				-0.045	0.046	0.075	0.107
				(0.117)	(0.121)	(0.120)	(0.120)
USE Receipt and Poverty status							
USE Receipt x Quintile 2					0.062*	0.046	0.043
					(0.034)	(0.034)	(0.034)
USE Receipt x Quintile 3					0.006	-0.006	-0.007
					(0.035)	(0.034)	(0.033)
USE Receipt x Quintile 4					0.032	0.021	0.015
					(0.035)	(0.035)	(0.034)
USE Receipt x Quintile 5					0.032	0.02	-0.001
					(0.041)	(0.040)	(0.038)
USE Receipt and Distance from school							
USE Receipt x Distance from school						-0.171***	-0.173***
						(0.031)	(0.031)
USE Receipt x Location							
USE Receipt x Location (Urban)							0.070**
							(0.033)
Constant	0.025***	0.033***	0.015***	0.015**	0.006	0.003	0.001
	(0.001)	(0.002)	(0.004)	(0.007)	(0.006)	(0.006)	(0.006)
Observations	36,605	20,062	7,701	3,439	3,437	3,437	3,437
R-squared	0.045	0.02	0.047	0.059	0.078	0.099	0.112

Notes: Robust standard errors in parentheses. All columns (2-7) include individual, household and community dummy variables interacted with the receipt of the USE subsidy. Column 2 include interaction terms between the receipt of the USE subsidy with youth individual characteristics (gender, orphanhood, youth working status). Column 4 adds interactions between the USE receipt and a father's various education levels while in column 5, the USE receipt is interacted with a mother's education level. Columns 6 and 7 add distance from school and location to the model.

*** Significant at the 1 percent level

** Significant at the 5 percent level

* Significant at the 10 percent level

Table 6.5. presents the results from the expanded equation (6) which addresses the potential endogeneity of the USE dummy variable. As explained in the previous section, a dummy variable (EXP) is created to account for the exogenous variation in households' school total expenses due to their exposure to the government subsidy for lower secondary school. The dummy variable EXP takes the value of 1 if a household school expenses are above the district average mean and 0 otherwise. This variable is interacted with USE to disentangle the effect of USE government on households' schooling decisions conditional on whether they (households) incur schooling costs below or above the district mean.

Model 1 shows that, compared to households with below district average schooling costs, living in a high cost district decreases the effect of the USE subsidy on the probability of enrolling in LSS by 44.9 percentage points. The difference is statistically significant at the 1 percent level. However, holding other factors constant, the overall effect of the USE is only 4.7 percentage points, which is lower than the estimate in the previous specifications. As expected, the main effect of living in a household with below district average schooling expenses is positive and statistically significant. Model 2 and 3 add gender and a youth working status. None of the interaction terms between the receipt of the USE subsidy and gender or youth-working status are statistically significant at any conventional level. However, in both models, and compared to households with school expenses below district average, households with schooling costs above the district mean register a statistically significant decreased effect of the USE subsidy on the probability of enrollment by .429 and .432 respectively. However, the unique effect of USE drops to 4.5 percentage points in both models, slightly lower than in the basic specification. Model 4 adds whether a youth is an orphan, either paternal, maternal or both. The coefficient of interest (interaction USE and school expenses) remains negative and statistically significant at 1 percent

level. The unique effect of the USE receipt is reduced to 3.2 percentage points and it is also statistically significant at 1 percent level. The triple interaction between the USE receipt, living in a high cost district and being an orphan fails to yield any effect. However, and not surprisingly, the coefficient on the interaction term between USE receipt, living in a high cost district and youth-working status is now negative (-.0211) and statistically significant at 1 percent level. Models 5 and 6 include parental education and leave the coefficient of interest negative and statistically significant at 1 percent level. However, the main effects of the USE receipt are positive and statistically significant at 1 percent level for both fathers (1.7) and mothers (2.3). Moreover, while model 6 yields no partial effect when the USE subsidy is interacted with a mother's highest education level, model 5 shows that having a father who has either achieved some primary education, completed primary education or completed LSS education and above is increases the USE effect on the LSS enrollment probability by 22.6, 36.7 and 32.8 percentage points respectively compared to youth with formally uneducated fathers. However, when living in a high cost district is interacted with both USE receipt and father's highest level of education, the effects are mostly negative and statistically significant.

Adding poverty level to the model (model 7) slightly improves the negative impact of living in a high cost district on the USE effect on the probability of enrolling in LSS. However, holding other factors constant, the model shows that the USE receipt increases the chance of LSS enrollment by 1.9 percentage points. None of the coefficients on the interaction between the USE receipt, school expenses and poverty rankings are statistically significant.

Models 8 and 9 improve our results when distance from school and location are added to the equation. While the coefficient of interest remains negative and statistically significant, the main effect of the USE receipt on the probability of enrolling in LSS is estimated at 7.3 and 6.8

percentage points when distance from school and living in an urban area are included in the model. Model 8 shows that distance from school reduces the USE effect on the LSS probability of enrollment by 48.3 percentage points. However, the triple interaction between USE receipt, school expenses and distance shows a statistically significant positive effect. The result is not unexpected and means that compared to households with schooling costs above the district mean and located far from school, the receipt of the USE subsidy is associated with a .416 probability of LSS enrollment for households with low schooling costs and located closer to school. In this model, having a mother with some vocational schooling increases the USE probability of LSS enrollment effect by 36.6 percentage points compared to youth with formally uneducated. Model 9 shows that living in an urban area increases the USE probability of enrollment effect by 21 percentage points on average compared to households living in rural areas. Adding a triple interaction term between USE receipt, school expenses and location yields a statistically significant negative effect of -.195. This finding could point to the overwhelming impact of schooling costs which are higher in urban areas than in villages. Also, in this full model, the triple interaction between USE receipt, schooling expenses and youth-working status has a statistically significant negative effect of .908 on the probability of LSS enrollment. This finding confirms the adverse effect of child labor which is exacerbated by living in a high school cost district. Moreover, the coefficient on the triple interaction between USE receipt, schooling expenses and orphanhood is now positive and statistically significant. Being an orphan is sensitive to schooling costs, which is shown in these results. Finally, worth noting is the statistically significant positive coefficient on the interaction term between USE receipt and a mother's vocation education while the corresponding effect for fathers is negative.

Overall, living in a high cost district diminishes the potential impact of the USE subsidy on the probability of households to enroll their youth in lower secondary school. This negative effect ranges from 44.9 to 20.3 percentage points on average and is statistically significant at the 1 percent level. However, my model specifications show a positive and statistically significant main effect of the USE policy ranging from 1.9 to 7.3 percentage points.

Table 6. 5 LPM Results: Expanded Model with interactions

	Dependent Variable: Probability of enrollment in LSS								
	School expenses interacted with individual - household characteristics and distance and location								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
USE Receipt	0.496***	0.474***	0.477***	0.413***	0.220***	0.307**	0.253*	0.451***	0.447***
	(0.020)	(0.031)	(0.031)	(0.037)	(0.079)	(0.121)	(0.130)	(0.145)	(0.139)
School expenses below district mean	0.025***	0.027***	0.026***	0	0.017	0.02	0.017	0.034*	0.036*
	(0.003)	(0.004)	(0.004)	(0.004)	(0.010)	(0.019)	(0.016)	(0.021)	(0.020)
USE Receipt x school expenses	-0.449***	-0.429***	-0.432***	-0.381***	-0.203**	-0.284**	-0.234*	-0.378**	-0.379***
	(0.021)	(0.032)	(0.032)	(0.038)	(0.081)	(0.125)	(0.134)	(0.151)	(0.145)
USE Receipt x location (urban)									0.210**
									(0.100)
USE Receipt x school expenses x location									-0.195*
									(0.105)
USE Receipt x distance								-0.483***	-0.468***
								(0.093)	(0.091)
USE Receipt x school expenses x distance								0.416***	0.401***
								(0.098)	(0.096)
USE Receipt x Quintile 2							0.099	0.099	0.066
							(0.180)	(0.159)	(0.160)
USE Receipt x Quintile 3							-0.078	-0.02	-0.081
							(0.163)	(0.129)	(0.132)
USE Receipt x Quintile 4							0.143	0.213	0.118
							(0.166)	(0.155)	(0.149)
USE Receipt x Quintile 5							0.029	0.022	-0.086
							(0.159)	(0.147)	(0.147)
USE Receipt x school expenses x quintile 2							-0.035	-0.046	-0.013
							(0.183)	(0.162)	(0.163)
USE Receipt x school expenses x quintile 3							0.088	0.021	0.084
							(0.166)	(0.133)	(0.136)
USE Receipt x school expenses x quintile 4							-0.104	-0.184	-0.085
							(0.169)	(0.158)	(0.153)
USE Receipt x school expenses x quintile 5							-0.055	-0.049	0.058
							(0.165)	(0.152)	(0.152)
USE Receipt and Mother's education									
USE Receipt x some primary education						-0.068	-0.08	-0.016	-0.031
						(0.142)	(0.148)	(0.140)	(0.130)
USE Receipt x completed primary education						0	0.033	-0.04	-0.067
						(0.187)	(0.183)	(0.187)	(0.171)
USE Receipt x some LSS education						-0.116	-0.15	0.013	0.026
						(0.197)	(0.200)	(0.183)	(0.161)
USE Receipt x completed LSS and above						0.189	0.152	0.301	0.161
						(0.240)	(0.248)	(0.242)	(0.263)
USE Receipt x other (vocation)						0.236	0.339**	0.366**	0.416**
						(0.166)	(0.170)	(0.171)	(0.171)
USE Receipt x school expenses x some primary						0.071	0.074	0.011	0.021
						(0.144)	(0.150)	(0.142)	(0.132)
USE Receipt x school expenses x completed primary						0.049	0.004	0.074	0.096
						(0.194)	(0.191)	(0.195)	(0.179)
USE Receipt x school expenses x some LSS						0.178	0.2	0.029	0.014
						(0.208)	(0.212)	(0.195)	(0.174)
USE Receipt x school expenses x LSS and above						-0.045	0.023	-0.127	0.028
						(0.265)	(0.273)	(0.266)	(0.284)
USE Receipt and father's education level									
USE Receipt x some primary education					0.226**	0.115	0.102	0.095	0.082
					(0.097)	(0.159)	(0.172)	(0.152)	(0.135)
USE Receipt x completed primary education					0.367***	0.114	0.103	0.212	0.262
					(0.117)	(0.197)	(0.200)	(0.210)	(0.188)
USE Receipt x some LSS education					0.15	0.196	0.201	0.155	0.141
					(0.108)	(0.191)	(0.193)	(0.181)	(0.167)
USE Receipt x completed LSS and above					0.328***	0.331*	0.349*	0.346*	0.378**
					(0.112)	(0.184)	(0.197)	(0.189)	(0.175)
USE Receipt x other (vocation)					-0.015	-0.317*	-0.329*	-0.309*	-0.285*
					(0.016)	(0.164)	(0.170)	(0.171)	(0.169)
USE Receipt x school expenses x some primary					-0.198**	-0.113	-0.107	-0.1	-0.087
					(0.098)	(0.162)	(0.175)	(0.155)	(0.139)
USE Receipt x school expenses x completed primary					-0.339***	-0.073	-0.072	-0.169	-0.217
					(0.120)	(0.203)	(0.205)	(0.216)	(0.194)
USE Receipt x school expenses x some LSS					-0.112	-0.175	-0.176	-0.13	-0.113
					(0.113)	(0.198)	(0.200)	(0.188)	(0.175)
USE Receipt x school expenses x LSS and above					-0.247**	-0.349*	-0.372*	-0.356*	-0.386**
					(0.120)	(0.195)	(0.207)	(0.200)	(0.187)
USE Receipt x orphanhood				-0.104	-0.003	-0.505***	-0.521***	-0.292	-0.313
				(0.225)	(0.204)	(0.158)	(0.175)	(0.192)	(0.200)
USE Receipt x school expenses x orphanhood				0.205	0.104	0.656***	0.660***	0.423*	0.448*
				(0.241)	(0.223)	(0.196)	(0.210)	(0.224)	(0.230)
USE Receipt x youth-working status			-0.1	-0.211**	-0.179	-0.205	-0.176	-0.004	0.065
			(0.087)	(0.106)	(0.115)	(0.153)	(0.171)	(0.140)	(0.145)
USE Receipt x school expenses x youth-working			-0.058	-0.016	-0.227	-0.712***	-0.708***	-0.874***	-0.908***
			(0.120)	(0.153)	(0.218)	(0.162)	(0.184)	(0.156)	(0.159)
USE Receipt x gender		0.039	0.043	0.028	0.017	0.029	0.055	0.02	0.019
		(0.041)	(0.041)	(0.051)	(0.067)	(0.091)	(0.097)	(0.093)	(0.090)
USE Receipt x school expenses x gender		-0.034	-0.037	-0.026	-0.019	-0.028	-0.058	-0.025	-0.021
		(0.042)	(0.042)	(0.052)	(0.069)	(0.094)	(0.100)	(0.096)	(0.093)
Constant	0.021***	0.019***	0.019***	0.033***	0.011***	0.011	0.003	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.007)	(0.006)	(0.006)	(0.006)
Observations	36,605	36,517	36,517	20,062	7,701	3,439	3,437	3,437	3,437
R-squared	0.114	0.114	0.115	0.081	0.12	0.134	0.155	0.183	0.195

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Table 6.6., I report the results from the enriched linear probability model with family fixed effects. The results appear to be largely consistent with the previous specification although the overall USE effects on the LSS enrollment probability now range from .5 to 9.4 percentage points. These results are driven by the negative impact of school expenses on the effect of high school expenses on the USE impact on LSS enrollment probability. These negative effects range from -15.4 to -46.5 percentage points. Consistent with the earlier specifications, the findings do not point to any gender differences in the effects of the USE subsidy on the probability of enrollment in LSS in Uganda. Also, in this specification, distance from still reduces the USE effect on the LSS enrollment probability by 32.1 percentage point and this result is statistically significant at the 1 percent level. The coefficient on the triple interaction between the receipt of the USE subsidy, schooling expenses and distance from school is positive and statistically significant. This result is not surprising: compared to households with schooling costs above the district mean and located far from school, the receipt of the USE subsidy is associated with a .254 probability of LSS enrollment for households with low schooling costs and located closer to school. However, contrary to the previous specification, compared to the poorest households (1st quintile), 4th and 5th quintile households appear to benefit more from the USE subsidy by 13.4 and 12.7 percentage points respectively. Unfortunately, I fail to see any variation in the negative effect of schooling expenses on the USE effects based on socio-economic status or location (Triple interaction).

Table 6.6. LPM Results – Household fixed effects

	Dependent Variable: Probability of enrollment in LSS								
	School expenses interacted with individual - household characteristics and distance and location								
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
USE Receipt	0.484***	0.455***	0.488***	0.389***	0.184**	0.209**	0.385***	0.559***	0.491***
	(0.023)	(0.033)	(0.023)	(0.031)	(0.074)	(0.093)	(0.054)	(0.028)	(0.026)
School expenses	0.015***	0.019***	0.015***	-0.021***	0.002	-0.099**	0.002	0.085***	0.002
	(0.003)	(0.004)	(0.003)	(0.004)	(0.011)	(0.042)	(0.004)	(0.008)	(0.003)
USE Receipt x School expenses	-0.432***	-0.408***	-0.436***	-0.346***	-0.179**	-0.154	-0.358***	-0.465***	-0.435***
	(0.023)	(0.034)	(0.024)	(0.032)	(0.074)	(0.108)	(0.055)	(0.031)	(0.026)
Father's highest education level					YES				
Mother's highest education level						YES			
Gender (1= Male)		0.004**							
		(0.002)							
USE Receipt x Gender		0.052							
		(0.043)							
School expenses x Gender		-0.009							
		(0.006)							
USE Receipt x School expenses x Gender		-0.042							
		(0.045)							
Youth working status			YES						
USE Receipt x Quintile 2							0.106		
							(0.079)		
USE Receipt x Quintile 3							0.115		
							(0.073)		
USE Receipt x Quintile 4							0.134*		
							(0.072)		
USE Receipt x Quintile 5							0.127*		
							(0.071)		
USE Receipt x school expenses x quintile 2							-0.064		
							(0.080)		
USE Receipt x school expenses x quintile 3							-0.066		
							(0.074)		
USE Receipt x school expenses x quintile 4							-0.096		
							(0.074)		
USE Receipt x school expenses x quintile 5							-0.089		
							(0.076)		
Distance from school								0.120***	
								(0.018)	
USE Receipt x distance								-0.321***	
								(0.051)	
School expenses x distance								-0.216***	
								(0.020)	
USE Receipt x school expenses x distance								0.254***	
								(0.054)	
USE Receipt x location (urban)									-0.029
									(0.054)
School expenses x location									0.057***
									(0.010)
USE Receipt x school expenses x location									0.025
									(0.057)
Constant	0.023***	0.021***	0.023***	0.039***	0.054***	0.013	0.023***	0.020***	0.023***
	-0.001	-0.001	-0.001	-0.002	-0.013	-0.024	-0.001	-0.001	-0.001
Observations	36,605	36,517	36,605	20,062	7,701	4,404	36,579	36,605	36,579
R-squared	0.103	0.103	0.103	0.073	0.096	0.113	0.108	0.133	0.105
Number of hh	6,896	6,896	6,896	5,732	2,885	2,115	6,887	6,896	6,887

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.6 Concluding remarks

This chapter set out to explore the micro-effects of the USE policy on secondary school participation in all 112 districts of Uganda. Specifically, I sought to determine whether and to what extent households' schooling decisions for their youths are determined by the receipt of the USE subsidy. Using a linear probability model, I ran three main regressions with basic and interaction terms specifications. Estimating the main regression with basic specifications shows that the receipt of the USE subsidy yields a positive and statistically significant effect on the probability of enrolling in lower secondary school ranging from 7.6 to13.3 percentage points. The second main regression equation, which interacts the USE subsidy with all individual, household and community characteristics, shows that the overall unique effect of the USE subsidy fluctuates from negative to positive and no effect at all. Though the model fails to show any gender difference in the USE effect on the probability of enrolling in lower secondary school, child labor decreases the USE impact by 5.6 percentage without nullifying the overall effect of the subsidy. The most controversial result from this model is the lack of effect when the USE subsidy is interacted with a mother's highest level of education. However, I find positive and statistically significant effects when poverty status is added to the model. In this specification, having a mother who has completed lower secondary education and above increase the effect of the USE subsidy on the probability of LSS enrollment by 17.4 percentage points, which is 4.9 percentage points higher than the effect of a father with equivalent education level. Also, in this model (where USE is interacted with poverty status), I fail to conclude that the USE benefits the rich (5^{th} quintile) compared to the poorest (1^{st} quintile). Only households in the 2^{nd} quintile seem to benefit from the policy compared to the poorest.

