REPUBLIC OF UGANDA

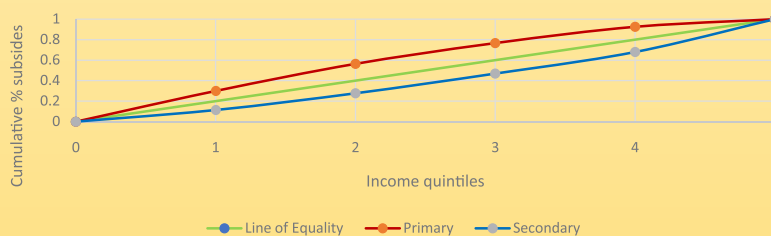# COMPREHENSIVE EVALUATION OF THE UNIVERSAL PRIMARY EDUCATION (UPE) POLICY

THEMATIC REPORT 6:

EDUCATION MODELLING AND FORECASTING

November, 2018

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COMPREHENSIVE EVALUATION OF THE UNIVERSAL PRIMARY EDUCATION (UPE) POLICY

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FOREWORD

This independent comprehensive evaluation of the Universal Primary Education (UPE) policy is one of the many evaluations of Government policies and programmes to be produced by the National Planning Authority (NPA)in fulfilment to the National Planning Act (2002) and the National Development Plan (NDPII). Two decades since the UPE policy was introduced, it is important to look back and take stock of the remarkable gains attained, identify the challengesfaced, and lessons learnt during the implementation of the UPE policy.

The objectives of the UPE Policy were:

1) To provide facilities and resources to enable every child to enter school;
2) To ensure the completion of the primary cycle of education;
3) To make education equitable in order to eliminate disparities and inequalities;
4) To ensure that education is affordable by the majority of Ugandans; and
5) To reduce poverty by equipping every individual with basic skills.

This comprehensive evaluation set out to assess the extent to which the above objectives have been achieved. In an effort to provide guided policy direction, the evaluation was undertaken along six (6) thematic areas that include:

(i) Policy, Legal, Regulatory and Institutional frameworks;
(ii) Efficacy of the Primary School Curriculum in Supporting the Realization of UPE;
(iii) Primary Teacher Training for Producing Competent Teachers to deliver UPE;
(iv) Efficacy of School inspection in Supporting the delivery of UPE;
(v) Financing and Costing of UPE; and
(vi) Education Modelling and Forecasting.

TheseReports provide over-arching findings and recommendations necessary for improving the quality of primary education in Uganda. In particular, the reports are useful in: informing the finalization of the review of the Education White Paper; improving teacher training mechanisms and policies; improving adequacy of the curriculum; strengthening policies and guidelines regarding community participation; inspection; providing status for the 2030 Agenda on Sustainable Development Goal 4 on Education for All; and informing policy planning and the Uganda Vision 2040.

The comprehensive evaluation used both quantitative (secondary and primary) and qualitative evidence using data from; the UNHS, EMIS, UNEB, NAPE, MTEF, World Bank, UNESCO, and NPA Survey among others. The quantitative analysis was based on rigorous econometric and non-econometric models that include the: Standard Mincerian Regression; Stochastic Frontier production function; Benefit Incidence analysis, cohort analysis, ordinary least squares analysis, logit analyses, UNESCO's Education Policy and strategy simulation (EPSSim). With respect to the qualitative analysis, we undertook a rigorous desk review of the relevant literature with bench marked good country policy practices, various formative and summative evaluations on the UPE policy before, interviews and field work.

This comprehensive evaluation was based on the standard OECD-DAC evaluation principles which includes; relevance, effectiveness, efficiency, impact and sustainability. The rating criteria is categorized into 3 decision rules namely; Substantially Achieved, Partially Achieved, and Not Achieved. Overall the UPE Policy has been **partiallyachieved** based on the OECD criteria rating.

The UPE policy substantially meets the relevance principle. The policy is aligned to national priorities and policies such as the Poverty Eradication Action Plan (PEAP), Millennium Development Goal (MDG) 2 of achieving Universal Primary education, Education Act 2008, Sustainable Development Goal (SDG) 4, NDPs and Uganda Vision 2040. Empirical evidence indicates that: 88 percent of the school going age children are in school; and equity in terms of gender parity and Special Needs Education have greatly improved.

On the other hand, **the UPE policy partially meets the effectiveness principle.** Overall, 60 percent of the UPE objectives have been substantially achieved under objective 1, 3 and 5, but with partial achievement registered on 2 and 4. This rating is as a result of performance on the following indicators; access of 88 percent, PLE completion of 65 percent,remarkable improvement in literacy and numeracy, cohort completion rate of 38 percent, dropout rate of 38.5, repetition rate of 1.5 percent.

This policy partially meets the efficiency principle in producing the maximum possible outcome given the available inputs. This is explained by the government-aided schools being away from the maximum possible outcome by only 0.38 percent when compared to their private schools counterparts at 11.8 percent. This implies that, for Government to improve learning outcomes, it should increase financing to the primary school sector. However, the evaluation notes that there are still leakages in the system among which include; poor completion, absentiseem, less time on task by teachers and low pass rates.

The UPE policy partially meets the policy impact principle. Notably, the policy has significantly impacted on the years of schooling especially on the average years of education for the household head that have increased to 10 years from 4.2 years in 1997. Empirical evidence shows that completing 7 years of primary increases household incomes by about 10.2 percent as compared to their counterparts who don't complete the cycle. Similarly, the analysis showed that an additional year of schooling improves Primary Health Care (PHC) outcomes of these households, as well as equipping individuals with basic skills and knowledge to exploit the environment for self-development and national development.

The UPE policy partially meets the sustainability principle. The comprehensive evaluation notes that while donor financing has gone down over the years, government financing and household education expenditure have increased. Over the same period, the per capita expenditure has consistently reduced occasioned by increase in enrolment out-pacing growth in the education budget, indicating a financial sustainability constraint. Beyond that, a

review of the institutions that support UPE indicates that albeit their challenges, they are technically capable of spear heading a successful UPE Programme. Moreover, Government continues to greatly support primary education amidst other education sub-sectors like BTVET and USE which compete for the available fixed resource envelope. Notwithstanding, there are other factors which hinder the sustainability of the policy, that include; high population growth rate, high dropout, negligence by parents and poverty among others.

Overall, empirical evidence indicates that the UPE policy remains relevant, pro-poor and has largely fulfilled its primary objective of increasing equitable access. However, challenges that include leakages within the system affect learning outcomes. Similarly, to attain the desired quality Universal Primary Education, the per pupil expenditure should increase to UGX 63,546 for Urban schools and UGX 59,503 for rural schools from the current UGX 10,000 that government is contributing. In fact, the demand constraints have reduced over the UPE span, with Uganda pursuing an inclusive economic growth and rapid reduction in poverty which has significantly increased the financial resources at the disposal of households. This also illustrates the increasing priority that Ugandans have accorded to these areas and the impact of the UPE policy in raising awareness and addressing cultural constraints even among the poorest households.

Indeed, Government was right on its decision to implement the policy and is therefore advised to continue pursuing this programme with improved financing and institution strengthening as indicated in the respective thematic reports.

In conclusion, I extend my gratitude to the; First Lady/Minister of Education and Sports for the overwhelming support, Parliament of Uganda and the Ministry of Finance Planning and Economic Development for appropriating funds for the first comprehensive evaluation. Also, we acknowledge thesupport from; the Inter-Agency Committee, Ministry of Education and Sports, Local Governments, Schools visited, the NPA Fraternity especially the M&E Department and the Research Assistants that collected the data that informed part of the analysis.