The negative coefficient on the interaction between USE and distance is expected. Still, the largest benefit goes to students living in urban areas, with an effect of 23.5 percentage points.

It should be noted that the validity of the above results could be rightly questioned on the account of the endogeneity of the USE variable as explained in section 6.4. To address the potential self-selection and omitted variable biases, I exploited an exogenous variation in the level of schooling decisions households might have been faced with in response to the USE implementation. Although the government subsidy is equal for all students, households' response to the policy would vary based on the total schooling expenses they incur. I therefore created a variable (EXP= living a low cost district) to capture that variation and I interacted it with the USE subsidy receipt. I find that living in a high cost district diminishes the potential impact of the USE subsidy on the probability of households to enroll their youth in lower secondary school. This negative effect ranges from -46.5 to -17.9 percentage points and is statistically significant at the 1 percent level. However, my model specifications show a positive and statistically significant unique effect of the USE policy ranging from .5 to 9.4 percentage points.

The results reported here are consistent with the vast and complex literature on the importance of government intervention in the funding and provision of education as one of the channels of increasing human capital. Though statistically significantly positive, the results are surprisingly modest and call for an in-depth discussion in the next chapter.

Chapter 7: Discussion and Policy Implications

7.1 Introduction

The question at the heart of this research is about the effectiveness of free secondary education policies that are increasingly being implemented across Sub-Saharan Africa in the hope of expanding secondary school participation. Taking stock of the dearth of empirical evidence on the effectiveness of these policies in the few African countries that are offering "free secondary education", I set out, in chapters 5 and 6, to explore and document the macro and micro-effects of the Ugandan USE policy, using a synthetic control method and a linear probability model respectively. Although the macro-analysis showed no positive effect of the USE policy on LSS gross enrollment rates during the period 2007-2015, the micro-analysis revealed a positive and statistically significant relationship between the USE policy and households' schooling decisions. This apparent contrast between the results calls for further investigation and interpretive caveats, which this chapter provides. Moreover, given the traction that tuition elimination policies at the secondary school level are gaining across Sub-Saharan Africa, the Ugandan experience might be instructive for countries considering such policies in the near, mid and long term.

In this chapter, I first discuss the country-level (7.2) and the household-level effects (7.3) of the USE policy. In section 7.4, I derive some policy implications from the above discussion and close the chapter with some concluding remarks (7.5).

7.2 Significance of the synthetic control effects

The results displayed in table 5.4 show that during the period 2007-2015, LSS gross enrollment rates grew at a decreasing rate of 8 percentage points per year on average in Uganda compared to its synthetic counterpart. The gains made in 2007 (.04) at the launch of the program and in 2008(.22) were not sustained throughout the entire post-treatment period. Instead,

enrollments in real Uganda remained relatively flat before taking a sharp decline in 2015, reaching 24.5 percent while synthetic Uganda continued its steady upward trend.

As indicated in section 5.6, these findings could be attributed, not to the USE policy itself, but rather to its design and implementation ills as well as to other confounding factors. Critics claim that, although laudable, the USE policy contains the seeds of its own ineffectiveness largely stemming from its design and chaotic implementation. They cite inadequate and delayed disbursement of government capitation, financial impropriety and the unintended consequences of the Universal Secondary Education policy resulting from the lack of and/or poor planning. In its 2015 National Headcount, the government of Uganda's Ministry of Education, Science, Technology and Sports acknowledges some of the USE implementation pitfalls, namely bureaucracy and delayed disbursement of government capitation to schools (Government of Uganda, Ministry of Education, 2015). These internal deficiencies could explain the USE underperformance shown in my results.

Inadequate and delayed government capitation

At the inauguration of the USE in 2007, the government of Uganda promised to subsidize tuition at the level of UGX 41,000 or UGX 47,000 per term, per child enrolled in a USE government or private school[26]. Schools are required to open bank accounts where the funds are deposited directly as a lump sum each year depending on the enrolled eligible students. According to the policy, the funds must be used to cover tuition for each eligible student, pay teacher salaries and other school inputs (Barungi et al., 2015). However, parents are still required to pay caution money for new students, fund development projects, shoulder the cost for lunch, remedial teaching, PTA projects, and non-discretionary items such as uniforms, books, bibles, textbooks, dictionaries,

[26] Roughly equivalent to US $11.2 – $13 in 2018.

atlases, etc. The cost of those items could be prohibitive for a large proportion of poor families and hamper school participation. In their study, Omoeva and Gale (2016) report that according to an independent evaluation of the policy, three-quarters of the school principals have lamented the inadequacy of the capitation and the lack of its adjustment for inflation. Barungi et al. (2015) also report instances of financial impropriety, with school management not spending the grants according to approved budgets (Barungi et al., 2015).

Not only is the capitation inadequate, its disbursement also suffers from chronic delays (Omoeva, C. & Gale, C., 2016) causing schools to seek assistance from either friends or the banks (at higher interest rates) in order to "clear the bills" (Barungi et al., 2015). In other instances, school administrators rely heavily on school levies to run the schools. As a result, students are sent home regularly if they fail to pay, which also results in several missed school days and poor learning. In its 2012 study on school dropout in USE schools, the government of Uganda found out that of the first cohort of students who started the LSS under USE, 25 % did not complete their LSS education under the policy. Further investigation showed a massive exodus from USE schools mostly due to the charging of school fees, long distances from home to school and the availability of scholarships in new schools[27].

Failure to provide adequate capitation and the existence of school fees at USE schools could still prevent a sizable proportion of Ugandan households from sending their youth to school despite the USE policy.

[27] See (http://www.education.go.ug/wp-content/uploads/2019/08/Dropout-Report-in-USE-schools-2012.pdf)

Poor planning or lack thereof

Other critics excoriate the lack of proper planning on the part of the government of Uganda to ensure that school administrators were prepared to address any challenge stemming from the implementation of the new policy. Among other things, they cite the inadequate information provided to parents on the structure and the mechanisms of the new policy, particularly their share of the cost of their children's education through various school levies, the sudden increase in student enrollments, which resulted in higher teacher-pupil ratios, and the lack of pedagogical materials to meet the needs of students (Chapman et al., 2011). The launch of the USE also increased the demand for secondary education which existing schools could not fully meet. Reports from the government of Uganda show that at the launch of the USE in 2007, there were 2,644 public and private secondary schools compared to 2,286 public and private schools in 2006, representing 15.7% growth over one year. School enrollments, at that time, increased from 814,087 to 954,328 students, representing 17.2% growth in student population for a 15.7 % growth in the number of available schools (UBOS, 2009 Statistical Abstract). Although efforts were made to accommodate the increased demand of secondary education during the last 10 years of the USE policy, reports show a consistent highly disproportionate development in the education sector, with the number of schools growing by 34.2% compared to 122% growth in student enrollments (Ministry of Education, Fact Sheet 2016).

In addition to a shortage of classrooms, the Government of Uganda did not seem to have planned for additional teachers to ensure proper accommodation of the student influx into secondary schools. As shown in Table 4.1, in the first year of the USE, the number of trained teachers declined by 42.4% between 2006 and 2007 while the number of students grew by 17.2%. Five years following the launch of the program, student enrollments outgrew the number of

teachers by 28 percentage points (31% vs 3%). Even ten years following the implementation of the USE, the growth in the number of trained teachers has not kept pace with the growth in the student population. While student enrollment increased by 57.72% between 2006 and 2015, the growth in the number of trained teachers stood at 36.15% over the same period (UBOS, Statistical Abstract 2006-2017). These gaps have resulted in congestion in USE schools, with some schools struggling to accommodate more than 90 students in a single class when the policy is 40 students per class (Ministry of Education, National Headcount 2016 Report).

Table 7. 1: Teachers vs. Secondary School Enrollments (2002-2015)

Year	Teacher Numbers	Secondary School Enrollments
2002	37,227	655,951
2003	38,549	683,609
2004	37,313	697,507
2005	37,607	728,393
2006	42,673	814,087
2007	24,548	954,328
2008	40,352	1,088,744
2009	65,045	1,194,454
2010	62,921	1,225,692
2011	64,675	1,258,084
2013	61,100	1,362,739
2014	63,957	1,391,250
2015	58,100	1,284,008

Source: Uganda Bureau of Statistics, Annual Statistical Abstract (2003-2015)

However, the above numbers mask considerable imbalances in the geographical distribution of teachers, schools and students in Uganda. In its aforementioned 2015 report on the annual national headcount, the government of Uganda shows a concentration of schools and teachers in the region of Buganda with 34.2% of trained teachers (19,883 teachers out of 58,100) and 31.2 % of all secondary schools (958 out of 3070 secondary schools) while the region of Karamoja shared only .7% of the schools (24 schools out of 3,070) and .67% of the teachers (393 teachers out of 58,100)[28].

[28] See http://www.education.go.ug/wp-content/uploads/2019/08/Abstract-2016.pdf

Poor planning could lead to school conditions not conducive to learning, which could justify the massive exodus from USE schools towards non-USE schools for households that can afford the cost of education. This could result in students from poor households not being able to transfer to non-USE schools and being forced to stay out of school altogether. Also, following the implementation of the USE policy, schools in rural areas closed, leaving students without alternatives and therefore forcing them to stay out of school.

Transition rates from P7 to S1 and survival rates from S1 to S4

Transition rates from primary to the LSS first year as well as survival rates from S1 to S4 are also critical to the LSS gross enrollment rates. As shown in figure 4.5, the proportion of students completing LSS increased between 2002 and 2016, thus suggesting a steady upward trend in the proportion of students surviving from the first to the last year of their lower secondary school education. However, the report from figure 4.2 shows that the upward trend in transition rates from primary to lower secondary school starting in 2006 sharply decreased in 2015, representing a 21% loss relative to 2014. Reports from the Ugandan government's annual school headcount attribute that sharp decline to a sizable proportion of primary school students failing to obtain the pass rate on primary school leaving examinations[29]. This loss could explain the sharp decline in Uganda's LSS gross enrollment rates in 2015, resulting in the worst gap relative to the Synthetic Uganda.

7.3 Significance of USE individual effects

The micro effects of the USE policy estimated through the linear probability expanded model in chapter 6 range from .5 to 9.4 percentage points. These results suggest that, holding other factors constant, the receipt of a USE subsidy accounts for 1.56 to 29.3 percent in households' schooling

[29] See http://www.education.go.ug/wp-content/uploads/2019/08/UPPET-and-UPOLET-National-Headcount-2015.pdf

decisions for their children. Positive and statistically significant at the conventional levels, these results support the claim about the relative effectiveness of the USE policy at the individual level. However, the effects are quite small and not large enough to translate into a meaningful positive impact of the USE policy at the country level. Table 7.2 shows that, 8 years after the USE implementation, the high cost of schooling was still the number one barrier to secondary school participation for 48.5% of the secondary school age youth in Uganda. The 2013 UNHS data show that parents shouldered the cost of school registration, books and school supplies, boarding, transport to and from school, uniforms and sports clothes, totaling UGX 182,751 (~$US 110) on average. Research has shown that the cost of those items could have adverse effects on school participation. Such costs could explain why the most startling of my results in Table 6.5 are about the negative effect of school costs on the potential impact of the USE subsidy on the probability of enrolling in lower secondary school for households living in high cost districts. The effects range from -44.9 to -20.3 percentage points.

Table 7. 2: Reasons for leaving school

Why did [NAME] leave school?	Whether the child is of secondary school age		
	No	Secondary school age (12-23)	Total
Completed desired schooling	785	119	904
Further schooling not available	68	10	78
Too expensive	4395	1248	5643
Too far away	52	5	57
Had to help at home	302	64	366
Had to help with farm work	88	27	115
Had to help with family business	20	5	25
Poor school quality	85	14	99
Parents did not want	429	88	517
Not willing to attend further	410	366	776
Poor academic progress	226	159	385
Sickness or calamity in family	515	196	711
Pregnancy	258	242	500
Other (specify)	172	30	202
Total	7805	2573	10387

Source: Uganda National Household Survey 2013.

Additionally, my results do not show any benefit to the poorest households when I interact the receipt of the USE subsidy with whether a household is living in a high cost district (Table 6.5). This finding is consistent with Omeova and Gale's study (2016) that showed a lack of difference in the USE impact by wealth status as well as inconclusive results on the USE impact on school retention (Omeova & Gale, 2016). This may cast doubt on the goal of increasing and improving equitable access to quality secondary education in Uganda (2008 Education Act, Strategic Plan for Universal Secondary Education in Uganda 2009 – 2018)[30] for which the USE policy was designed and implemented in 2007. After all, the USE policy may not have substantially alleviated Ugandan households' burden of sending their youth to secondary school.

Finally, the results on the contribution of parental education to the probability of enrollment in LSS are somewhat surprising. Maternal education seems to matter only if the mother has completed some vocational schooling. The findings show that that education level increases the USE effect on the probability of LSS enrollment by 41.6 percentage points whereas the corresponding effect of fathers is negative 28.5 percentage points. This puzzling result on fathers could be explained away by a formally uneducated father's own involvement in informal economy which does not require formal education (agriculture, interurban transportation…). This could lead to an underestimation of the benefits of formal education and thus discourage school participation. Nonetheless, the overwhelming lack of evidence for mothers could be, as explained earlier, driven by the highly patriarchal family structure in most of Sub-Saharan Africa, which results in men being largely the household heads, keeping all the decision-making power. This finding is somewhat consistent with existing literature that shows no consensus on which parent's level of

[30] See http://www.education.go.ug/wp-content/uploads/2019/07/Policies-and-Regulations.pdf

education matters the most and for which child (Hunt, 2008). The next section discusses some policy implications of the above results.

7.4 Key policy implications

The findings of this dissertation are used in this section in order to extract some key policy implications/recommendations related to tuition elimination policies in Sub-Saharan Africa.

7.4.1 Policy design and implementation

The macro analysis carried out in this research shows no statistically significant positive effect of the USE policy at the country level during the period 2007-2015. Although the descriptive statistics show an upward trend in aggregate gross enrollment rates at the LSS level during my study period, that growth pales in comparison to the trend in the synthetic Uganda. Instead of a no effect, the analysis in chapter 5 suggests that during my study period, gross enrollment rates growth was reduced by a yearly average of 8 percentage points, which represents 25 percent of the baseline level in 2007. This finding is not consistent with Asankha and Takashi's aforementioned study (2011). Though quasi-experimental in nature, Asankha and Takashi's study is limited in scope as it uses two data points, two years prior to the policy and two years post policy, which is not enough to map out the pre and post-USE trend in gross enrollment rates. Their positive effect is somewhat consistent with my synthetic control results that show a positive effect in the first two years of the policy. Nonetheless, I posit that the lack of USE effect at the country level documented in this dissertation does not cast doubts on the USE policy per se, but rather on its design and implementation ills.

Since schooling costs have been blamed for Sub-Saharan Africa's low participation rates at the secondary school level in general (Inoue et al., 2015), one can only applaud a policy that eliminates such barrier in order to expand school participation. However, if the policy is ill-

designed or poorly planned (Chapman et al., 2011), implementing it may not yield the expected results. The USE policy allows for primary school leavers who score between 4-28 on the primary school leaving examinations (PLE) to attend any USE-eligible lower secondary school (public or private) tuition free. This PLE score restriction does nothing but to penalize poor students who may not have the resources to prepare for and do well on the test. Parents with resources could hire private tutors to provide assistance to their children and position them to perform well on the test. As such, the USE seems designed to benefit students from relatively financially secure and stable families, thus perpetuating the inequalities that the policy is designed to correct. Besides, most students achieve the PLE 4-28 score and qualify for USE participation. As part of basic education and the connecting link between primary and higher education, lower secondary school should be made compulsory and fully funded without artificial conditions. Perhaps, a fairer policy would remove the PLE score restriction and make the policy truly universal much like the Kenyan Free Day Secondary School policy.

In terms of its implementation, there is a concern that the USE policy was driven by a presidential reelection campaign promise, and therefore, little to no thought was given to careful planning. However, as the USE enters its 14th year, its re-evaluation is overdue for some corrective measures. Taking stock of Chapman et al.'s study (2011), such reevaluation would entail full participation on the part of schoolteachers, principals, parents and community by virtue of their role in the education production function. In its report on "Abolishing schooling fees in Africa", the UNICEF insists on empowering the community and the school because it "not only improves quality and administrative efficiency but also creates a stronger constituency for education"[31].

[31] See https://www.unicef.org/publications/files/Aboloshing_School_Fees_in_Africa.pdf

It is my contention, nevertheless, that even the best designed and well-thought-out tuition elimination policies are not the panacea. The afore-mentioned 2008 Education Act as well as the Strategic Plan for Universal Secondary Education in Uganda 2009 – 2018 present the USE as though it were the only expansionary policy to cure the ills of secondary education participation in Uganda. Nothing could be further than the truth. If abolishing tuition and fees at the primary school level has taught us anything, it is that tuition elimination policies work well if they are a part of a wider policy package (UNICEF, 2008). Countries such as Ethiopia and Malawi (1994), Kenya and Mozambique (2003) and Ghana (2005) all introduced their fee abolition policies at the primary level as a part of a wide-ranging program. Ethiopia and Mozambique launched curriculum reforms; they decentralized their education system. Ghana viewed its policy as part of a wider education strategy and growth and poverty reduction strategy. Malawi raised its education budget, decided to promote girls' education, introduced mother tongue instruction in grades 1-4 and provided more support for teachers. Kenya undertook a comprehensive review of its education system, adopted a no "forced" repetition policy, encouraged households to enroll their children and offered free training material. Combined, those strategies helped the above countries to achieve steady growth in primary school enrollments (UNICEF, 2008). Uganda followed suit when it implemented its 1997 Universal Primary Education policy. The country launched curriculum reforms, textbook revision, encouraged girls' education, prioritized the education of children with special needs, trained and hired new teachers and built new schools. In just six years, gross enrollment rates at the primary school level more than doubled, increasing from 3,068,625 in 1996 to 7,354,153 in 2002 (Avenstrup, et al., 2004). Perhaps, Uganda could learn from its own experience with the UPE in order to reform its USE policy.

7.4.2 Advocacy for better targeting within the USE policy

The results from this research have shown no micro-effect of the USE policy by wealth status. The implication is that even in the absence of the USE policy, children from relatively financially stable Ugandan households would still be able to enroll in LSS while poor children would be most likely excluded from the education system. This finding suggests that by treating all children equally and by failing to take into account children's individual financial needs, the USE policy is exacerbating vertical inequities (Adan & Orodho, 2015; Mualuko & Lucy, 2013) and proving to be inefficient. It is telling, as mentioned earlier, that 8 years following the USE implementation, schooling cost was the number one barrier to secondary education access. As shown in Table 7.3, recent data from the 2017 UNHS also show that households were still feeling the financial burden of keeping their children in school.

Table 7. 3: Private cost of education in Uganda

Variable	Obs.		Mean
School and registration fees	23981		176,330.69
Exam Fees	16759		10,318.88
Boarding Fees	3467		11,5000.00
Uniforms	12241		21,678.40
Books	27224		32,793.10
Transport	4856		66,737.35
Day care fees	1726		17,884.04
Other expenses	13276		56,871.62
		Total	497,614.08

Calculation by the author based on 2017 UNHS

This raises the question of the adequacy of the government capitation and to whom the capitation benefits accrue. Although, there is room for making the USE policy universal by removing all participation restrictions, better targeting is also needed in order to reach children who could benefit most from the USE policy. Learning from the success of PROGRESA and South Africa's tuition elimination policy that focuses on schools in low socio-economic status communities (Garlick, 2017), a revised USE policy could target students from low socio-economic status

families by providing them the funding to defray the cost of the items not covered under the current USE policy. Those items include uniforms, books and school supplies, boarding fees, transport, other educational needs. Alleviating the private cost of education could yield positive results in terms of school participation and even learning. Kremer et al. (2008) report positive effect of their experiment of distributing free uniforms to 1231 children in 12 primary schools in Western Kenya in June 2002. They show that the experiment had a strong positive effect on school participation. Receiving a uniform reduced absenteeism by 6.4 percentage point from a 15% base of school absenteeism. Similar interventions led to increases in student enrollment in India (Adukia, 2015), reduced dropout rates in boys and girls as well reduced teen pregnancies in Kenya (Duflo et al., 2015) and reduced dropout rates without reducing test scores (Kremer et al., 2003). In light of the foregoing, the government of Uganda could use its current household surveys to regularly update its information on households in need of further assistance. This would guarantee some form of vertical equity or distributive justice in the allocation of public resources.

7.4.3 Toward a more progressive government capitation grant

Critics of the USE design and implementation point to the flat government capitation grant of UGX 41,000 and UGX 47,000 per term for students enrolled in public and private USE schools respectively. These amounts have remained flat since the launch of the USE policy in 2007 while Ugandan currency (Ugandan Shilling) has lost nearly half of its value relative (47.8%) to the US $. Based on historical information, UGX41,000 were equivalent to $US23.3 and UGX 47,000 to $US26.7 in 2006. This meant an annual subsidy of $US 70 and $US80 per student in USE public and private schools respectively. In 2018, those numbers were reduced to an annual subsidy of approximately $US 34 and $US 39 per student in public and private secondary school respectively. Based on the descriptive in Table 7.3, the USE subsidy represents only 24.7 % and 28.3 % of the

total cost for students enrolled in public and private secondary schools respectively, leaving households with a financial burden of more than 70% of the cost to bear. Perhaps, a revised USE policy could include an inflation-adjusted capitation that also seeks to reduce the private costs of education and is based on school district needs.[32]

7.5 Concluding remarks

The evaluation of Uganda's USE policy raises the question of resource mobilization and allocation with the twin concerns of equity and efficiency. Equity is about fairness (Chapman, 2006), or distributing the benefits and the costs of education in way that is considered to be fair (Levin, 1994). Equity in mobilization requires that all stakeholders (households, schools, governments, communities) equally participate in the financing of education while equity in allocation means fairness towards students (specify which groups or kinds of students need special attention), taxpayers (make sure that the tax burden is distributed fairly, and that the yield is proportional), and towards teachers (ensure that salaries are commensurate to experience and that they are they regular). Equity also means that fiscal inputs such as per student expenditures are equally distributed at the district level, and that physical inputs such as teacher-student ratios are equally distributed across districts. Moreover, equity concerns processes (curricula, instruction), output (student achievement) and outcomes (labor market performances). As an education financing scheme, the USE should concern itself with those key features (Levin, 1994). However, in its current form, the USE policy seems to have adopted a "one size fits all" approach, which greatly sacrifices vertical equity and therefore perpetuates the inequalities in education access which, ironically, the USE policy seeks to remedy. The key policy implications discussed above

[32] Schools in urban and rural areas have different needs and different priorities that should be accounted for in the decision-making regarding the capitation size.

address the USE theory, design and implementation aspects and suggest a few corrective measures to ensure its success in the long run.

By eliminating tuition and fees, the USE policy seeks to expand lower secondary school participation. However, this goal cannot be achieved solely on the merits of the policy alone. Additional accompanying measures that target students from poor households and reduce private costs of education could bolster the USE impact. Identifying poor households would not entail additional costs because Uganda's regular household surveys provide such information. To reduce the private cost to a more equitable level, the government of Uganda could adopt a dynamic and progressive mechanism in determining the capitation size. Moreover, a revised USE policy could lift the PLE score participation restriction to make the policy truly universal and accessible to all Ugandan primary school leavers. It goes without saying that learning from the chaotic implementation of the current USE policy, its revision would require a fair process to ensure a better outcome of the revision. Fair process (Kim & Mauborgne, 2003) would mean seeking inputs from all stakeholders (parents, school teachers and principals, local government, business and community leaders), explaining to all parties why the revision is needed and clarifying the expectation about the implementation of the revised policy. Fair process would also mean ensuring that all those involved clearly understand their roles and tasks (who is responsible for what?), know the targets (all primary school leavers, but with a clear option for poor and struggling students) and see the need for a regular control and accountability system.

Chapter 8: Conclusion

8.1 Introduction

This dissertation set out to explore the effectiveness of the Ugandan Universal Secondary Education (USE) policy. I sought to ascertain whether and to what extent does offering free-tuition education at eligible public and private secondary schools has affected aggregate gross enrollment rates at the lower secondary school level since the policy enactment in 2007. Given the complexity of the question at hand, I explored the effects of the USE at both the country and the household levels, using several data sources and two empirical strategies, the synthetic control method and a linear probability model. I structured the dissertation in three parts. The first part provided the policy context of my research and related literature review, the second part delved into the macro and micro-analysis of the USE effects and the third part provided a discussion of the results and explored some key policy implications.

In this concluding chapter, I summarize the chapters of this dissertation (8.2) and close with limitations of my research and suggestions for future research.

8.2 Summary of the chapters

In the first chapter, I provided the general context of the USE policy as a response to the Education for all movement, followed by the Millennium Development Goals, the Sustainable Development Goals and the 2030 Vision Framework for education. In light of those global pronouncements and country initiatives to expand school participation at the secondary school level, the second chapter set out to explore why secondary school gross enrollment rates still stand below 50% in Sub-Saharan Africa while the rest of the world average is over 65%. Using the classic demand and supply framework, I reviewed the extant literature (qualitative and quantitative studies, reviews and reports) related to secondary education across Sub-

Saharan Africa. I have confirmed and expanded on earlier findings that show that demand and supply-side factors, interacting within a particular political, economic, social and cultural context, could explain why there are so few African adolescents enrolled in secondary school. From the demand side, the literature review has singled out gender, age, child labor, orphanhood and health status as important individual characteristics. Age is associated with higher opportunity cost of attending secondary school if parents are poor. Parents might choose to keep their older children in household and agricultural labor on family holdings or send them to work to supplement their income and therefore increase household consumption. Gendered practices based on cultural norms, poor perception of returns of investing in girls' education, safety concerns exacerbated by conflicts and wars, early marriages, pregnancy…might also limit access to secondary education. Still, household characteristics play the most critical role in the parents' decision not to invest in their children's secondary education. Household poverty levels and low parental education constitute the most important barriers to youth's access to secondary education. Although parents may value education, they are most likely to choose higher present consumption through child labor over delayed and uncertain gratification that schooling brings. From the supply side, the literature points to a number of obstacles to education including insufficient supply of schools, inadequate infrastructures and resources, and perceived low quality of education. From the context standpoint, the literature centers around the pernicious effects of conflicts and wars on education through various channels such as forced military recruitment of adolescent boys, decrease in school funding to support the wars, destruction of existing facilities as casualties of wars, targeting of the elite in some areas and thus discouraging school enrollments, internal displacements…Lack of employment opportunities for secondary school graduates who

cannot afford college education as well as misguided religious beliefs, although not clearly documented, also appear in the literature as barriers to secondary school participation in Sub-Saharan Africa.

However, several African governments have initiated policies aimed at reversing the current trends in secondary school participation. Using the same demand and supply framework, the third chapter reviewed the literature on the effectiveness of those policies. Unfortunately, empirical evidence on their effectiveness is hard to come by. On the demand side, the existing thin body of empirical evidence shows that eliminating tuition and fees, scholarship schemes and stipends, whether embedded in conditional cash transfers or other holistic approaches (targeting girls' education), tend to increase school enrollment, attendance, persistence and completion. Yet, better policy design and targeting is warranted for sustainable success of the interventions. On the supply side, evidence is also thin. But, the literature shows that building new and high quality schools, providing counseling to students, improving the quality of education through adequate infrastructures, material (classrooms, blackboards, desks…) and human (trained teachers) resources, monitoring systems and accountability measures, building partnerships between schools and communities, are among the many steps to be taken to improve secondary school participation across Sub-Saharan Africa.

It should be noted, however, that the above results only partially help to explain why there are so few adolescents in secondary school in Sub-Saharan African countries and why we know so little about the effectiveness of policies aimed at reversing the current trends. The following three reasons may account for the limitations of this review. Firstly, the economic research on secondary education across Sub-Saharan African countries is very limited. Following decades of neglect (Verspoor, 2008), interest in secondary education has gone up only since 2003 with the World

Bank's first conference on secondary education in Africa (Bregman, 2005). Secondly, existing research tends to center around primary and tertiary education. One has to sift through the literature on either sector to decipher any pertinent analysis pertaining to secondary education. Thirdly, the literature abounds with descriptive studies and anecdotal evidence on the effectiveness of policy interventions aimed at expanding secondary school participation. Wide gaps in the research call for more rigorous empirical studies to shed light on what works to expand secondary school participation in Africa.

Taking stock of the aforementioned gaps in the literature on what works for expanding secondary school participation in Sub-Saharan, I narrowed my attention to the Ugandan USE policy as one version of the tuition elimination policies that are increasingly becoming popular in Sub-Saharan Africa as a tool to expand secondary school participation. In chapter 4, I provided an overview of the USE policy within the context of the Ugandan education system and discussed the evidence of its effectiveness based on the existing literature and government reports. Unfortunately, the existing literature on the USE policy is seriously lacking in rigorous empirical studies that assess its effectiveness. With only one study using a randomized controlled trial to ascertain the USE impact on learning (Barrera-Osorio, F. et al., 2015) and only one relatively rigorous study using a quasi-experimental approach limited to household level (Asankha, P. & Takashi, Y. (2011), the current literature on the USE policy fails to offer a clear picture of its effectiveness and calls for more robust quantitative studies to provide additional evidence on the effectiveness of the tuition free delivery of education at the secondary school level in Uganda.

In chapters 5 and 6, I provide such empirical evidence on the USE effectiveness using a synthetic control method and a linear probability model respectively. In chapter 5, following Abadie et al.'s techniques (2010, 2014), I estimated the effectiveness of the USE policy as the

difference in the gross enrollment rates between Uganda and its synthetic version that I constructed using 17 Sub-Saharan African countries in the post-USE period. The analysis shows that the USE did not have any positive impact on LSS gross enrollment rates between 2007 and 2015. Instead, during that time, LSS gross enrollment rates grew at a decreasing rate of 8 percentage points per year on average. The analysis does show that the USE had some positive effects in 2007 (.04) and 2008 (.22) before seeing a sharp decline starting in 2009. To evaluate the credibility of those results, I ran a series of in-space placebo tests and none of them was similar to or larger than my results. I also conducted a robustness check using a leave-one-out approach and determined that the results from the above main analysis were fairly robust to the exclusion from my small sample of most countries with stronger weights.

It should be noted, however, that these results do not suggest that Uganda's LSS gross enrollment rates did not increase during the period 2007-2015. The descriptive statistics provided in chapter 4 show that during my study period, LSS gross enrollment rates followed an upward and zigzagging trend and remained above the pre-USE level. Nonetheless, the story behind my results is that, compared to the synthetic Uganda, the LSS gross enrollment rates in Uganda should have grown by a yearly average of at least 8 percentage points since 2007.

To complement the above results, chapter 6 explored the USE effects at the household level using a linear probability model. Due to the controversy surrounding the use of the linear probability model for a binary dependent variable, I devoted the first part of the chapter addressing its rationale and identification problems. I determined that the LPM would still be appropriate for my analysis since my research question is not about predicting but rather about estimating the probability of enrollment in the lower secondary school level conditional on receiving the USE

subsidy. Using a series of model specifications, I find a positive association between receiving the USE subsidy and the probability of enrolling in lower secondary school. The results show, that holding other factors fixed, the receipt of a government subsidy to attend lower secondary school has a positive and statistically significant effect ranging from .5 to 9.4 percentage points. Nonetheless, the findings indicate that coming from a household with schooling costs above the district average diminishes the potential effect of the USE policy on the probability of enrolling in LSS. This negative partial effect ranges from -46.5 to -17.9 percentage points and is statistically significant at the 1 percent level.

Finally, in chapter 7, I discussed the above results and explored a number of policy implications aimed at addressing the USE theoretical, design and implementation deficiencies in order to ensure its success in the long run. Overall, the suggested policy changes call for making the USE truly universal by lifting the PLE score participation restriction, targeting students from poor households and offering additional grants to reduce the burden of private costs, adopting a progressive mechanism in determining the government capitation size and involving all stakeholders (parents, school principals and teachers, local community and business leaders) in the USE revision with the twin concerns of equity and efficiency.

8.3 Limitations and suggestions for further research

The analysis provided in this dissertation is limited to secondary school participation. This could be deemed questionable at a time when the issue of learning is increasingly preoccupying policymakers and international donors. Without discounting the importance of assessing the impact of the USE policy on the quality of secondary education since its implementation, I determined that evaluating access effects still carries considerable weight in light of the original

goal of the policy. Also, as this dissertation made it abundantly clear at the outset, access to secondary education is still a priority in a region beset with the highest rates of education exclusion and where almost 60% of the youth population ages 15-17 are not in school. Nevertheless, future research on quality effects of the USE policy will still be needed in order to capture the full picture of the USE effectiveness.

Moreover, this dissertation could have benefited from a cost-benefit analysis of the USE. For instance, between 2012 and 2017, the government of Uganda spent on average UGX 112.6 bn (the equivalent of $US 30 Million)[33] a year in subsidies to the USE policy alone. Given the findings of this research as well as the government of Uganda's findings of its own 2012 study on dropout from USE schools, a cost-benefit analysis could shed light on whether the USE policy is worth pursuing in its current form by asking whether the monetary benefits to society of the USE exceed its costs. Such could be a promising research project in the future.

Finally, this research relied solely on several sources of administrative data for both the macro and the micro analyses. The macro-analysis (synthetic control method) used a small sample with only 15 pre-USE policy data points and some missing data which were handled through linear interpolation. Unfortunately, some countries had missing information on important variables for all periods, and therefore were excluded, causing therefore some loss of goodness of fit. The micro-analysis (linear probability model) could have benefited from a richer and more recent dataset, the 2017 Uganda National Household Survey (UNHS). Unfortunately, that dataset lacks the key information on the availability of the USE subsidy. Instead, I used the 2013 UNHS which, although it does contain pertinent information for my analysis, fails to capture the HIV prevalence rate in

[33] See Government of Uganda-Ministry of Education and Sports. National USE/UPPET and UPOLET Headcount 2013-2016

Uganda as well as adolescent fertility rates which, as shown in the literature, greatly affect secondary school participation. Better data will be needed to improve the analysis provided in this dissertation.

References

Abadie, A., and Gardeazabal, J. (2003). “The Economic Costs of Conflict: A Case Study of the Basque Country.” American Economic Review 93 (1), 112–132.

Abadie, A. et al. (2010). “Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California’s Tobacco Control Program.” Journal of the American Statistical Association 105 (490): 493–505.

Abadie, A. et al. (2015). “Comparative Politics and the Synthetic Control Method.” American Journal of Political Science 59 (2): 495–510.

Abadie, A. & Cattaneo, M. (2018). “Econometrics methods for program evaluation.” Annual Review of Economics 10(1): 465-503.

Abadie, A. (2019). Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. Retrieved from https://economics.mit.edu/files/17847

Abuya, B. A., et al. (2012). "Educational challenges and diminishing family safety net faced by high-school girls in a slum residence, Nairobi, Kenya." International Journal of Educational Development 32(1): 81-91.

Adan, M.A. & Orodho, J. A. (2015).Constraints of Implementing Free Secondary Education in Mandera West Sub-County, Mandera County, Kenya. Retrieved from https://files.eric.ed.gov/fulltext/EJ1082462.pdf

Al-Samarrai, S. & Peasgood, T. (1998). “Educational Attainments and Household Characteristics in Tanzania.” Economics of Education Review, 17(4): 395-417.

Anyang, E. D. (2011). "Typology of school dropout: The dimensions and dynamics of dropout in Ghana." International Journal of Educational Development 31(4): 374-381.

Angelucci, M., et al. (2010). "Family networks and school enrolment: Evidence from a randomized social experiment." Journal of Public Economics 94(3-4): 197-221.

Asankha, P. & Takashi, Y. (2011). “Impacts of Universal Secondary Education Policy on Secondary School Enrollments in Uganda.” Journal of Accounting, Finance and Economics 1(1):16-30.