Joseph Muvawala (PhD)
EXECUTIVE DIRECTOR

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ACRONYMS AND ABBREVIATIONS

BTVET	Business, Technical and Vocational Educational and Training
EE-MF	Education Economics-Modelling and Forecasting
EPRC	Educational Policy Review Commission
EMIS	Education Management Information System
ESSAPR	Education and Sports Sector Annual Performance Report
MFPED	Ministry of Finance, Planning and Economic Development
MoES	Ministry of Education and Sports
NAPE	National Assessment of Progress in Education
NDP	National Development Plan
NPA	National Planning Authority
PCR	Pupil-Classroom Ratio
PSCR	Pupil-toilet stance ratio
PTR	Pupil Teacher Ratio
SFA	Stochastic Frontier Analysis
UBOS	Uganda Bureau of Statistics
USE	Universal Secondary Education
TORs	Terms of Reference

EXECUTIVE SUMMARY

In 1997 the government of Uganda introduced Universal Primary Education (UPE) and abolished school fees in line with the goal of UPE as stated in the 1992 Government White Paper on Education. Government aimed at creating conditions for the expansion of equitable access to primary education for both boys and girls, and to improve the quality, delivery of education services and capacity development. In collaboration with development partners, Government has made significant investments in the education sector. International development agendas such as the MDGs also helped Uganda to pool resources and create conditions for a more focused, coordinated and efficient approach to education sector financing.

Almost two decades since the UPE policy was introduced, it's important to look back and take stock of the remarkable gains Uganda has attained, identify the challenges it has faced, and lessons learnt during the implementation of the UPE policy.

This report titled "***Comprehensive Evaluation of the Universal Primary Education (UPE) Policy in Uganda: Education Modelling and Forecasting***" is part of the four thematic areas of the main evaluation of UPE policy in Uganda. The modelling and forecasting report aimed at compiling important information (review of literature, data and empirical/statistical analysis methods) and conducting evidence-based analytical analysis of the Government interventions made in primary education sub-sector since 2000. Specifically, the report assesses the achievements, effectiveness, efficiency, relevancy, and sustainability of educational interventions, in terms of incidence and educational outcome results. The report helps to shed more light on central and pertinent questions such as the following:

(1) In what way have school attendance and learning achievement developed since 2000?

(2) What were the main drivers/determinants of these developments?

(3) Which interventions have had the largest and most cost-effective impact on educational outputs?

(4) How has UPE contributed to returns to education and the overall household welfare?

Using a wide range of available datasets combined with existing evidence on learning achievements (e.g., numeracy and literacy) and other education learning outcomes, this report presents findings that remind us of the journey Uganda has trekked in a bid to deliver on the objectives of the UPE policy. In this endeavor, Uganda has seen progress in a number of areas, notably equitable access and increased funding for the education sector. However, Uganda still faces a challenge of general decline in quality of education. The key take-home messages emanating from this report are highlighted below.

KEY MESSAGES

1. Uganda has made Enormous Progress in Improving Access to Primary Education

Following abolition of school fees, enrolment increased from 2.6 million children in 1995 to 7.2 million in 2005, although enrolment slowed down between 2007 and 2015, standing at 8.2 million children to date. Initially, this massive inflow had a negative effect on the quality of education: pupil teacher ratios and pupil classroom ratios skyrocketed. Pupils did not have enough seating and reading space and instructional materials. Government responded by making significant investments in the education sector, mainly through expansion of school facilities and the reduction of financial and social barriers to education. Investments in teachers and teacher training, in schools and classrooms, in school facilities and in books have been, and still are, important instruments for reducing dropout and repetition, for improving progression and completion rates and for improving the quality of education. The number of schools increased from 17,000 in 2006 to 22,600 in 2015. The number of classrooms grew from 68,000 in 2000 to 100,000 in 2006 and to 149,000 in 2014, representing a 46% increase between 2006 and 2014. Over the same period, the number of books for the four main subjects increased from 6.6 million to 10.6 million. In the same period, the PCR declined from 72:1 to 63:1. As a result of these investments, the pupil teacher ratio decreased from 60:1 in 2000 to 48:1 in 2006 and to 43:1 in 2015. In the same period, the pupil classroom ratio decreased from 108:1 to 71:1 and to 63:1. Net enrolment increased to above 90%, gender parity was achieved, average examination and test results have gradually improved, and the percentage of pupils who complete primary seven is above 60%.

2. The Quality of Education Remains Poor

Notwithstanding the impressive performance in access to education, quality of education remains an enormous problem, albeit slight improvement in learning achievements. Improving learning must be a policy priority. A substantial number of children complete primary education without having acquired the basic numeracy and literacy competencies critical to further learning and independent social living.

3. Low Progression and High Dropout Rates Undermine the Sustainability of High Enrolments

Progression rates are low and even tend to fall because of high dropout rates. Moreover, a large number of school going-age (12%) remains out of school. This partly explains why, net enrolment in primary school is still less than 100%. In addition, it raises questions of whether there is need for enforcement of UPE policy and the role of parents and the community in children's education. Gross and primary completion rates remain low at 67% and 10% respectively. Moreover, only 38% of children who enroll in primary 1 manage to complete primary 7.

4. Need for Clarifying the Automatic Promotion and Class Repetition Policy

Class repetition rates remain high in Uganda even in the existence of the automatic promotion policy. High repetition rates not only clog the system by increasing PTR and PCR but also waste the meagre resources available for the education sector as government spends on the same pupil more than once in the same class.

5. The Growing School-Age Population is a Challenge for Financing of the Primary Education Sub-Sector

Uganda's rapid population growth, young age structure and consequent high child dependency burden among others are threats to the achievement of socioeconomic development. In particular, the rapid growing school-age population poses a financing challenge to the primary sector. Public

spending on education has grown significantly over the last 15 years, albeit at a slower rate than GDP; public education spending was 2.1% of GDP in 2013/14, compared to 4.0% of GDP a decade earlier. In general, public education spending has barely kept pace with the school-age population and this may have increased the burden on households to use their own resources. The per-unit cost for each child has either remained constant or declined due to increased population. Moreover, the per-unit cost per primary school child is expected to even decrease further due to other introduction of other Government policies such as USE and BTVET. Between 2002/03 and 2012/13, government spent on average between Ush.60,129.80-108,321.34 for primary compared to Ush 78,916.78-262,826.11 for secondary. While the higher per-unit cost at the secondary level may be attributed to the introduction of USE in 2007 given a fixed resource envelope for the education sector, the USE, BTVET and Higher Education spending is crowding out UPE financing. From the analysis it is clear Government financing cannot sustain expansion of all sectors of education at the same time without innovative financing mechanisms. **It is therefore, prudent and timely to consider a training levy to support financing of TVET so as to release funds for Primary Education.**

6. Government Spending on Primary Education has been Pro-poor

Whether government spending on education is useful or not depends on effective targeting of the people that are in most need of achieving their educational goals. Public spending on education cannot improve learning outcomes if it only benefits households that have already achieved their education goals. The analysis of the distribution of government spending on education indicates that government expenditures on primary education have largely benefited the poor compared to the rich. On average, government spending on primary education for the poorest quintile increased from 24% in 2002/03 to 30% in 2016/17 compared a decline for the rich from 13% to 9% over the same period.

7. Indirect Costs of Accessing Education Remain High

Whereas Government abolished school fees (direct cost to access), the indirect costs of accessing education especially for the poor households remain high. Financial constraints remain the most prominent factor explaining both non-enrolment and high dropout rates in Uganda. This reflects high out-of-pocket household expenses on scholastic and non-scholastic materials such stationary, meals and uniforms. Therefore, while the increasing trend towards higher private spending on education is a reflection that inclusive growth and poverty reduction has significantly increased financial resources for education, the poor still find it extremely hard to educate their children. On average, spending on education by the poorest 20% of households grew by 11% over the last 15 years. In general, education-spending growth was in fact highest among less-well-off households. This would therefore call for better targeting of government programs.