Athey, S. and Imbens, G. W. (2017c). The state of applied econometrics: Causality and policy evaluation. Journal of Economic Perspectives 31(2):3–32.

Avenstrup, Roger. 2004. “Free Primary Education and Poverty Reduction: The Case of Kenya, Lesotho, Malawi and Uganda.” Africa Region, Human Development Department, World Bank, Washington, DC.

Azarnert, L. V. (2008). "Free education, fertility and human capital accumulation." Journal of Population Economics 23(2): 449-468.

Azarnet, L.V. (2009). "Abortion and Human Capital Accumulation: A Contribution to the Understanding of the Gender Gap in Education". Scottish Journal of Political Economy 56(5): 559-57.

Banerjee, A. et al. (2013). Expanding access and increasing student learning in post-primary education in developing countries: A review of the evidence. Retrieved from https://www.povertyactionlab.org/sites/default/files/publications/PPE%20Review%20Paper%20April%202013.pdf

Barrera-Osorio, F. et al. (2015). The Impact of Public-Private Partnerships on Private School Performance: Evidence from a Randomized Controlled Trial in Uganda. Retrieved from https://assets.publishing.service.gov.uk/media/57a09dce40f0b64974001a68/5_PPP_Uganda_Barreraetal.pdf

Barungi, M. & Wokadala, J., & Kasirye, I. (2015). "Performance of Public-Private Partnerships in delivering Education Services: the Case of Universal Secondary Education Policy Implementation in Uganda." Advances in Social Sciences Research Journal 2(7) 205B 220.

Bernal, J. et al. (2017). "Interrupted time series regression for the evaluation of public health interventions: a tutorial." International Journal of Epidemiology 46(1): 348-355.

Biddlecom, A. et al. (2008). "Associations Between Premarital Sex and Leaving School in Four Sub-Saharan African Countries." Studies in Family Planning 39(4): 337-350.

Black, S. et al. (2005. "The More the Merrier? The Effect of Family Size and Birth Order on Children's Education." The Quarterly Journal of Economics 120(2): 669-700.

Bloom, H. (2003). "Using "Short" interrupted time- series analysis to measure the impacts of Whole-School Reforms. With Applications to a Study of Accelerated Schools." *Evaluation Review*, Vol. 27, N.1, 3-49.

Borkum. (2012). "Can Eliminating School Fees in Poor Districts Boost Enrollment? Evidence from South Africa." Economic development and cultural change 60(2): 359-398.

Bouttell J, Craig P, Lewsey J, et al. (2018). "Synthetic control methodology as a tool for evaluating population-level health interventions." Journal of Epidemiology and Community Health (72):673–678.

Bregman, J. (2005). First Regional Conference on Secondary Education in Africa (SEIA) Held in Kampala, Uganda, June 9–13, 2003 Report on the Proceedings.
Retrieved from
http://documents.worldbank.org/curated/en/781201468201608669/pdf/328010ENGLISH0Regional0conf0AFHD0no179.pdf

Brudevold-Newman, A. (2017). The impacts of free secondary education; evidence from Kenya. Retrieved from https://sites.tufts.edu/neudc2017/files/2017/10/paper_384.pdf

Buchmann, C., & Brakewood, D. (2000). "Labor structure and school enrollments in developing societies: Thailand and Kenya compared." Comparative Education Review, 44, 175-204.

Burde, B. & Linden, L. (2012). "The Effect of Village-Based Schools: Evidence from Randomized Controlled Trial in Afghanistan." NBER Working Paper No. w18039. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2050829##

CAMFED Ghana. (2012). What Works in Girls' Education in Ghana? A critical review of the Ghanaian and international literature. Retrieved from http://www.ungei.org/files/What_Works_in_Girls_Education_in_Ghana.pdf

Carnevale, P. et al. (2015). The economic value of college majors. Retrieved from https://cew.georgetown.edu/wp-content/uploads/Economic-Value-of-College-Majors-Full-Report-v2.compressed.pdf

Carr-Hill, R. et al. (2002). The impact of HIV-AIDS on education and institutionalizing preventive education. Retrieved from http://unesdoc.unesco.org/images/0012/001293/129353e.pdf

Chapman, B. 2006. Income contingent loans for higher education: international reforms. Handbook of the Economics of Education, 2, pp. 1435-1503.

Chapman. D. et al. (2010). "Universal secondary education in Uganda: The head teachers' dilemma." International Journal of Educational Development 30:77-82

Cherotich N.V., Simatwa E.M.W. and Ayodo T.M.O. (2014). Impact of free Secondary education policy on gender equality in secondary school education in Kenya: A case study of Kericho County. Educ. Res. 5(3):83-97

Chevalier, A. and G. Lanot (2002). "The Relative Effect of Family Characteristics and Financial Situation on Educational Achievement." Education Economics 10(2): 165-181.

Chingos, M. (2010). The impact of a universal class-size reduction policy- Evidence from Florida's Statewide Mandate. Working Paper. Retrieved from https://files.eric.ed.gov/fulltext/ED510250.pdf

Deacon, R. (2012). Teacher pay for performance. Lessons from other countries. Retrieved from https://issuu.com/cdesouthafrica/docs/teacher_pay_for_performance__lesson

Dee, T. S. and Jacob, B. (2011), The impact of no Child Left Behind on student achievement. J. Pol. Anal. Manage., 30: 418–446.

De Hoop, J. and F. C. Rosati (2014). "Does promoting school attendance reduce child labor? Evidence from Burkina Faso's BRIGHT project." Economics of Education Review 39: 78-96.

Dei, G. J. S. (2004). "Dealing with difference: ethnicity and gender in the context of schooling in Ghana." International Journal of Educational Development 24(4): 343-359.

Dinkelman, Taryn and Claudia Martinez. (2011). “Investing in Schooling in Chile: The role of information about financial aid for higher education.” Working Paper.

Duflo, E. et al. (2017). The impact of free secondary education: experimental evidence from Ghana. Retrieved from https://www.poverty-action.org/sites/default/files/presentation/The-Impact-of-Free-Secondary-Education-Experimental-Evidence-from-Ghana.pdf

Easterly, W. (2009). "How the Millennium Development Goals are Unfair to Africa." World Development 37(1): 26-35.

Edmonds, E. V. (2006). "Child labor and schooling responses to anticipated income in South Africa." Journal of Development Economics 81(2): 386-414.

Edmonds, E. V. (2007). "Chapter 57 Child Labor." 4: 3607-3709.

Esi Sutherland-Addy (2008). Gender Equity in Junior and Senior Secondary Education in Sub-Saharan Africa. Washington, D.C. : World Bank, Africa Region Human Development Dept.

Evans, D. et al. (2009). The Impact of Distributing School Uniforms on Children‟s Education in Kenya Retrieved from http://www.povertyactionlab.org/publication/impact-distributing-school-uniforms-childrens-education-kenya

Ferreira, F. H. G. and N. Schady (2009). "Aggregate Economic Shocks, Child Schooling, and Child Health." The World Bank Research Observer 24(2): 147-181.

Filmer, D. (2007). "If you build it, will they come? School availability and school enrolment in 21 poor countries." Journal of Development Studies 43(5): 901-928.

Fiszbein, A., et al. (2009). Conditional cash transfers: Reducing present and future poverty. Washington D.C.: World Bank.

Fleisch, B., et al. (2012). "Who is out of school? Evidence from the Statistics South Africa Community Survey." International Journal of Educational Development 32(4): 529-536.

Foley, K. et al. (2013). Ability, Parental Valuation of Education and the High School Dropout Decision. Retrieved from http://econ.sites.olt.ubc.ca/files/2014/06/pdf_paper_david_green_ability.pdf

Galiani, S. & Quistorff, B. (2016). The synth_runner Package: Utilities to Automate Synthetic Control Estimation Using synth∗. Retrieved from http://econweb.umd.edu/~galiani/files/synth_runner.pdf

Garlick, R. 2019. "The Effects of Nationwide Tuition Fee Elimination on Enrollment and Attainment." Working Paper, Duke University, Department of Economics, Durham, NC.

Glass, V. (1997). Interrupted times series quasi-experiments. Jaeger, R. M. (1997). Complementary methods for research in education. 2nd Edition. Pp. 589-608. Washington D. C.: American Educational Research Association.

Glewwe, P. & Lambert, S. (2010). "Education production functions: Evidence from developing countries." In Brewer, D.J. & McEwan, P.J. (eds). Economics of education. Boston, MA: Academic Press, pp. 137-147.

Glewee, P., Ilias, N., Kremer, M. (2010). "Teacher Incentives." American Economic Journal—Applied Economics 2(3): 205-227.

Glewwe, P. et al. (2014). Education policy in developing countries. Chicago, IL: University of Chicago Press.

Grant, M. & Hallman, K. (2006). Pregnancy-related School Dropout and Prior School Performance in South Africa. Retrieved from http://www.popcouncil.org/uploads/pdfs/wp/212.pdf

Grant, M. et al. (2013). "Menstruation and school absenteeism- evidence from rural Malawi." Comparative Education Review 57(2): 260-284.

Grimm, M. (2011). "Does household income matter for children's schooling? Evidence for rural Sub-Saharan Africa." Economics of Education Review 30(4): 740-754.

Hallberg, K. et al. (2018). "Short Comparative Interrupted Time Series using Aggregate School-level Data in Education Research." Education Researcher 47(5): 295-306.

Hanushek, Eric A., Victor Lavy, and Kohtaro Hitomi. (2006). "Do Students Care about School Quality? Determinants of Dropout Behavior in Developing Countries." NBER Working Paper 12737, National Bureau of Economic Research, Cambridge, MA.

Heymann, J., et al. (2013). "Does prohibiting child labor increase secondary school enrolment? Insights from a new global dataset." International Journal of Educational Research 60: 38-45.

Huylebroeck, Lisa and Titeca, K. (2015). 'Universal Secondary Education (USE) in Uganda: blessing or curse? The impact of USE on educational attainment and performance'. In: Reyntjens, F., Vandeginste, S. and M. Verpoorten (eds.) L'Afrique des Grands Lacs: Annuaire 2014-2015. Antwerp: University Press Antwerp, pp.349-372.

Hunt, F. (2008). Dropping out of school: a cross-country review of literature. University of Sussex, Centre for International Education: CREATE.

Inoue, K. et al. (2015). Out-of-school youth in Sub-Saharan Africa: A policy perspective. Directions in Development. Washington, DC: World Bank.

Jakiela, P. & Ozier, O. (2016). "Does Africa need a rotten kin theorem? Experimental evidence from village economies." The Review of Economic Studies 83 (1): 231-268.

Jensen, Robert. (2010). "The (Perceived) Returns to Education and the Demand for Schooling." Quarterly Journal of Economics 125 (2): 515-548.

Johnson, C.S. (2013). Compared to What? The Effectiveness of Synthetic Control Methods for Causal Inference in Educational Assessment. Retrieved from https://scholarworks.uark.edu/cgi/viewcontent.cgi?referer=https://search.yahoo.com/&httpsredir=1&article=1945&context=etd

Kabubo-Mariara & Mwabu, Kabubo-Mariara & Mwabu, D. (2007). "Determinants of school enrolment and education attainment- Empirical evidence from Kenya." South African Journal of Economics 75(3): 572-593.

Kazeem, A. (2012). "Children at Work in Nigeria: Exploring the Implications of Gender, Urban, Rural Residence, and Household Socioeconomic Status." The Review of Black Political Economy 39(2): 187-201.

Künnemann, R. and R. Leonhard. (2008). "A Human Rights View on the Potential of Social Cash Transfers for Achieving the Millennium Development Goals."
Brot für die Welt and Evangelischer Entwicklungsdienst,Germany.

Levin, H.M. (1994). "School Finance." In T. Husén and T. N. Postlethwaite, (eds.), International Encyclopedia of Education, 2nd Ed. (Oxford, UK: Pergamon, 1994), 5233- 5241.

Lewin, K. M. and A. W. Little (2011). "Access to education revisited: Equity, drop out and transitions to secondary school in South Asia and Sub-Saharan Africa." International Journal of Educational Development 31(4): 333-337.

Liang, X. (2002). Uganda Post-primary Education Sector Report. Washington, DC: World Bank, 86p.

Lloyd, C. B. and B. S. Mensch (2008). "Marriage and childbirth as factors in dropping out from school: an analysis of DHS data from sub-Saharan Africa." Population Studies 62(1): 1-13.

Lochner, L. J., and A. Monge-Naranjo (2011): "The Nature of Credit Constraints and Human Capital," American Economic Review, 101, 2487–529.

Lucas, A. & Mbiti, J. (2012). “Access, Sorting, and Achievement: The Short-Run Effects of Free Primary Education in Kenya.” American Economic Journal: Applied Economics 4(4): 226–253

McClelland, R. & Gault, S. (2017). The Synthetic Control Method as a Tool to Understand State Policy. Retrieved from https://www.urban.org/sites/default/files/publication/89246/the_synthetic_control_method_as_a_tool_1.pdf

Melissa, B. (2009). “Why are some low-income countries better at providing secondary education?” Comparative Education Review 53(4): pp. 513-534.

Molyneaux, K. (2011). Uganda’s Universal Secondary Education Policy and its Effect on ‘Empowered’ Women: how reduced income and moonlighting activities differentially impact male and female teachers. Research in Comparative and International Education 6(1), pp.62-78.

Moumie, M. (2009). HIV and Secondary School Attendance in Mainland Tanzania: Are Youth Living in HIV Households Disadvantaged ? Available at http://gradworks.umi.com/33/73/3373797.html

Moyi, P. (2012). "Who goes to school? School enrollment patterns in Somalia." International Journal of Educational Development 32(1): 163-171.

Mualuko, N. & Muhavi, L. (2013). “Government funding on access to secondary education in Kenya: Challenges and prospects.” Education research and review. Vol 8(18): 1650-1655.

Murnane, R. & Willet, J. (2010). Methods matter: Improving Causal Inference in Educational and Social Science Research. Oxford University Press.

Ohba, A. (2011). "The abolition of secondary school fees in Kenya: Responses by the poor." International Journal of Educational Development 31(4): 402-408.

Oketch, M. and C. Rolleston (2007). "Chapter 5: Policies on Free Primary and Secondary Education in East Africa: Retrospect and Prospect." Review of Research in Education 31(1): 131-158.

Olivier, J. et al. (2013). On the use of empirical bayes for comparative interrupted time series with an application to mandatory helmet legislation. Retrieved from http://acrs.org.au/files/arsrpe/Paper%2076%20-%20Olivier%20-%20Cyclists.pdf

Omoeva, C. and Gale, C. (2016). “Universal, but not free: Household schooling costs and equity effects of Uganda’s Universal Secondary Education policy.” International Journal of Educational Development 50(2016): 41-50.

Orodho, J. (2014). “The equity and quality implications of FDSE policy in Kenya.” International Journal of Current Research Vol. 6, Issue, 03, pp.5582-5591.

Ota, M. & Moffat, P, (2007). “The within-household schooling decision: a study of children in rural Andhra Pradesh.” Journal of Population Economics 20(1):223-239.

Poirier, T. (2012). "The effects of armed conflict on schooling in Sub-Saharan Africa." International Journal of Educational Development 32(2): 341-351.

Rose, P. & Al-Samarrai, S. (2001). “Household constraints on schooling by gender- empirical evidence from Ethiopia.” Comparative Education Review 45(1): 36-63.

Rothbard, A. (2015). Quality issues in the use administrative data records. Retrieved from https://www.aisp.upenn.edu/wp-content/uploads/2015/06/Data-Quality-Paper_Final.pdf

Sabates, R., et al. (2013). "School drop out in Bangladesh: Insights using panel data." International Journal of Educational Development 33(3): 225-232.

Schady, N. R. (2004). "Do Macroeconomic Crises Always Slow Human Capital Accumulation?" The World Bank Economic Review 18(2): 131-154.

Schady, N. & Araujo, M. (2006). Cash transfers, conditions, and school enrollment in Ecuador. Washington, DC: The World Bank, 34p.

Schubert, B. & Slater, R. (2006). “Social Cash Transfers in Low-Income African Countries: Conditional or Unconditional?” Development Policy Review, 24: 571–578.

Selzer, A. (2009). "Gender in primary and secondary education: a handbook for policymakers and other stakeholders, by Ramya Subrahamanian." Gender and Education 21(2): 233-234.

Shafiq, M.N. (2007). “Household schooling and child labor decisions in rural Bangladesh.” Journal of Asian Economics 18:946-966.

Siddhu, G. (2011). “Who makes it to secondary school? Determinants of transition to secondary schools in rural India.” International Journal of Educational Development 31(4): 394-401.

Tonini, D. (2010). The wide divide between policies and impacts: Examining government influence over parental educational choice in Tanzania. Available at http://gradworks.umi.com/34/25/3425009.html

Tsang, M. (1994). Cost analysis of educational inclusion of marginalized population. Paris: IIEP, UNESCO.

Tsang, M. (2002). Comparing the costs of public and private schools in developing countries. In Levin, H. and McEwan, P. (eds.) Cost-effectiveness studies in education (2002) Yearbook of the American Education Finance Association.

UIS, United Nations Educational, Scientific and Cultural Organization (UNESCO). (2010). "Quantitative impact of conflict on education." Retrieved from http://unesdoc.unesco.org/images/0021/002145/214576e.pdf

UIS, United Nations Educational, Scientific and Cultural Organization (UNESCO). (2011). "Global education digest. Focus on Secondary Education." Retrieved from http://www.uis.unesco.org/Education/Pages/ged-2011.aspx

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2012). "Global Initiative on out-of-school children. Nigeria Country Report". Retrieved from http://www.uis.unesco.org/Education/Documents/OOSCI%20Reports/nigeria-oosci-report-2012.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2012). Global Initiative on out-of-school children. Ghana Country Report." Retrieved from http://www.uis.unesco.org/Education/Documents/OOSCI%20Reports/ghana-oosci-report-2012.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2013). "Initiative mondiale en faveur des enfants non scolarises. Republique Democratique du Congo: Rapport de l'enquête nationale sur les enfants et adolescents en dehors de l'école". Retrieved from http://www.uis.unesco.org/Education/Documents/OOSCI%20Reports/drc-oosci-report-2013-fr.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2013). "Global Initiative on out-of-school children. Eastern and Southern Africa Regional report." Retrieved from http://www.uis.unesco.org/Education/Documents/esar-oosci-report-2013.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2014). "Global Initiative on out-of-school children. West and Central Africa: Regional report". Retrieved from http://www.uis.unesco.org/Education/Documents/wca-oosci-report-2014-en.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2014)."Education under attack." Retrieved from http://protectingeducation.org/sites/default/files/documents/eua_2014_full_0.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2015)."EFA Monitoring Report". Retrieved from http://unesdoc.unesco.org/images/0023/002322/232205e.pdf

Verhey, B. (2001). Child Soldiers: Preventing, Demobilizing and Reintegrating. Washington, DC: The World Bank, 31p.