8. A More Balanced Approach To Spending on Social Sectors and Infrastructure Development Needs to be Adopted

While there is indication that public spending on education grew at an average rate of 0.7% per year for the entire schooling age group (ages 6-24 years), this has grown at a much lower pace owing to the significant increase in the level of the school-age young population. This therefore calls for further allocation of resources to this age group. While much emphasis has been put on the primary age group (resources increasing by 1.2 percent per capita), this is still not sufficient to meet the increasing population under this age group.

9. Per Capita Spending on Both Primary and Secondary Education Levels Remain Small Ranging Between 59,000 and 67,000 Uganda Shillings even Compared to Peer Countries like Kenya and Ghana

The public consumption profile for education reveals extremely large transfers to the younger population. Total public consumption on education increases sharply from age 4 peaking to age 19 years. It then declines sharply initially until age 22. This result is similar with public consumption profile in several other countries like Kenya (Mwabu et al., 2011) and Ghana (Amporfu et al.2014). A bigger share of public consumption on education is driven by spending on primary and secondary education. This is expected in light of the two government policies on education —UPE and USE.

10. Monitoring Inputs, Outputs and Outcomes is Critical for on Improving Effectiveness of UPE Policy

Government and its development partners have made significant investments in the education sector, mainly by investing in recruitment and training of teachers, construction of classroom, teachers' houses, and sanitation facilities, and procurement of instructional materials (e..g, text books). These interventions have had a significant and positive impact on equitable access through increased enrolment. However, the impact on other indicator (access: attendance, absenteeism, dropout); efficiency (repetition, progression, and completion rates); quality (qualified teachers, PTR, PCR); and learning achievement (knowledge test score-PLE, competency test scores-literacy and numeracy) remains small. Limited effectiveness of those interventions on the quality of education can be attributed to weak monitoring systems of Uganda's education system. Therefore, there is need to harness the monitoring and evaluation function to ensure that government interventions in education sector are more effective in simultaneously increasing access to and raising the quality of education. Other issues that need serious attention include issues of district management, school management, parents and community participation (i.e., the so-called education triangle) among others. For example, the analysis test scores shows that children in private schools perform better than those in public schools. One implication for this finding is that supply-side constraints aside, differences in school efficiency, quality of education and pupil learning achievements could be due to differentials in school/district education management between public and privately managed schools.

SECTION ONE

1.0. BACKGROUND
1.1. Introduction

In 1997, Uganda became one of the first Sub-Saharan African countries to introduce education for all, through the Universal Primary Education (UPE) policy. UPE abolished school fees in line with the different international initiatives (e.g., EFA, MDGs) that aimed at improving access and the quality of education, and the following aims of education in Uganda, as outlined in 1992 Government White Paper:

i. To promote understanding and appreciation of the value of national unity, patriotism, and cultural heritage, with due consideration of international relations and beneficial inter-dependence;

ii. To inculcate moral, ethical, and spiritual values in the individual and to develop self-discipline, integrity, tolerance, and human fellowship;

iii. To inculcate a sense of service, duty, and leadership for participation in civic, social, and national affairs through group activities in educational institutions and the community;

iv. To promote scientific, technical, and cultural knowledge, skills, and attitudes needed to promote development;

v. To eradicate illiteracy and equip the individual with basic skills and knowledge to exploit the environment for self-development as well as national development, for better health, nutrition, and family life, and the capability for continued learning; and

vi. To contribute to the building of an integrated, self-sustaining and independent national economy.

In line with the general objectives of education, UPE objectives were five-fold namely:

i. To provide facilities and resources to enable every child to enter school;
ii. To ensure the completion of the primary cycle of education;
iii. To make education equitable in order to eliminate disparities and inequalities;
iv. To ensure that education is affordable by the majority of Ugandans;
v. To reduce poverty by equipping every individual with basic skills

In an attempt to achieve the general objectives of education, the government of Uganda with financial and technical support from development partners, has made significant investments in the education sector. Global development agendas such as the Millennium Development Goals (MDGs)[1], also helped Uganda to pool resources and create favorable conditions for a more focused, coordinated and efficient approach to education sector financing.

Right from commencement, the overall performance of UPE in Uganda with regard to enrolment at grade 1 was ahead of set targets, as the country continued to register gross enrolment of over 100% and a 95% net enrolment. Access to primary education increased from 2.5 million in 1996 to 8.5 million pupils in 2013. As a result, spending on education as a total share of government expenditures rose from an average of 20.2 percent of the budget in the three fiscal years preceding the UPE announcement to an average of 26.3 percent in the three years following the

announcement. An increasingly large share of the education budget was devoted to primary schools (averaging 65 percent) in the same period.

The dramatic increase in primary school enrolment followed by the jump in completion rates saw the emergence of a number of challenges including shortage of teachers, instructional materials and classrooms. To counter these challenges, the government formulated a ten-year Education Sector Strategic Plan (ESSP) 2004 – 2015, with five specific objectives:

i.   increase and improvement of equitable access and completion rate for primary and secondary education and ensuring gender equity,
ii.   improvement of the quality and relevance of primary and secondary education,
iii.   enhancement of equitable access to the Business Technology, Vocational Education and Training (BTVET) and tertiary education,
iv.   improvement of the relevance and quality of BTVET and tertiary education and;
v.   improvement of the effectiveness and efficiency of the delivery of education services at all levels by increasing the planning, management and monitoring capacity.

The ESSP was later harmonized with the first National Development Plan (2010/11 – 2014/15) (NDP1), with a view of focusing on achieving the objectives of the education sector within the framework of the wider national development goal of achieving growth, employment and socio-economic transformation for prosperity. This education sector approach was further consolidated within the increased prioritization of human capital development of the NDP2, towards employment creation and inclusive growth.

Over the years, targeted improvements in primary education have been guided by the findings and recommendations of the Education and Sports Sector Annual Performance Reports (ESSAPR) and the periodic National Assessment of Progress in Education (NAPE) studies. The NAPE is mainly focused on pupils' learning outcomes, namely, numeracy and literacy, and their related delivery costs. Several other have looked at education issues related to teacher and pupil absenteeism; allocative efficiency; and cost effectiveness, among others. These and many other studies have shown that while Uganda has been successful at increasing access and reducing the gender gap, the UPE program still faces the dilemma of low rates of: completion; numeracy and literacy; and low mastery of life-long basic skills and knowledge. Moreover, measures to progressively address these daunting challenges have often been hampered by inadequate resources and poor implementation planning.

1.2 Objectives of the UPE Policy Evaluation

Globally, education is one of the effective strategies to reduce poverty, increase economic empowerment, and achieve social inclusion. Therefore, the importance of providing quality education to all children regardless of any differences is recognized in several international declarations including the Education for All (EFA)[2], Millennium Development Goals (MDGs) 2000-2015 and the post-2015 Sustainable Development Goals (SDGs). In particular, the SDG 4.1 incorporates primary education, stating: "By 2030, ensure that all girls and boys complete free, equitable and quality primary education leading to relevant and effective learning outcomes." Primary education provision is also implicitly linked to a number of other SDG goals, making it a timely area of focus at the forefront of attention. The Incheon Declaration adopted at the 2015 World Education Forum also supports this message, calling for "the provision of 12 years of free, publicly funded, equitable quality primary education, of which at least nine years are compulsory." The inclusion of the term "free" is particularly significant, as it reaffirms a

commitment to mitigating the financial burden on households and ensuring that the full cycle of primary education.

At a national level, Uganda's transformative agendas —the Vision 2040 and the NDP2—emphasize the importance of primary education as a base for building a human capital for the realization of socio-economic transformation to middle-income status. At the sector level, the Education and Sports Sector Strategic Plan (ESSP) 2017-2020 has been prepared to provide the policy framework that will guide the Sector as it navigates through its ambitious goals of providing quality education with an insufficient resource envelope.

The structural transformation the country has experienced in terms of economic growth, poverty reduction, and improvement in provision of basic services, particularly, increased access to equitable primary education (but not quality education), over the last two decades, indicate a need to look back and take stock of the remarkable gains Uganda's education sector has attained in universalizing primary education, identify the challenges faced, and lessons learnt during the implementation of the UPE policy. In particular, if effective policies for scaling up access and quality education are to be formulated, there is need to conduct a more comprehensive assessment of the effectiveness, efficiency, relevance, sustainability and long-term impacts of the current UPE policy.

It is within this context that the Government of Uganda through the National Planning Authority (NPA) commissioned an independent evaluation of the UPE Policy, aimed at establishing the success, challenges, lessons learnt so far, in order to inform wide-ranging policy planning and implementation improvements for quality education in Uganda.

The overall objective of the independent evaluation of UPE policy is to assess the policy impact of the UPE program on learning outcomes, skills development, poverty reduction, inequality, and affordability, in order to provide a benchmark for informed policy action for sustainable quality UPE delivery. Specifically, the study aims to:

i. Assess the extent to which the goals and objectives of the UPE program have been achieved and their relevance;

ii. Assess the adequacy of the policy, legal and regulatory frameworks in the delivery of UPE;

iii. Assess the adequacy of the implementation institutional framework and coordination mechanisms (i.e. Structures, Key Actors, Roles and Responsibilities, UPE Partners) in the delivery of UPE;

iv. Assess the effectiveness of the Planning, budgeting, monitoring and Financing Frameworks; and

v. Assess the impact of the UPE program on acquisition of basic skills and knowledge necessary for exploitation of the environment for self-development, life sustenance and social development.

Achieving the above stated UPE evaluation objectives requires benchmarking UPE program on international best practices, namely: relevance of the program; efficiency and effectiveness of Planning, budgeting and Financing Frameworks; impact; and the overall sustainability of the program. Specifically, these components involve a detailed assessment UPE program in terms of:

i.   Relevancy—the extent to which the program is suited to the National Development Planning framework that is currently in place. Particular considerations include analyzing the extent to which the objectives are still relevant and valid; consistency of the activities and outputs to the overall UPE goals and objectives; and consistency of the activities and outputs to the intended UPE impacts and effects;

ii. Effectiveness—the extent of achievement and likelihood of achieving the objectives; establishing the major factors influencing the achievement or non-achievement of the objectives; and proposing policy actions required to remedy the situation;

iii. Efficiency— analysis of the cost-effectiveness, quality, timeliness, in comparison to alternatives of achieving the outputs (qualitative and quantitative), in relation to the inputs;

iv. The impact—positive and negative changes from the UPE program — direct, indirect, intended and unintended. This requires analysis of the results of the social, economic, environmental and other development indicators. Of particular importance is the analysis of the resulting effects (distributional, learning achievements, monitoring of inputs and outputs) of UPE and the difference made to beneficiaries; and

v.   Continuity—in relation to budgetary, capacity and partnerships implications including community participation aspects in order to assess whether the program is sustainable or not. This is important in light of other resource competing programs like Universal Secondary Education (USE) and Business, Technical and Vocational Educational and Training (BTVET).

1.3 Scope of the Report

The first stage of the independent evaluation of the UPE policy was a scoping study structured along three inter-related thematic areas of UPE policy: i) Policy, legal and regulatory framework, and institutional framework; ii) Education economics of Cost Accounting and Financing; and iii) Education economics of Modelling and Forecasting education learning outcomes. Different scoping reports under each theme were produced.

The general objectives of the scoping study were to:

i.   Identify and review existing literature on the performance of the UPE policy in Uganda;

ii. Identify and document milestones in the implementation and evolution process of the UPE policy;

iii. Prepare summary abstracts of about 500-800 words containing information on the scope, objectives, findings, recommendations, and shortcomings of the study to inform the main evaluation;

iv. Undertake a data compilation and analysis to inform the final assessment of the achievements, efficiency, effectiveness, relevancy, sustainability and impact of UPE policy; and

v.   Prepare final reports containing key sources of data and information; summary of information on scope, objectives, findings, recommendations and shortcomings of each thematic study areas; summary of milestones of UPE policy implementation and evolution, including timelines of their occurrence; and where applicable, databases and forecasts of various UPE attributes, to be used to inform the main evaluation exercise.

In light of the scoping study and main evaluation study objectives, the primary contribution of the education economics modelling and forecasting theme was to provide a deeper evidence-based analysis of the progress and challenges of UPE policy since its inception. This necessitated gathering evidence (desk research documents, secondary datasets and primary data) and use of rigorous modelling techniques to comprehensively assess the achievements, relevancy, efficiency, effectiveness, impact and sustainability of UPE policy. This evidence would then form a basis for realistic recommendations to inform wide-ranging policy, planning and implementation improvements.

It is important to note a priori that following discussions with the technical team at NPA before and during the scoping study exercise, some modifications to the scope of work under this thematic area were undertaken. To this end, nine (9) main tasks were identified under both scoping and main evaluation studies.

The tasks for the main evaluation included:

i. Identify and review existing empirical literature on the performance of Uganda's UPE policy;

ii. Compile relevant datasets (primary and secondary) sources for evidence-based analysis;

iii. Examine current state and historical trends of UPE performance indicators (e.g., gross and net intake rates, survival rates, repetition rates, dropout rates) in order to provide evidence on access problems and the internal efficiency of the educational system; and

iv. Examine the public and private education expenditure patterns under UPE policy regime in order to assess the burden of private spending on education and how the benefits of public sending on primary education are distributed among different groups of households across regions

The tasks for the main evaluation included:

i. Conduct econometric analysis of the drivers of UPE learning outcome indicators;

ii. Conduct econometric analysis of technical efficiency and total productivity growth in Uganda's primary education;

iii. Analyse the dynamics or changes in returns to schooling that have taken place since the introduction of UPE in Uganda;

iv. Provide forecasts of future educational learning outcomes to aid sound management decisions related to the UPE program and the entire education system planning for reaching goals, for allocation of resources, and for fiscal soundness; and

v. Assess the economy-wide and sectoral impacts of primary education public investments (taking into account different financing mechanisms—domestic borrowing, foreign borrowing, and increased domestic revenue mobilization) needed to scale up access to quality education services as envisaged in the Uganda Vision 2040, on growth and poverty reduction.

It is important to note that the findings presented in the scoping report for this thematic area were not conclusive for a number of reasons. First, the findings were majorly based on the analysis of the Annual School Census data of MoES (hereafter EMIS) and nationally representative household surveys by UBOS. At the time of analysis and report write-up, we did not have access

to PLE results and NAPE datasets by UNEB. These two datasets capture important information concerning learning achievements (numeracy, literacy, and PLE grades). As a result, we could not link the EMIS data with the learning achievements data at a school level, to conduct a more detailed analysis of the impacts of UPE policy on educational learning achievements. Second, the preliminary analysis of the EMIS and UNHS datasets found a number of inconsistencies (see Chapter 2 for details). A recommendation was made that primary data collection exercise be undertaken to collect information at the school, community, beneficiary, District/Municipal, and sub county/town council levels to valid the existing databases such as EMIS and provide missing information on, for example, impacts on UPE beneficiaries.