Verspoor, A. (2008). At the crossroads: choices for secondary education in Sub-Saharan Africa. Washington, DC: World Bank, 387p.

Verspoor, A. & Bregman, J. (2008). At the crossroads: challenges for secondary education in Africa. Washington, DC: World Bank, 269p. Retrieved from http://siteresources.worldbank.org/INTAFRREGTOPSEIA/Resources/SEIA_Synthesis_Report_feb_08.pdf

Weir, S. (2010). "Parental Attitudes and Demand for Schooling in Ethiopia." Journal of African Economies 20(1): 90-110.

World Bank. (2005). Expanding Opportunities and Building Competencies for Young People: A New Agenda for Secondary Education. Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/7429 License: CC BY 3.0 IGO.

World Bank. (2008). Transitions in secondary education in Sub-Saharan Africa. Equity and Efficiency issues. Retrieved from http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/02/19/000333037_20080219005941/Rendered/PDF/425380PUB0ISBN101OFFICIAL0USE0ONLY1.pdf

World Bank & UNICEF. (2009). Abolishing School Fees in Africa. Lessons from Ethiopia, Ghana, Kenya, Malawi and Mozambique. Retrieved from https://www.unicef.org/publications/files/Aboloshing_School_Fees_in_Africa.pdf

Appendix i. Maps

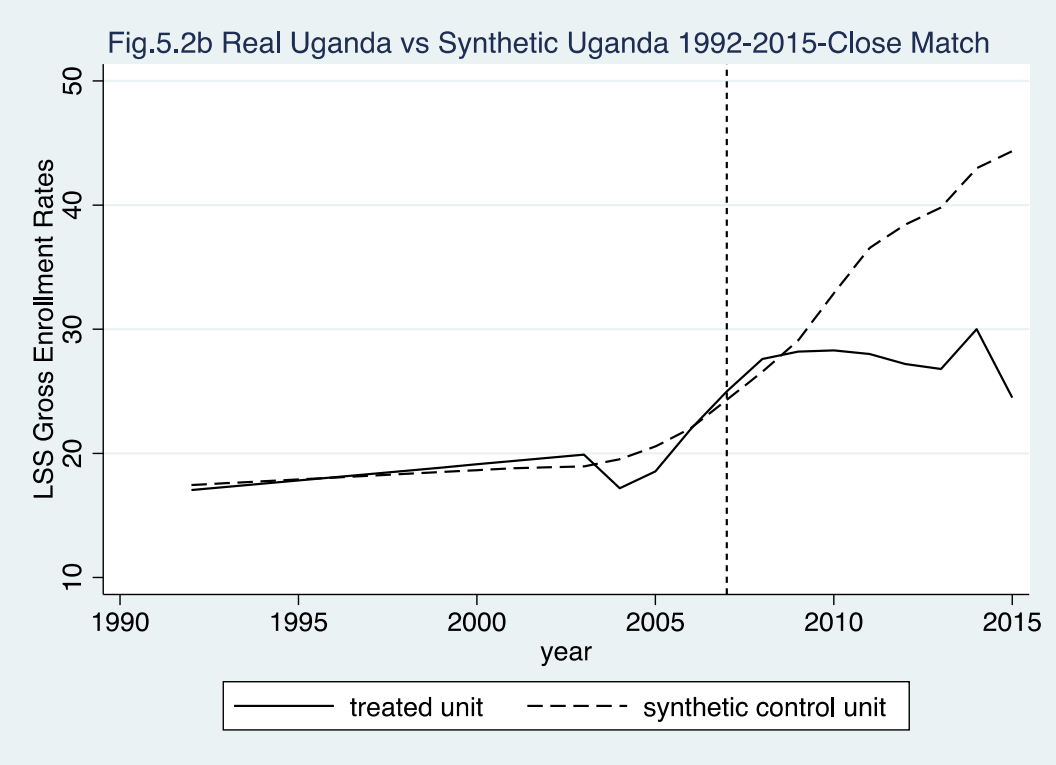
a) Location of Uganda on the African Map

Retrieved from https://goo.gl/images/yVjtYb

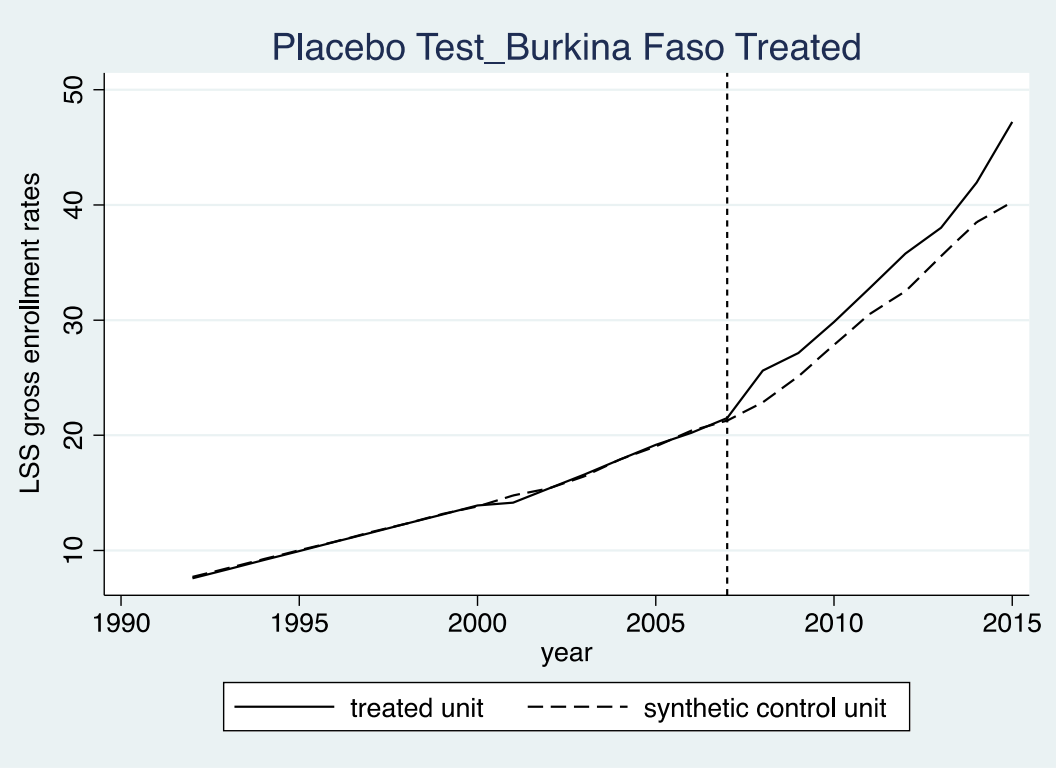
b) Location of Uganda in East Africa

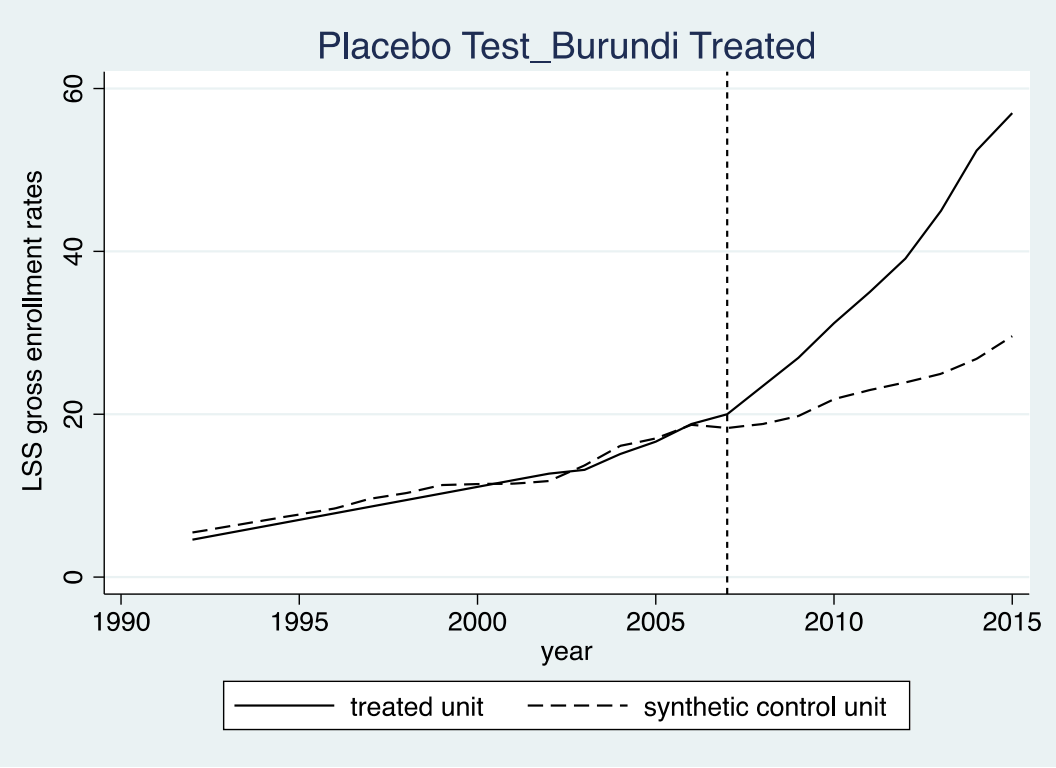
Retrieved from https://goo.gl/images/xVK9ZJ

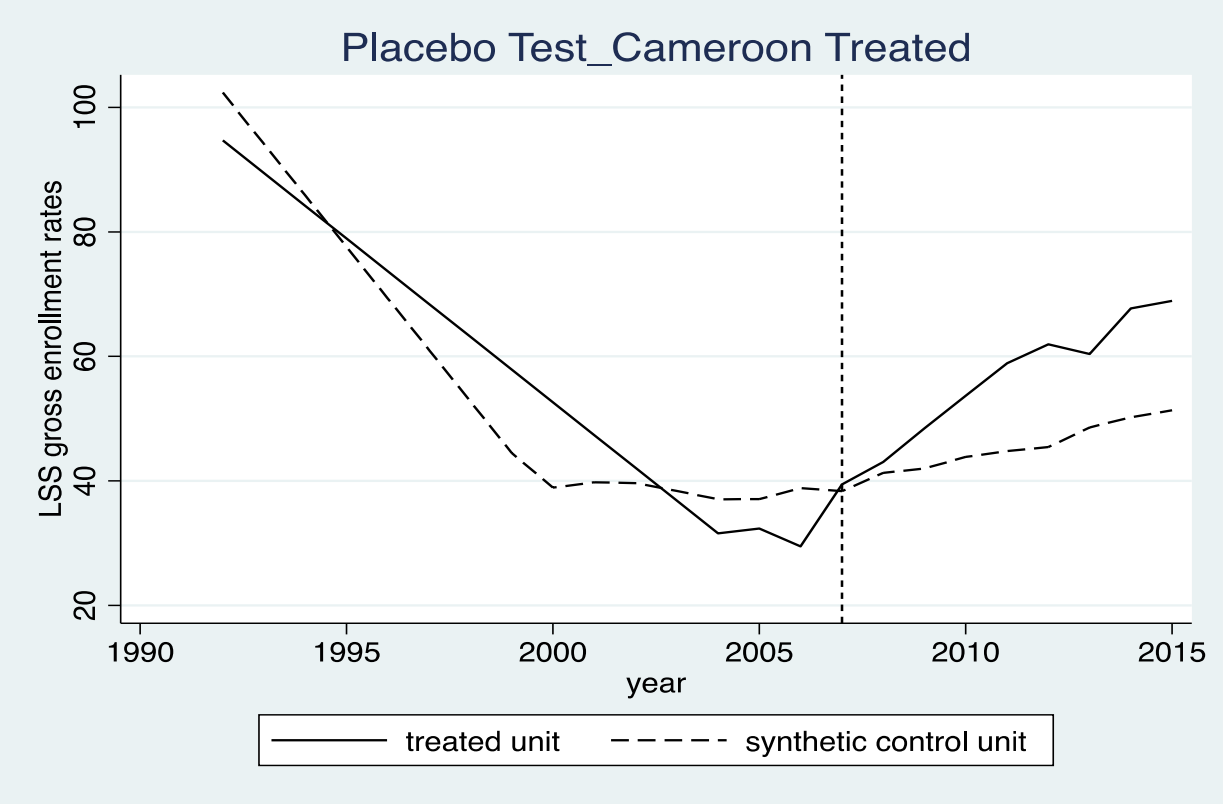
Appendix ii: Revised Matching



Appendix iii- Placebo Tests






Placebo Test_Cameroon Treated
LSS gross enrollment rates
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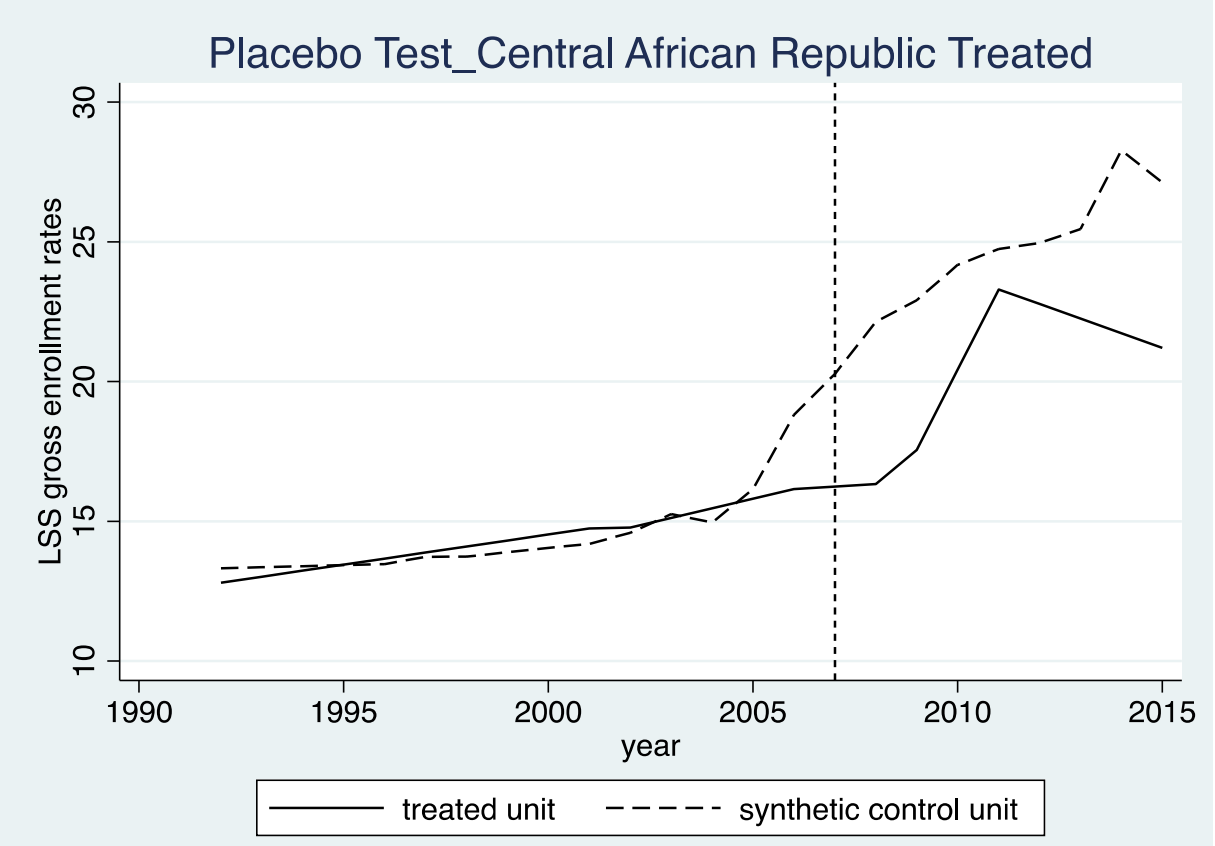
Placebo Test_Central African Republic Treated
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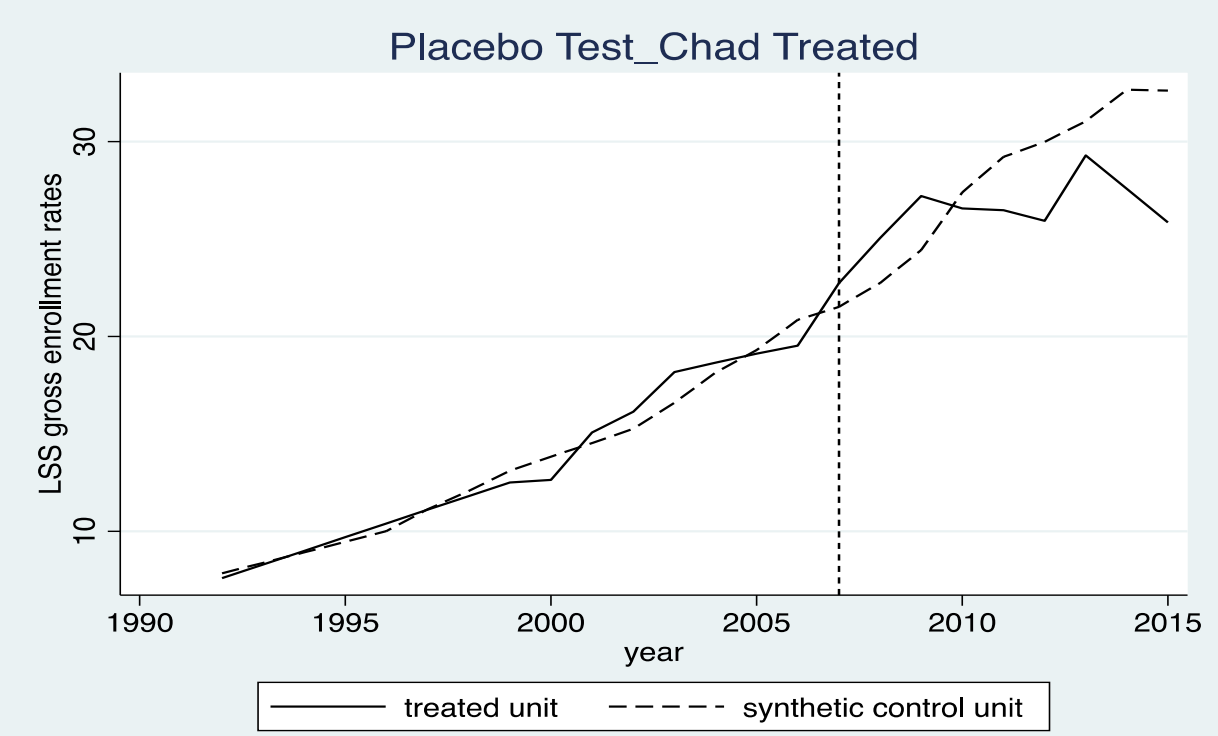
Placebo Test_Chad Treated
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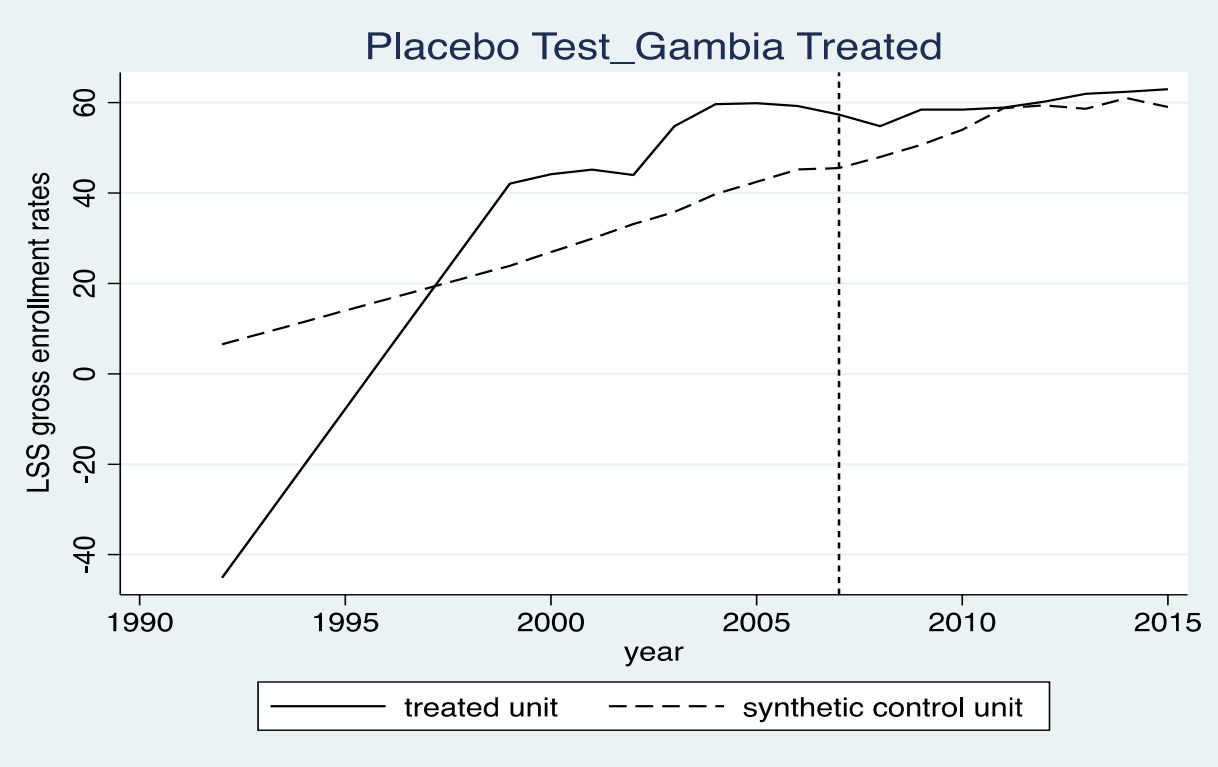
Placebo Test_Gambia Treated
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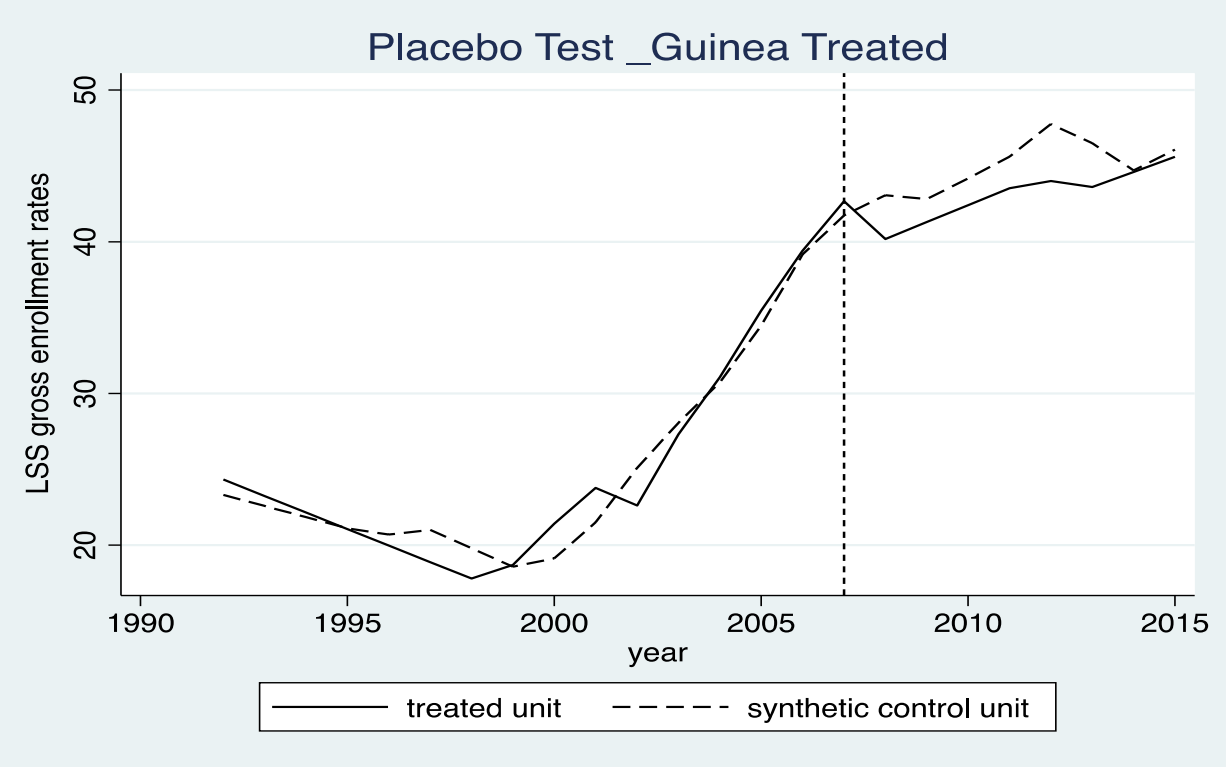
Placebo Test _Guinea Treated
LSS gross enrollment rates
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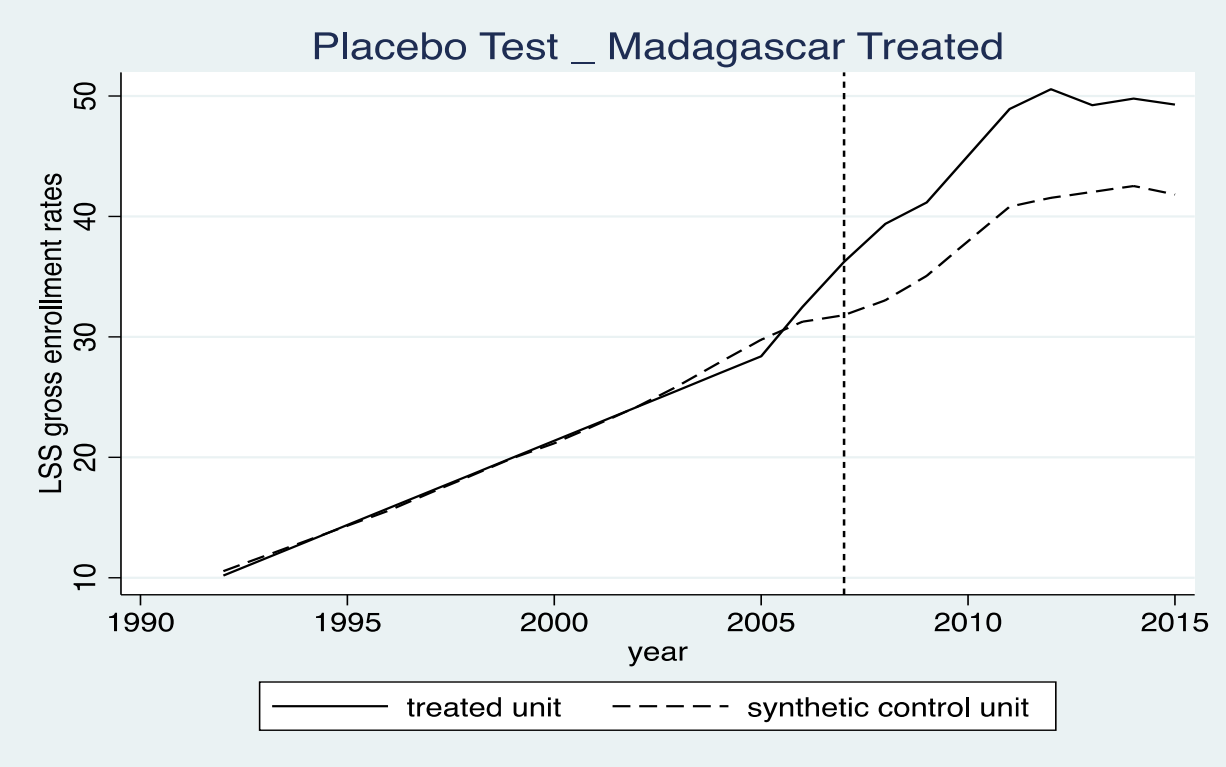
Placebo Test _ Madagascar Treated
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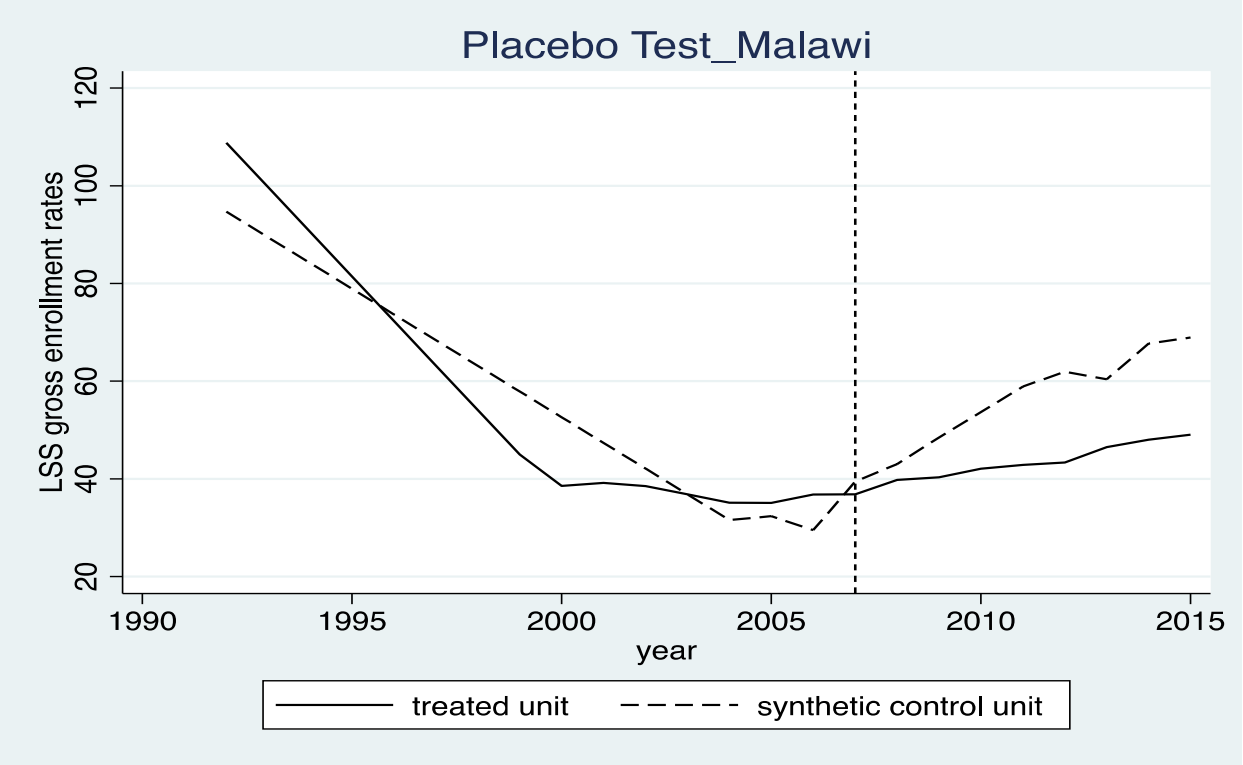
Placebo Test_Malawi
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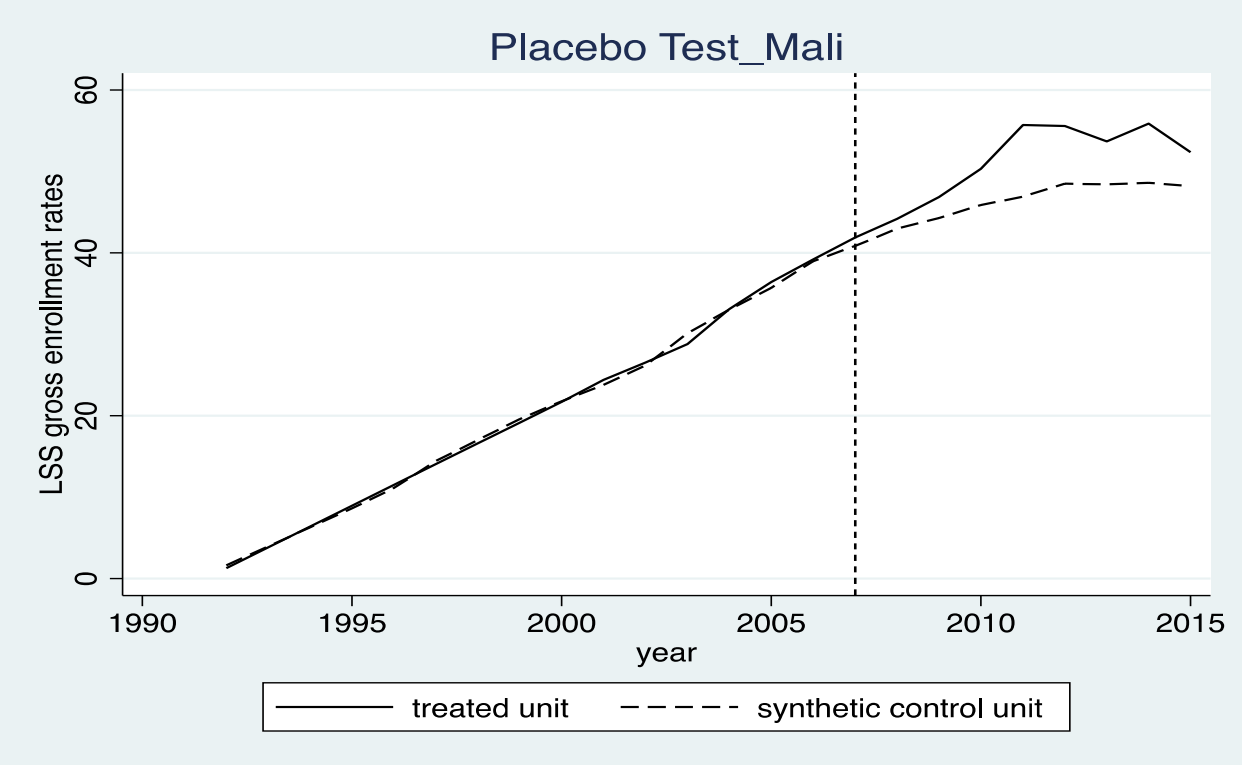
Placebo Test_Mali