This report builds on the findings of the scoping study report to provide evidence-based analysis of the impacts of UPE policy. It helps to shade more light on central and pertinent questions such as the following: 1) In what way have school attendance and learning achievement developed since 2000? 2) What were the main drivers/determinants of these developments? 3) Which interventions have had the largest and most cost-effective impact on educational outputs? and 4) How has UPE contributed to returns to education and the overall household welfare? The analysis in the report relies on the utilization of the nationally representative UNHS and UNPS datasets, EMIS data and other administrative datasets. The available data has been analyzed using the econometric techniques that help to identify the effect of UPE on educational learning outcomes and how efficient and effective the UPE policy is in delivering those education-learning outcomes. In addition, economy-wide modeling techniques are also used to assess the economy-wide the likely future economy-wide impacts of government investments aimed at scaling up access to quality primary education in Uganda.

1.4 The Structure of the Report

The report is structured into nine chapters. Chapter 1 presents a brief background to UPE policy and its objectives; and objectives of the main evaluation. Chapter 2 explains the sources of evidence and the methods used to analyse the data. Chapter 3 presents an updated analysis of education learning outputs and outcomes indicators. Chapter 4 presents an updated analysis of public and private education investments and distributional impacts of public investments in the primary education. The returns to education are analysed in Chapter 5. The chapter raises the veil on the question of "how has UPE contributed to returns to education and the overall household welfare?" Chapter 6 presents the impacts of UPE policy in Uganda in terms of learning achievements (access and quality impacts). Chapter 7 provides an updated analysis on technical efficiency of Uganda's primary schools. Chapter 8 concludes and proposes a set of complimentary recommendations to encourage and scale up access to quality education in Uganda in line with the socioeconomic transformation envisaged in Vision 2040.

Notes for Chapter 1

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[1] UPE objectives were very much in line with MDGs—MDG1 aimed at eradicating extreme poverty and hunger; MDG2 aimed at achieving universal enrolment, completion and literacy for primary education; and MDG3 aimed at promoting gender equality and empowering women.
[2] The Education for All (EFA), was first launched in Jomtien, Thailand in 1990 to bring benefits of education to every citizen in every society

SECTION TWO

2.0. SOURCES OF EVIDENCE AND METHODOLOGY

Both quantitative (secondary and primary) and qualitative evidence was used to inform the UPE evaluation analysis in this report.

2.1. Sources of Evidence

2.1.1. Quantitative Secondary Data Sources

The key sources of quantitative secondary data are the Annual School Census Survey (commonly known as EMIS) conducted by the Ministryof Education and Sports (MoES); and the National Assessment of Progress in Education (NAPE) and PLE results conducted by Uganda National Examination Board (UNEB). These datasets as well as other data sources are presented below.

2.1.1.1. Annual School Census (ASC) Survey

The Annual School Census is a comprehensive collection of basic (i.e. enrolment, learner characteristics, teacher details, infrastructure, etc.) educational data for all levels of the education system (i.e. pre-primary, primary, secondary, post primary, BTVET, and Tertiary) by the MoES. The purpose of the Annual School Census exercise is to generate basic data required for planning (incl. budgeting), policy analysis, development and decision making. Current data is usually required for budgeting since the government is implementing a cash budget. It is an efficiency measure intended to ensure that the scarce resources are not unduly wasted (MoES, 2016). The ASC data is processed and stored in the Education Management Information System (EMIS)—an ICT management tool that "integrates people, technology and practices in the process of collecting, capturing and processing data from different sources to generate information to aid informed decision making for operation and managerial functions of the education and sports sector" (MoES, 2016). EMIS was introduced to improve the management and planning procedures of the education sector by providing accurate information and building staff capacity in the education sector through trainings.

Every year, a detailed questionnaire is sent to all primary schools across the country. The questionnaire is supposed to be completed by all Heads of all government and private primary schools. The heads are required to provide accurate information reflecting the condition of their schools at the beginning of term one. All head teachers, are required to provide information on school particulars (e.g., the name of the school, head teachers, districts); and school particulars (e.g., the status of the school, the founding body, source of funding, school type, distance to the nearest school, number of inspections conducted at the school, distance to the DEO's office, location, founding year, the highest class in the school etc.).

The ASC also collects information on pupil information such as enrolment by class, gender and age, repeaters by class and gender, orphans by class and gender, pupils with special learning needs by class and gender, Physical streams by class, pupils with adequate seating and writing space, pupils that transferred to your school by class and gender, the number of pupils who sat for the exams at the end of each term by class and gender for previous year. In addition, information on teaching staff such as their highest level of education, highest

teaching professional qualifications, additional school responsibilities, their salary scale, the type of additional training received, the type of education received in physical education and sports, training received in sanitation promotion, the information on teacher leaving the school, the information on non-teaching staff is also collected. Other important information on infrastructure and sanitation information such as infrastructure/ buildings (rooms) by type like classrooms, libraries, store rooms, workshops, office, staff rooms, latrine stances, teacher houses, computer lab, complete structure, incomplete structure, buildings or infrastructure under construction, the number of existing sanitation facilities, information on teaching materials as well as information on HIV/AIDS, physical education and sports are all included in the EMIS data set.

The ASC data therefore, contains important information on both demand and supply-side educational performance and learning achievement indicators. The ASC data is an important input to the planning and monitoring of the provision of quality and relevant education to all Ugandans.

Despite the well-intended objectives of ASC and EMIS altogether, the EMIS has a number of limitations.

First**, EMIS suffers the problem of differences in participation**. While MoES sends census questionnaire to all schools in Uganda, some schools do not remit back the fully filled questionnaires. As for 2015, the response rate was estimated at 97%.

Second, **missing information (for some schools) on important education performance indicators such as pupil enrolment numbers**. Lack of this information makes it difficult to reliably estimate Gross Enrolment Rates (GER) and Net Enrolment Rates (NER). Normally, GER and NER computed from EMIS data are on the high side due to a combination of problems in enrolment and low population projection estimates compared to estimates from either UNHS or Population Census. Differences in enrolment mainly reflect differences in the school participation in the school census. Low participation rates are particularly a challenge for higly urbanized such as the Kampala, Wakiso, and Mukono districts. For these districts, it seems difficult to reliably estimate enrolments using the EMIS data.

For instance,Figure 2-1 illustrates significant differences between population estimates derived from the population census, and enrolment figures derived from the EMIS data for 2010-2015 (at the national level).

Figure 2-1: Population and enrolment figures (2010-2015)
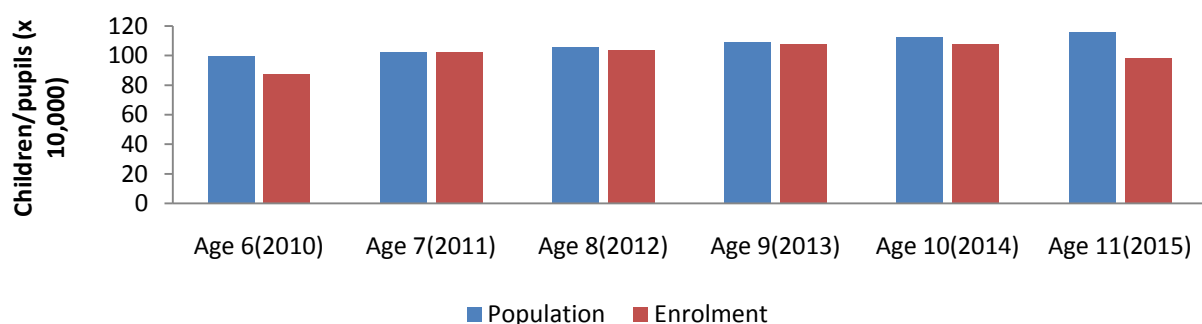
Source: NPA calculations based on EMIS&NPHC database

Furthermore, it appears the reported age of pupils is not reliable. This hamper accurate calculations of Net Enrolment Ratio (NER). Net enrolment rates are computed by dividing

the number of pupils aged 6-12 years enrolled in school by the correspondent population group. This computation assumes that the reported age of pupils is reliable. This is not necessarily the case. A comparison between EMIS data and UNEB (NAPE data) shows striking differences in age distribution. Figure 2-2 shows these differences at Primary six (P6).According to EMIS data, approximately 88% of the pupils in P6 are aged between 10 and 12 years; according to NAPE data, this is only about 26% (almost three and half times less the EMIS figure). This misstatement of the age of pupils partly explains the (too) high net enrolments rates.