LSS gross enrollment rates
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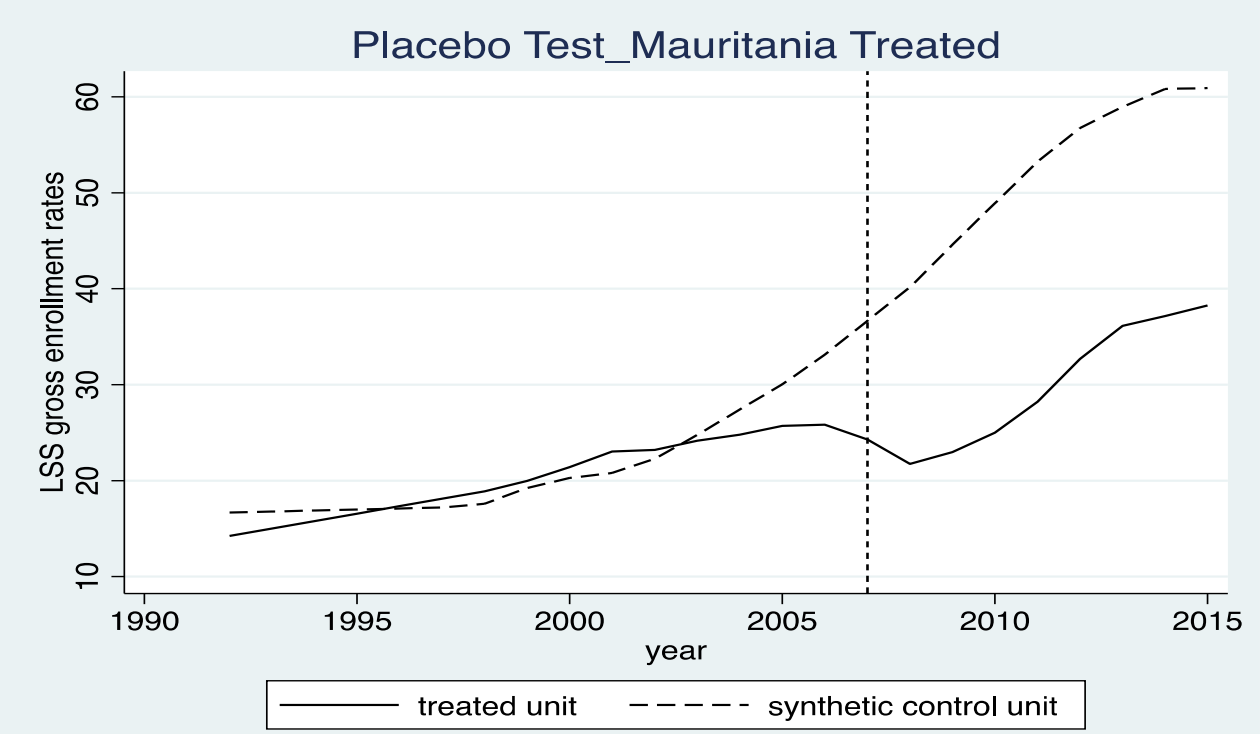
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LSS gross enrollment rates
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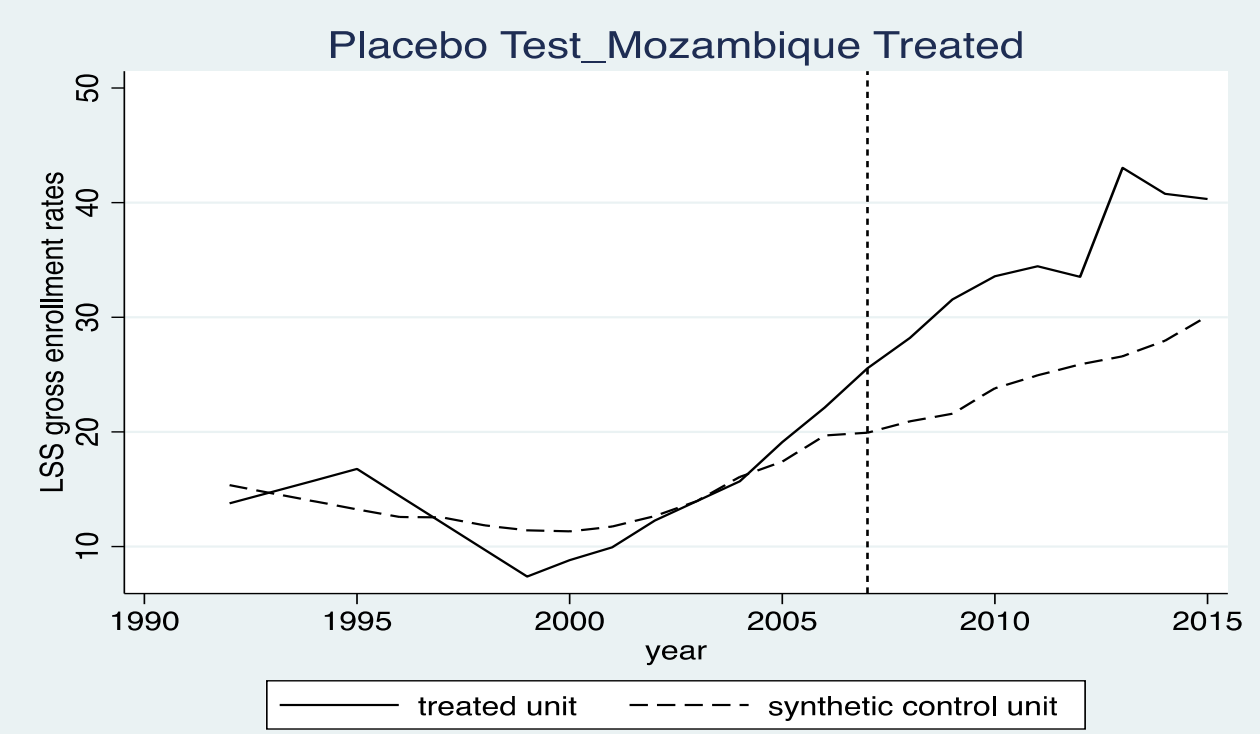
Placebo Test_Mozambique Treated
LSS gross enrollment rates
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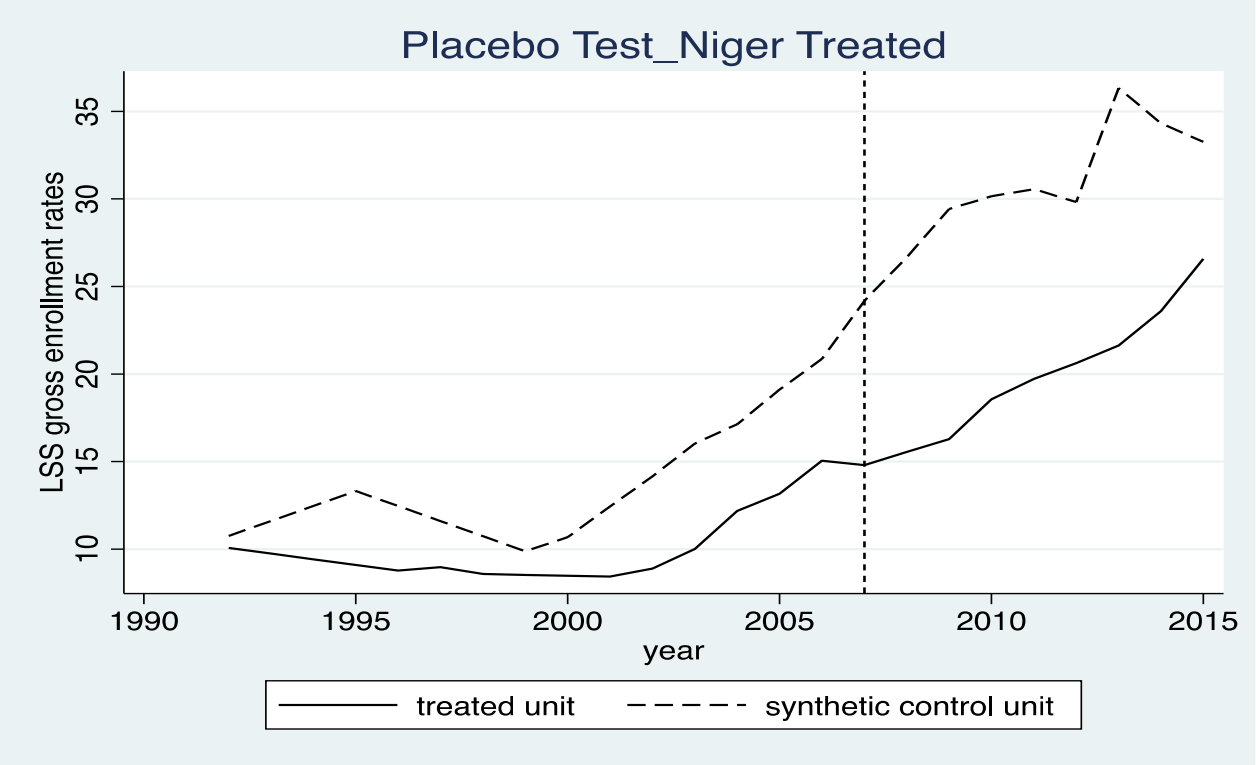
Placebo Test_Niger Treated
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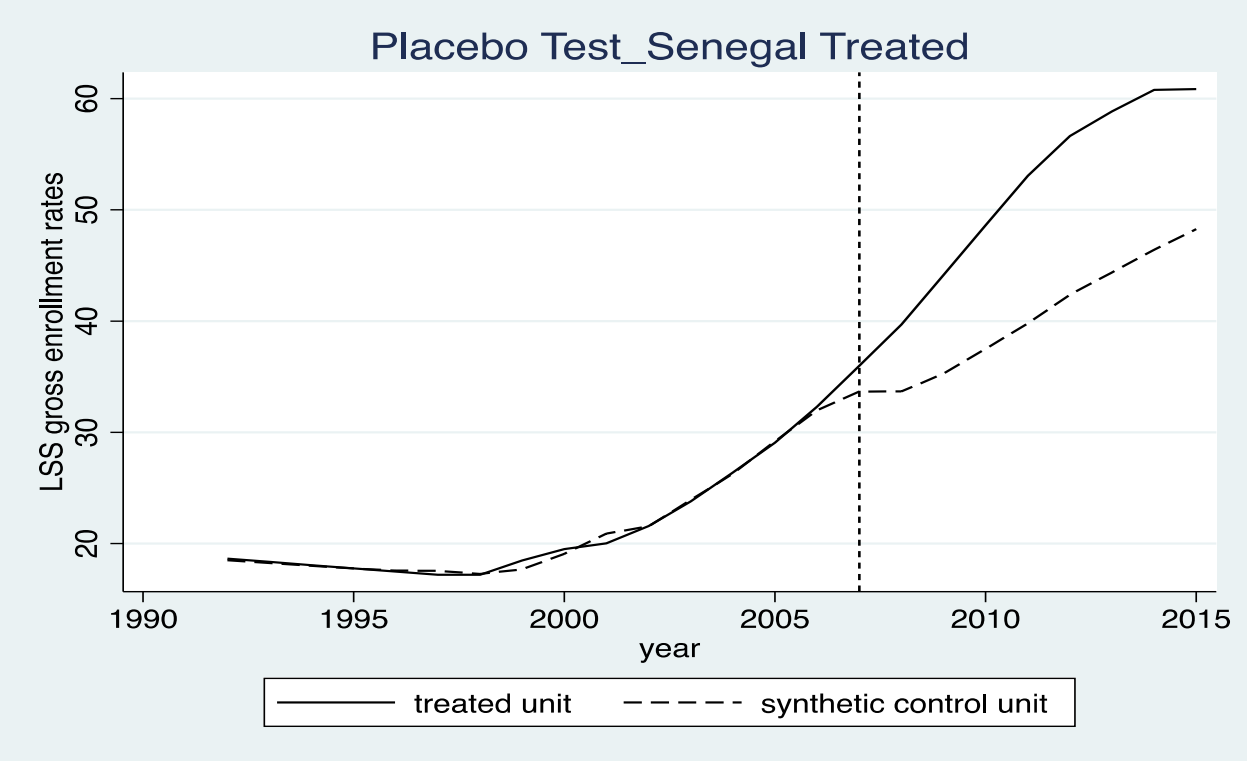
Placebo Test_Senegal Treated
LSS gross enrollment rates
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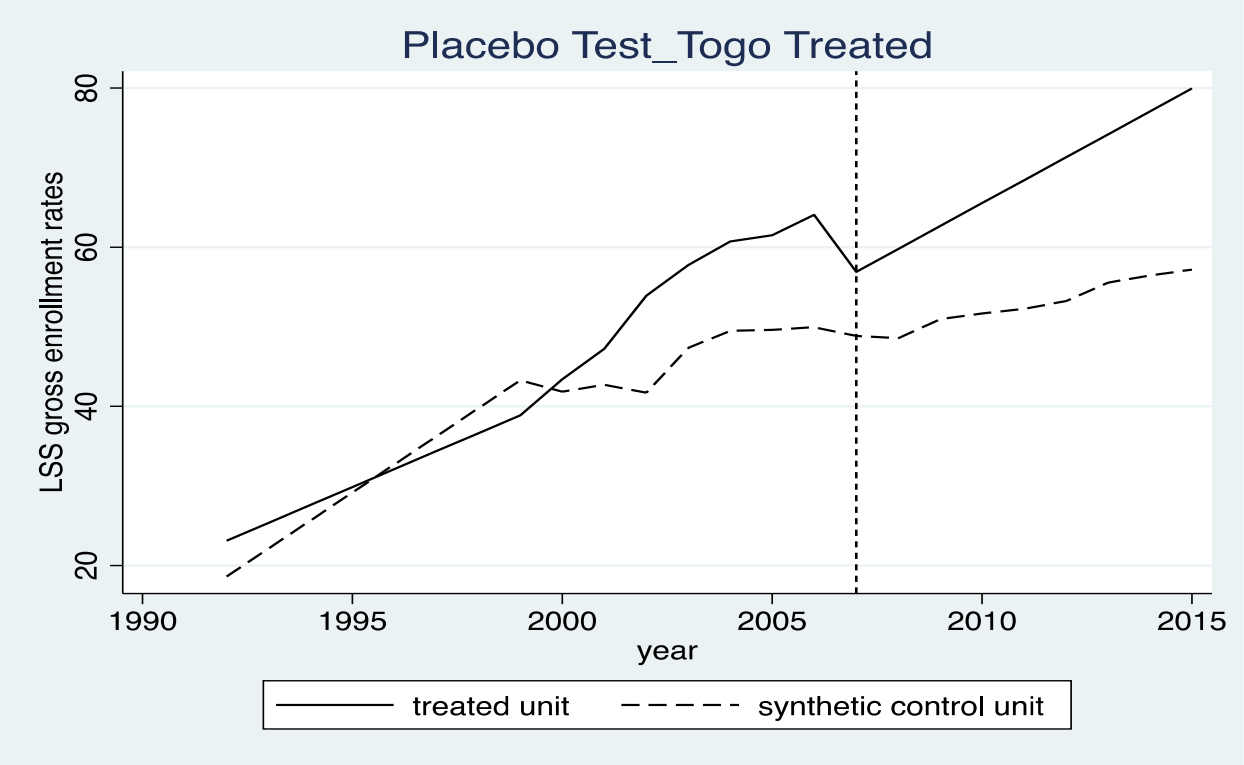
Placebo Test_Togo Treated
LSS gross enrollment rates
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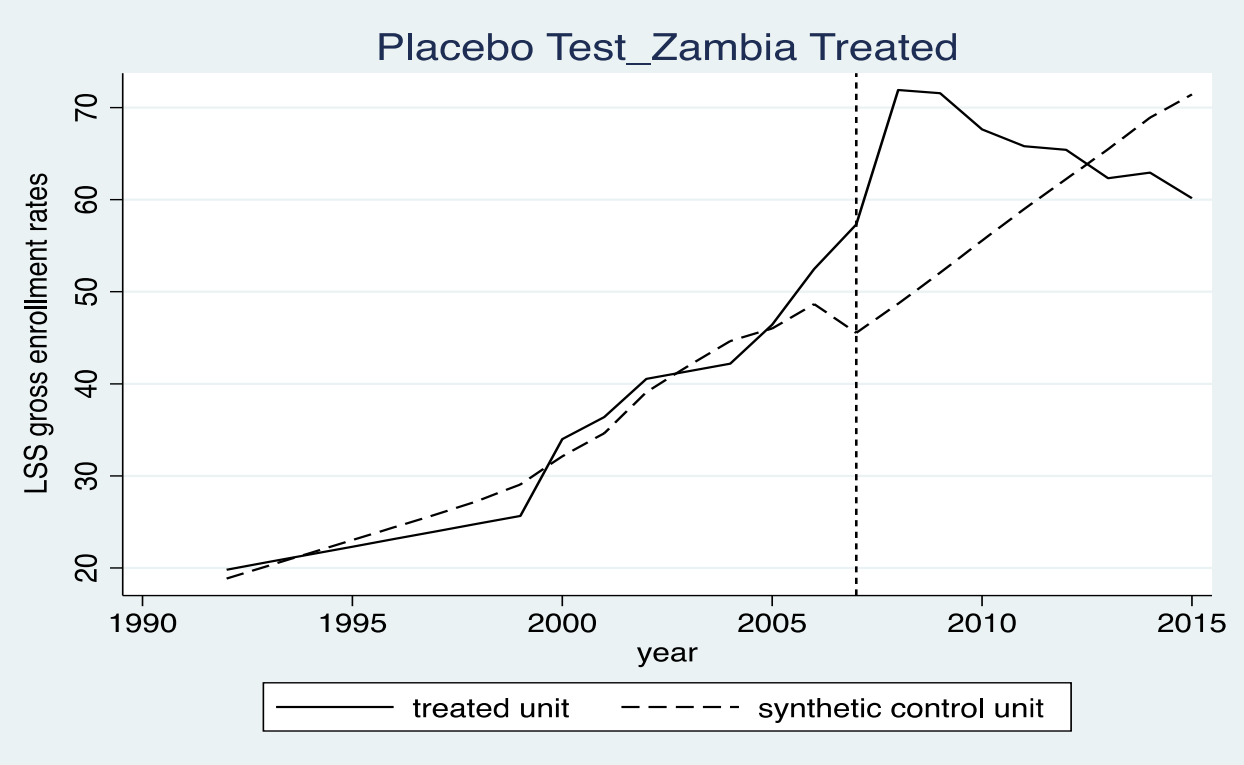
Placebo Test_Zambia Treated
LSS gross enrollment rates
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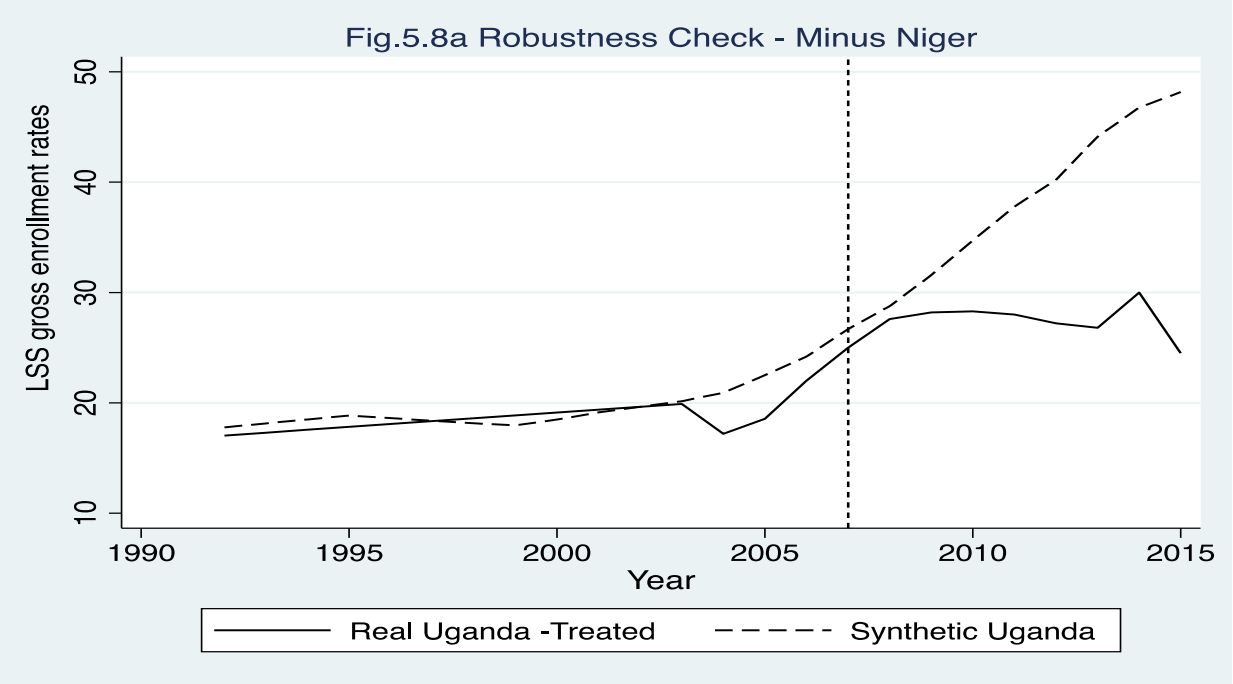
Appendix iv-Robusteness check



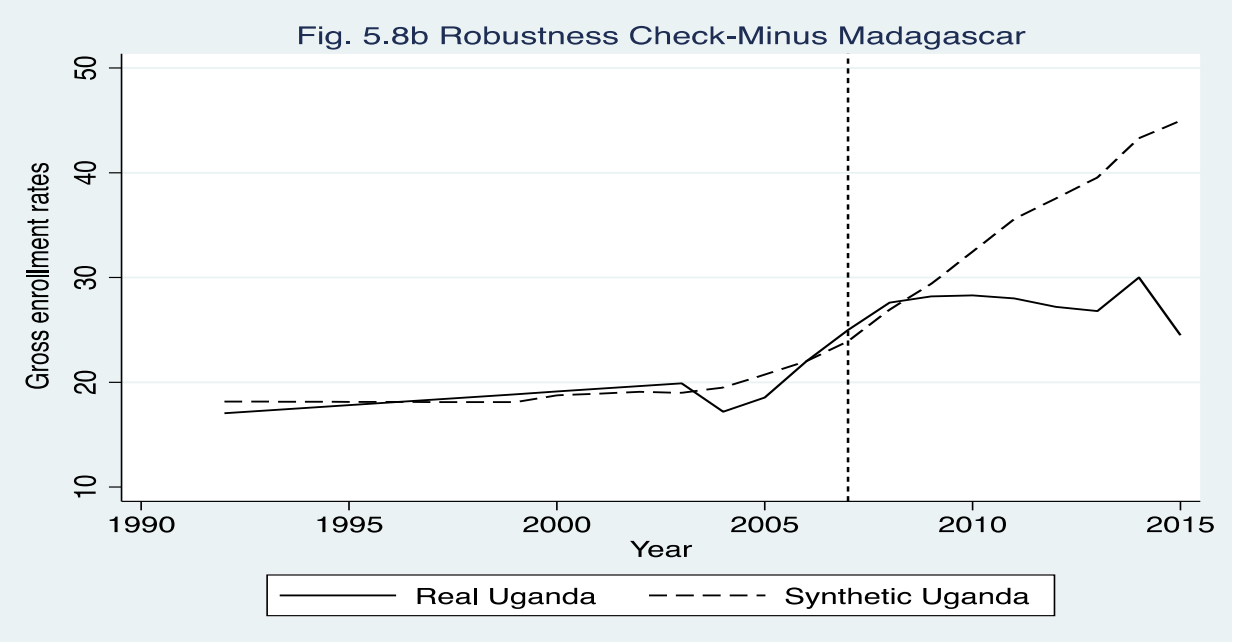


Fig. 5.8c LSS gross enrollment rates: Robustness Check(Minus Cameroon)

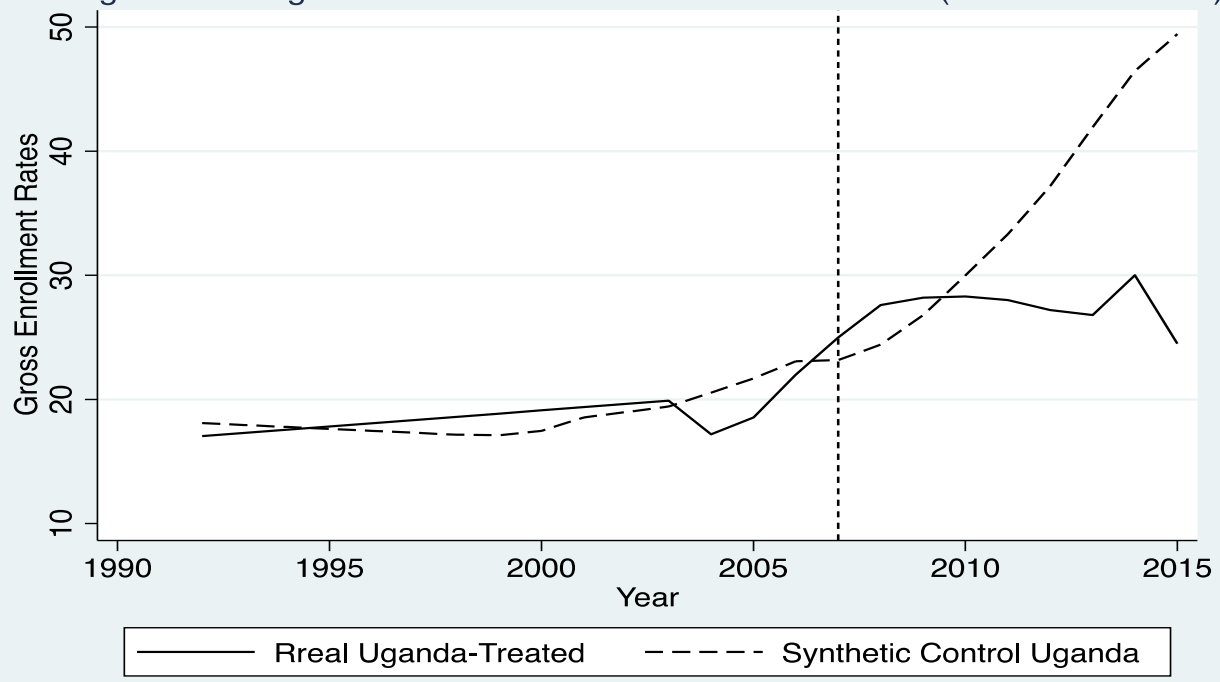
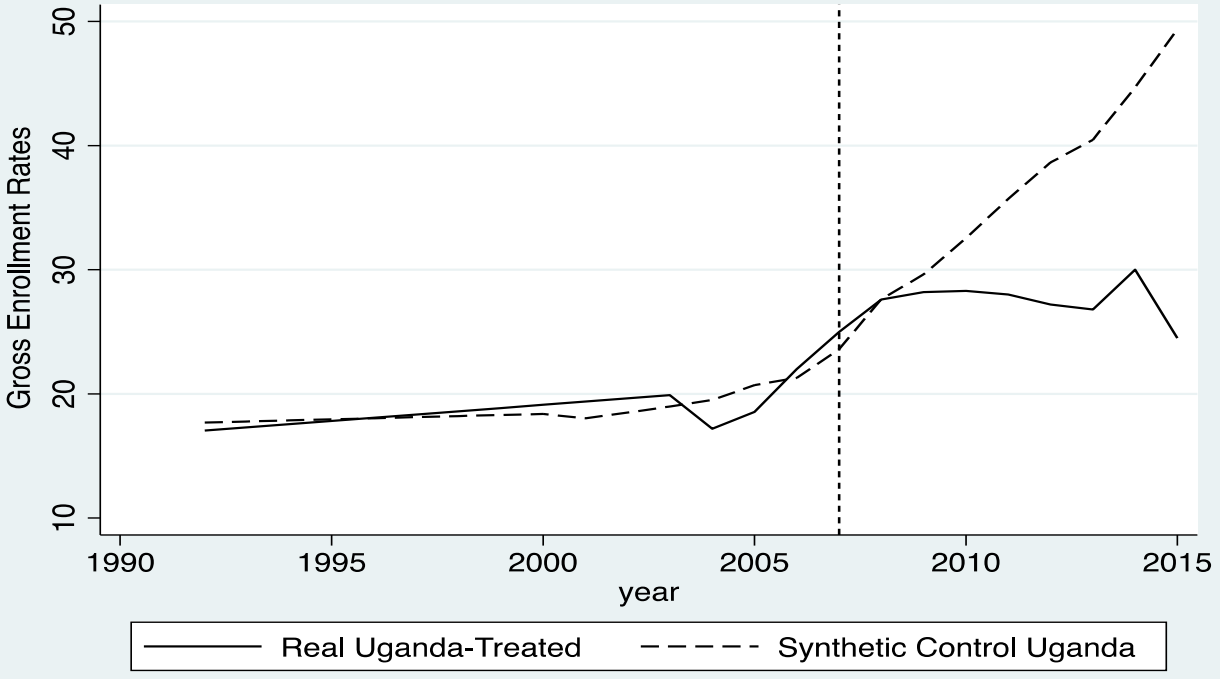


Fig. 5.8d LSS gross enrollment rates: Robustness Check(Minus Burundi)



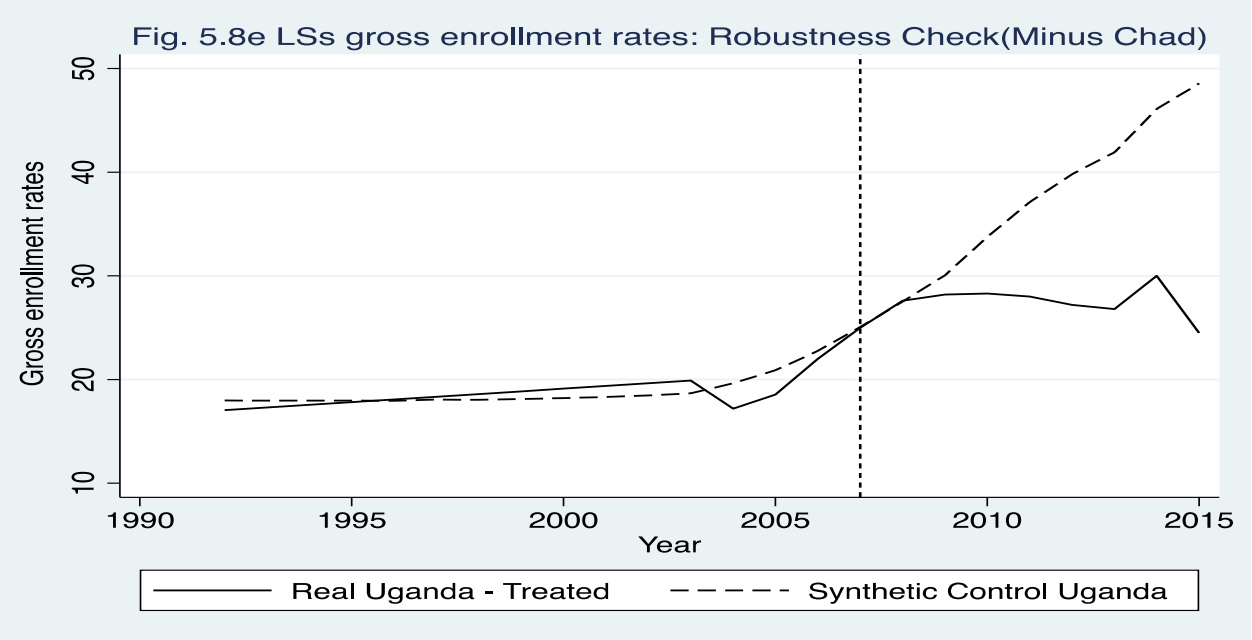
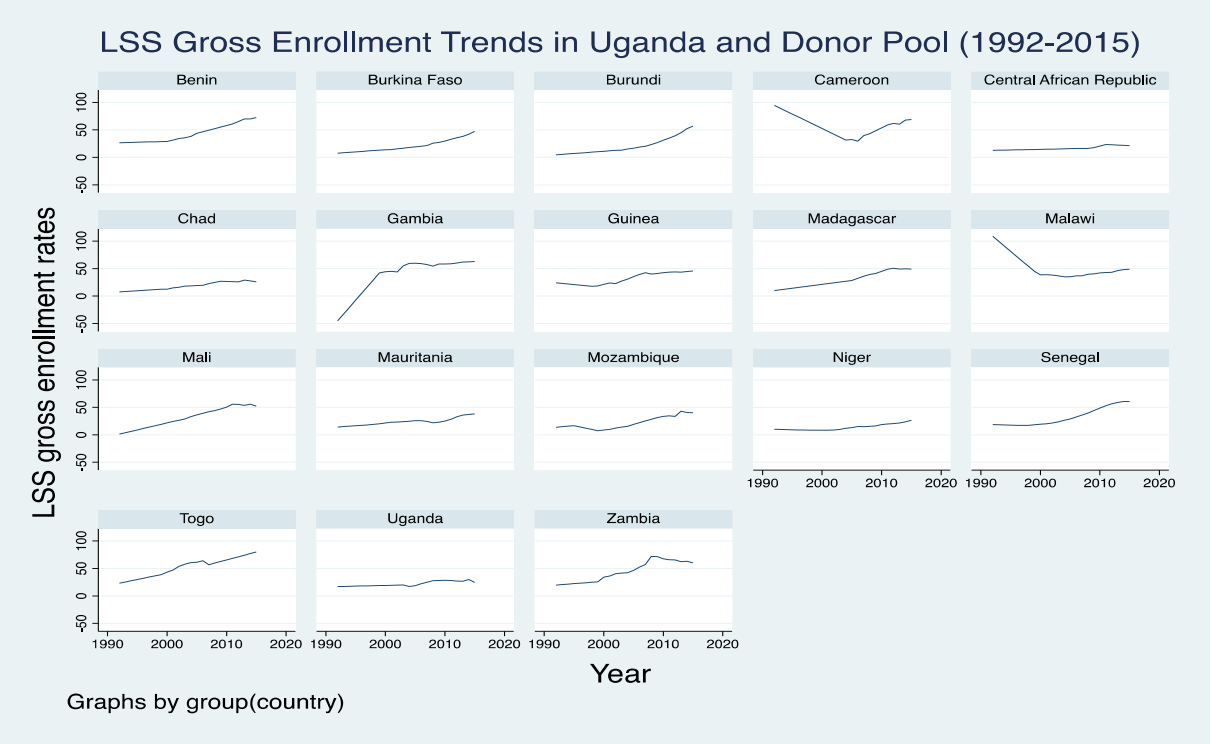


Fig. 5.8e LSs gross enrollment rates: Robustness Check(Minus Chad)
Gross enrollment rates
10
20
30
40
50
1990
1995
2000
2005
2010
2015
Year
Real Uganda - Treated
Synthetic Control Uganda

Appendix v. LSS GER Trends in Uganda and donor pool 1992-2015



Appendix vi. District average schooling expenses (in Ugandan Shillings)

District	Expenses	District	Expenses	District	Expenses
Bukedea	136000	Kaliro	74913.13	Wakiso	557000
Kaabong	36950.99	Kalungu	179000	Yumbe	56045.03
Abim	70306.04	Kampala	376000	Zombo	38491.06
Adjumani	820000	Kamuli	76340.88	Wakiso	557000
Agago	89073.61	Kamwenge	160000	Moroto	80946.09
Alebtong	67078.41	Kanungu	145000	Moyo	58621.63
Amolator	54600	Kapchorwa	49500.31	Mpigi	185000
Amudat	82422.41	Kasese	215000	Mubende	144000
Amuria	103000	Katakwi	192000	Mukono	324000
Amuru	86190.23	Kayunga	161000	Nakapiripirit	30553.36
Apac	85545.94	Kibaale	80194.8	Nakasangola	119000
Arua	91526.15	Kiboga	81118.6	Nakaseke	382700
Budaka	27121.63	Kibuku	40577.89	Namayingo	30893.53
Bududa	65953.16	Kiruhura	235000	Namutumba	59640.35
Bugiri	79391.29	Kiryandongo	145000	Napak	166000
Buhweju	317325	Kisoro	291000	Sembabule	319000
Buikwe	264000	Kitgum	88873.38	Serere	26878.64
Bukomansimbi	103000	Koboko	99303.04	Sheema	360000
Bukwo	9238.667	Kole	36053.56	Nebbi	38341.4
Bulambuli	37991.83	Kotido	103000	Ngora	60434
Buliisa	48750	Kumi	88768.29	Ntugamo	126000
Bundibugyo	245000	Kween	9021.516	Nwoya	34382.06
Bushenyi	613000	Kyankwanzi	292000	Otuke	76822.39
Busia	77204.24	Kyenjojo	172000	Oyam	67238.66

Butaleja	40724.35	Lamwo	62210	Pader	109000
District	Expenses	District	Expenses	District	Expenses
Butambala	173000	Lira	166000	Pallisa	101000
Buvuma	180000	Luuka	37661.48	Rakai	149000
Buyende	90130.87	Luwero	225000	Rubirizi	110000
Dokolo	48565.27	Lwengo	200000	Rukungiri	97363.26
Gomba	458025	Lyantonde	184000	Sironko	174000
Gulu	175000	Manafwa	159000	Soroti	336000
Hoima	150000	Maracha	75880	Tororo	210000
Ibanda	419000	Masaka	284000	Kaberamaido	179000
Iganga	162000	Masindi	435000	Kalangala	108000
Isingiro	175000	Mayuge	86326.93	Mitooma	399000
Jinja	348000	Mbale	97763.3	Mityana	241000
Kabale	218000	Mbarara	122000		
Kabarole	267000	Mitoma	72895.95		