Figure 2-2: Age distribution at P6 (NAPE and EMIS; 2015)
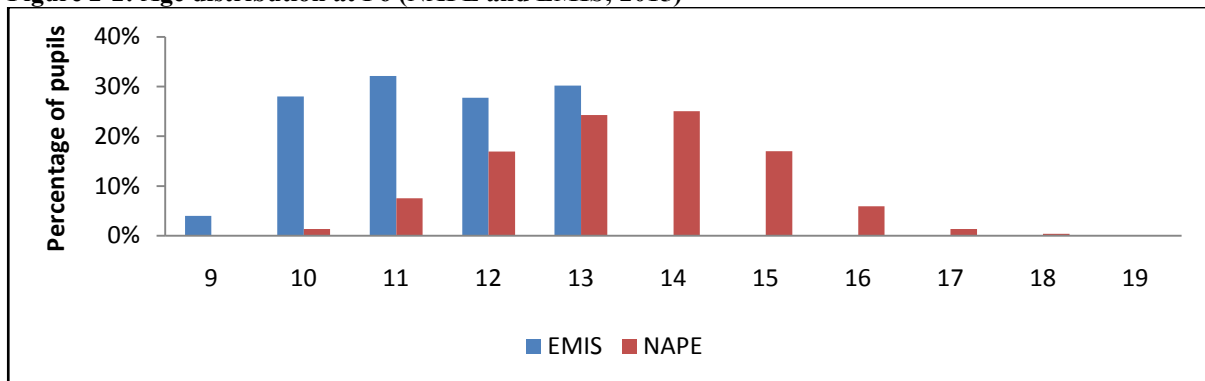
Source: NPA calculations based on EMIS &NAPE database

Third, **there is a problem of over- and underreporting**. The low enrolment rates suggest that schools underreport. Especially the private schools do not always return the census forms. The MoES report of June 2006 that presents the facts of 2005 school census already referred to the problem of over-and underreporting. The comparison between enrolment of pupils in primary 7 and the number of (registered) PLE candidates leads to the same conclusion (see**Figure 2-3**)

Figure 2-3: Enrolments in P7 and number of registered PLE candidates (2006-2014)
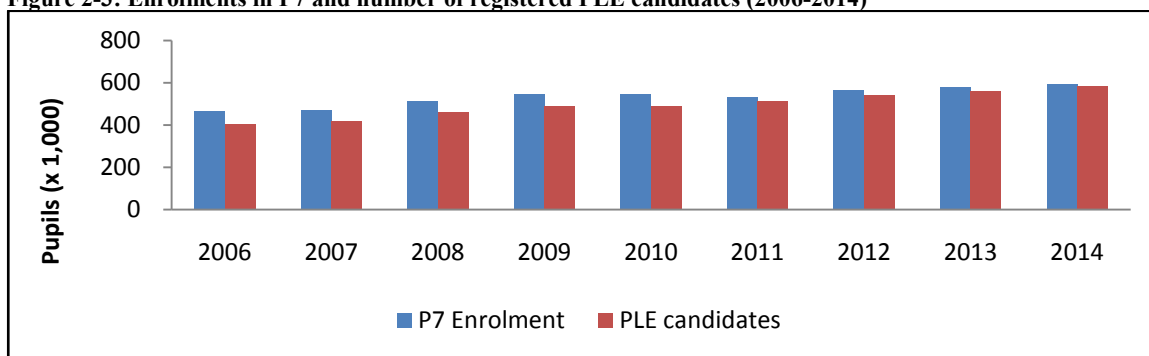
Source: NPA calculations based on EMIS &UNEB-PLE results

Fourth, **the EMIS data is not consistent for all years, particularly the period before 2006**. Even for the 2006 - 2015 data, there are differences in the definition and interpretation of the questions on the questionnaire by respondents, reflecting the need for sensitization of Head teachers on how to correctly fill the questionnaires. Moreover, there seem to be a capacity gap in the MoES in cleaning and checking data for consistency after the data collection exercise is done. Raw data is entered without serious scrutiny.

Fifth, the **EMIS data collection exercise is not comprehensively participatory**. For example, the district planning department does not participate in the administration of the Census instrument, which further affects the quality of the dataset.

Sixth, **there are multiple similar datasets collected by the other departments, particularly the Ministry of Finance, Planning and Economic Development and UBOS**. It is possible that the head teachers' pay more attention to the instrument from government departments (especially the MFPED) than the ASC, since MFPED uses the collected data to disburse funds to different school. This not only reduces the relevancy of the EMIS data but also reduces the amount of resources available for EMIS data collection because disbursement from MoFPED is based on attendance and not enrolment and yet at the district level disbursement takes consideration of enrolment and all Schools regardless of having completed the ASC forms. The same challenge was reported about attention being given to NIRA and not the ASC. Moreover, presence of similar multiple datasets collected by government entities points to the challenge of how to effectively manage the mandate of different government entities in order to reduce duplication of efforts.

Lastly, **rapid changes in the administrative structure, mainly the formation of new districts**, hamper year-year district level comparison of performance of education learning outputs and outcome indicators collected in the ASC.

In light of the above limitations, a number of suggestions deemed important in helping to address the limitations of EMIS are listed below:

i. There is need for sensitization of Head teachers and other stakeholders on how to correctly fill the ASC questionnaires.

ii. There is need to strengthen the EMIS system byintegrating the NIRA information on Schools and introducing a module for Education financing to reduce on duplication of efforts and reducing on data collections costs.

iii. There is need to support the current EMIS by introducing modules for Education processes and Education financing mechanisms. The latter could, for example, capture detailed information on income (e.g., internally generated funds in public schools) and expenditures of education institutions. Currently, information on important aspects such as the time schools receive the capitation grant and school facilitation grant; School Management Committees (SMCs) activities; and the level of parent participation in school activities is missing in the ASC. This recommendation is in line with the 2016 National Education Accounts Report (NEA), which also recommended that the MoES should come up with guidelines requiring education institutions to regularly provide information on their income and expenditure. The same report also called for introduction of a module on education financing in the EMIS.

iv. There is need to build capacity of the MoES staff in statistics and planning sections to ensure that high quality, reliable and consistent EMIS data is collected, processed, and freely available for use for evidence-based policy analysis.

v. The MoES should come up with stringent sanctions/penalties for schools that do not participate in the ASC or return a fully filled questionnaire. In addition, the MoES should strengthen the inspection function at the district level to ensure that mandatory 3 inspections per school in a term are effected; and oblige the district planning department to participate in the administration of the ASC and clearly indicate how the collected information is integrated in the district planning processes.

2.1.1.2. National Assessment of Progress in Education (NAPE)

Uganda is one of the few African countries with a functional national assessment system. Established in 2003, the National Assessment of Progress in Education (NAPE) Program is executed by the Uganda National Examination Board (UNEB). The program uses a learning outcomes measurement framework to annually measure achievement in literacy and numeracy proficiency based on a cross-sectional, nationally representative sample of learners from the primary three (P3) and primary six (P6) grades. In 2008, the framework was extended to the senior two (S2) grade of lower secondary education for English, math, and biology. NAPE targets students in public and private schools.

The NAPE serves the following purposes: (1) supporting teachers (training, relevant materials, etc.); (2) school or educator accountability; (3) sub-national level monitoring of learning outcomes; (4) monitoring education quality levels; and (5) planning education policy reforms.

The NAPE is a low-stake assessment, administered in two ways: (1) a minor assessment is administered every year. It is comprised of written tests only; (2) a major assessment is administered every 3 years. In addition to written tests, it includes a reading component in local languages and in English, and the collection of background information for analysis. All test-takers are presented with the same cognitive booklets or tests, which are aligned with the national curriculum of each targeted grade. The NAPE accommodates students with special needs, by providing the following arrangements: - Hearing impairment: additional time, support staff, sign language interpreters - Visual impairment: braille However, only students who are enrolled in schools for children or youth with disabilities are assessed. Students with special needs who are enrolled in regular schools are not included in the assessment.

For the recent NAPE survey of 2015, P6 tests were administered to In-service teachers, Pre-service teachers and Primary Teachers' College (PTC) tutors. In-service teachers and Tutors sat for the subject areas they teach/lecture while Pre-service teachers sat for both tests. However, use of national assessment results to inform improvements in student learning remains weak. These data can nevertheless be used to search for solutions to the challenge of low-quality education in Uganda. While NAPE was established in 2003, data is only available starting with 2006.

2.1.1.3. Primary Leaving Examinations (PLE)

Examination data for P7 resultscommonly known as Uganda Primary Leaving Examinations (PLE) of the UNEB, contains information of pupil performance on four subjects (English, mathematics, science and social studies). Examination Results data is important in assessing the impact of UPE interventions on pupil learning achievements.

2.1.2. Other Secondary Data Sources

Apart from the primary secondary datasets ASC (or EMIS), NAPE and PLE, other secondary sources of evidence were used to complement these primary datasets. These include the nationally representative cross-sectional household and health and demographic; and longitudinal (or panel) surveys, conducted by the Uganda National Bureau of Statistics (UBOS); Uwezo; education sector administrative data as well as international datasets (e.g., UNESCO, World Bank & MDGs databases). UBOS's nationally representative cross-sectional household surveys (UNHS), longitudinal panel surveys (UNPS) as well as demographic and health surveys (UDHS), and population and housing census (NPHS), contain essential information on demographic and socio-economic data such as household characteristics and their spending patterns, school choices (public/private), access to education services among others. This rich information enables the analyst to take into account household and community (or regional) characteristics to describe developments in enrolment and learning achievements (e.g., examination results), impacts (e.g., development of returns to education to individuals in the wage sector), distributional impacts of public spending), cost-effectiveness of UPE interventions, and technical efficiency of the primary education system in Uganda.

2.1.2.1. Uganda National Household Surveys (UNHS)

The first household survey was the 1992/93 Integrated Household Survey (IHS), followed by UNHS for fiscal years 1999/2000, 2002/03, 2005/06, 2009/10, 2012/13, and 2016/17. The UNHS is nationally representative survey designed to allow for reliable estimation of key indicators at the national, rural-urban, regions levels and separately for 10 sub-regions.

Two-stage stratified sampling design is used. At the first stage, Enumeration Areas (EAs) are grouped by districts and rural-urban location, then drawn using Probability Proportional to Size (PPS). At the second stage, households which are the Ultimate Sampling Units are then drawn using Systematic Random Sampling. UNHS is comprised of different modules. The most relevant module for this analysis is the Socio-economic module, which collects information on household characteristics such as housing conditions, household assets, incomes, loans, household expenditure, welfare indicators, cultural participation of household members and non-crop farming enterprises. The module also collects information on individual-level characteristics of household members namely education, literacy, health status and health seeking behaviour of household members. There is also a Community Survey module focused on information about the general characteristics of the community (LC I); access to community facilities; community services and other amenities; economic infrastructure; agriculture and markets; education and health infrastructure.

2.1.2.3. Uganda National Panel Surveys (UNPS)

For almost two decades, there was paucity of panel data in Uganda, largely because most of Government programmes (e.g., PEAP programme) focused on the currently poor households. Panel data—required to track issues of poverty dynamicswas unavailable since 1999/2000.[1] However, starting with 2009/10, Government (through UBOS) launched seven-year UNPS program, presenting opportunities for understanding poverty dynamics at household level and its nexus with other human development outcomes such as education and health. Since 2009/10, five waves of panel data 2009/10 (Wave I), 2010/11 (Wave II), 2011/12 (Wave III), 2013/14 (Wave IV), and 2015/16 (Wave V) have been conducted. UNPS is carried out annually over a twelve-month period on a nationally representative sample at least 2,300

households, for the purpose of accommodating the seasonality associated with the composition of and expenditures on consumption. The survey is conducted in two visits in order to better capture agricultural outcomes associated with the two cropping seasons of the country.

The UNPS aims at producing annual estimates in key policy areas and at providing a platform for experimenting with and assessing of national policies and programs. Explicitly, the objectives of the UNPS include: (1) To provide information required for monitoring the National Development Strategy, of major programs such as National Agricultural Advisory Services (NAADS) and General Budget Support, and also to provide information to the compilation of the National Accounts (e.g. agricultural production); (2) To provide high quality nationally representative information on income dynamics at the household level and provide annual information on service delivery and consumption expenditure estimates to monitor poverty and service outcomes in interim years of other national survey efforts, such as the UNHS, UDHS and NSDS; (3) To provide a framework for low-cost experimentation with different policy interventions to e.g. reduce teacher absenteeism, improve ante- and post-natal care, or assessing the effect of agricultural input subsidies; (4) To provide a framework for policy oriented analysis and capacity building substantiated with the UGDR and support to other research which will feed into the Annual Policy Implementation Review; and (5) To facilitate randomized impact evaluations of interventions whose effects cannot currently be readily assessed through the existing system of national household surveys.[2]

Of importance to this exercise, is the fact that the UNPS tracks the same individuals over time, and therefore allows for dynamic analysis of issues related to returns to education and household welfare.

2.1.2.3. Uganda Demographic and Health Survey (UDHS)
The UDHS is conducted by the UBOS with technical assistance and funding from Macro International Inc. through MEASURE DHS, a USAID-funded project that assists developing countries to collect data on fertility, family planning, maternal and child health, and HIV/AIDS. DHS, conducted every five years, collects information on education level of household population as well as well as reasons for not attending/absenteeism.

2.1.2.4. Uganda National Population and Housing Census (NPHC)
Uganda has conducted five post-independence National Population and Housing Census (NPHC), the recent being NPHC 2014, carried out on the Night of 27th August 2014. NPHC collects demographic and socio-economic data, useful for planning and evidence-based decision making in the country. It provides information on particulars of household members, housing conditions, community services, household characteristics, and agriculture and population mortality. The data is highly disaggregated to the extent that population counts can be disaggregated by sex down to Sub-county and lower levels such as LC I (the lowest administrative unit). Information about the size of a country's population is critical for planning purposes. For instance, analysis of educational requirements, labour force projections, household composition and migration would not be complete without considering information on age and sex of the individuals. Sex and age composition of a population has significant implications for the reproductive potential, human resource, school attendance, family formation, healthcare and other aspects of service delivery.

While the impact evaluation of UPE is largely conducted at the school level, it is important to take into account household and community (or regional) characteristics. Several sources including UNHS and DHS can be used to take the differences between households and

regions into account the data obtained from these surveys make it possible to study the relation between pupil and household characteristics and school enrolment and attendance. On the other hand, census information provides important explanations for socio-economic differences between regions. In particular, census data enables one to link EMIS data up to the parish level.[3]

2.1.2.5. National Service Delivery Survey (NSDS)

UBOS has since 2000 conducted four National Service Delivery Surveys (NSDS); NSDS 2000, 2004, 2008, and 2015. The NSDS 2015 aimed at providing a comprehensive assessment of the trends in service delivery in the areas that were covered in the previous surveys, and to obtain a baseline position in the additional areas that were brought on board. The survey was conducted in all the regions of Uganda and covered the sectors of Education, Health, Agriculture, Infrastructure, Water and Sanitation, Energy, Justice, Law and Order, and Public Sector Management and Accountability. The survey establishes the availability, accessibility, cost and utilization of services and whether service recipients are satisfied with service delivery in terms of coverage, quantity and quality. In each of the sectors covered, the survey provides feedback from service recipients regarding areas where progress and positive trends in service delivery has been made. Likewise, for each area covered, the survey report also highlights areas where challenges are still being encountered. Therefore, NSDS is a good data source to check the consistency of EMIS data collected by the MoES.

2.1.2.6. Uwezo Datasets

Uwezo, meaning 'capability' in Kiswahili, is a five-year initiative that aims to improve competencies in literacy and numeracy among children aged 6-16 years old in three East African countries; Kenya, Tanzania and Uganda. The development of Uwezo Initiative was motivated by mainly three factors: (1) Governments prioritized education but children are not learning; (2) Numerous assessments undertaken, but with little impact; (3) Need for new communication channels that are increasingly powerful for civil society organizations. To this end, Uwezo uses an innovative, citizen-driven approach, to enable policy makers as well as ordinary citizens – parents, students, local communities and the public at large – to become aware of actual levels of children's literacy and numeracy, and build on that awareness to stimulate practical community and policy change across East Africa.[4] Uwezo gathers information pertinent to answering an important question of: "Are our Children Learning?", which goes beyond how many children are signed up to school (enrolment) or even how many are showing up in school (attendance), but how many of our children are learning?

Uwezo surveys are anchored on the simple notion that huge progress in school enrolment, provision of classrooms and teachers supported by significant political commitment, larger allocations of public resources, and increased parental participation (e.g., covering costs of uniforms, books and pens, extra tuition, and transport), must translate into concrete improvements in children's competencies (i.e., numeracy and literacy). The point of schooling is to enable every child to develop the knowledge and skills to enable the child to thrive in the world – starting with basic skills in literacy and numeracy that form the foundation of the ability to be curious, think, listen, ask questions, analyse, synthesize and communicate with confidence.

We used the above secondary datasets to profile the performance of education learning outputs and outcomes indicators for pre-UPE (1992/93—1995/96) and post-UPE (1997 and above).

2.1.3 Quantitative Primary Data Sources

Preliminary analysis of the EMIS and UNHS during the scoping study identified a number of inconsistencies and challenges, particularly, with respect to EMIS data as already indicated above, to an extent that if left unaddressed would bias the overall study findings. As results, there was a need to collect additional information (through a primary data exercise) at covering the district/municipal, sub county/town council, schools, parents, and UPE beneficiaries, in order to verify EMIS data and inform the main evaluation.

It is in this that the NPA carried out a Primary Schools survey (hereafter NPA schools survey) to assess effectiveness of education financing, existing financing mechanisms, parent and community contribution. The principal method for the evaluation was a nationwide quantitative and qualitative primary schools survey complemented by direct consultations with community members using diverse multi-group discussions. Specifically, the NPA schools survey aimed to:

(i)   Fill data gaps identified in the scoping studies;
(ii)   Validate the current EMIS data on schools; and
(iii)   Identify challenges experienced in the various schools

For the quantitative survey, a total of 605 (385 government and 219 private) schools were visited across the country. A sample of six (6) schools from each of the ten (10) districts (old, new and hard to reach) were selected from each of the (10) regions of the country. The study used multi-stage stratified sampling criteria to stratify the country into ten (10) regions comprising of 10 groups each composed of seven (7) members. These regions included Greater Kampala Metropolitan Areas (GKMA), Central I, central II, Western, South Western, Eastern I (Bukedi & Teso), Eastern II (Busoga), Acholi, and West Nile.

In the first stage, the country was stratified into 10 regions as used by UBOS in major surveys like UDHS, 2011. The regions include; West Nile, North, Karamoja, Eastern, East Central, Central 1, Central 2, Kampala, Western and South West. The second stage involved selecting districts from the strata identified in the first stage. A sampling frame was used to generate the districts. The districts were selected based on the following characteristics: districts that existed in the periods 1997, 2008 (NDPI baseline), and 2014 to capture old and new districts; hard to reach and stay districts; and municipality. In addition, the sub district classification was considered. For example, Eastern category took care of Teso, Bukedi, Sebei, and Bugisu. Stage three involved selecting administrative units (sub-counties/divisions) within a district. In this particular stage, a list of administrative units (rural and urban) were generated, from which 3 sub-counties and 1 division/town council were selected using systematic sampling technique and simple random sampling respectively. For Kampala District, all the divisions were considered. However, unlike for the divisions/town councils elsewhere, sampling frames were developed and selection of sampling units was the same like the sub-counties. Stage four involved selecting the sampling units using a systematic sampling technique. Firstly, the sub-county/ division schools were listed as private and public schools to provide two independent sampling frames detailing their residences, i.e. rural or urban and total enrolments. The schools were then ranked by enrolments before selecting the sampling units. Secondly, using the sampling frame, the sampling units (schools) were selected at a sampling interval of $n(n1=3) = k$; where n is the number of schools in the sampling frame and n1 is the sampling size (number of sampling units required from a sub-county sampling frame); and k in the sampling interval. The first unit was identified through simple random sampling and

the other remaining units were selected at intervals (k). Simple random sampling was used in selecting 1 private school for the exercise.

2.2. Methodology

2.2.1 Desk Document Review

A detailed literature review of appropriate documentation (i.e., government reports, research reports, and peer reviewed journal articles) on the UPE policy design, implementation and evaluation outcomes was carried out. A detailed chapter on literature review was included in the scoping study report.

Educational attainment in SSA countries has been stagnant for long time. The gross enrolment ratio (GER) in primary education was 76.1% in 1985 and, surprisingly, decreased over the following decade, reaching 73.9% in 1995 (UNESCO 1998). Since around 2000, there has been significant progress because of the introduction of UPE policy in some SSA countries. This policy abolished school fees for public primary education. However, despite Uganda adopting UPE policy in 1997, earlier than other SSA countries, UNESCO (2015) shows that Uganda's GER diminished by 18 percentage points between 1999 and 2012.

Though ample literature has examined the cost of education both for developed anddeveloping countries, studies particularly focusing on the impact of UPE in developing countries are rare. There are some important studies examining the impact of UPE in Uganda on school attendance and educational attainment (Deininger, 2003; Nishimura et al. 2008; Grogan 2009; Masuda 2016; Lamichhane and Tsujimoto, 2017). Deininger 2003 and Grogan 2009 found that UPE contributed to a dramatic increase in primary school attendance and decrease in gender, income, and region inequalities in attendance. However, Deininger 2003 also found that school fees paid by parents decreased at the primary level but not the secondary. Additionally, by using data from 940 rural households, Nishimura et al. 2008 estimated the effect of UPE policy in Uganda on primary education attainments and found that it decreased delayed enrolments and increased grade completion rates up to the fifth grade (Nishimura et al. 2008). The same study also found strong a association between UPE and girls' enrolment in school, particularly in poor households. The study also contributes to literature on the effects of UPE on educational attainment by focusing on people with disabilities (PwDs); making a significant departure from earlier studies that examined the effects of UPE on children in general or female students in Uganda. The study compares the effects of UPE on educational attainment (years of schooling and enrolment rates) of PwDs, and compares the effects between PwDs and females.

2.2.2. Descriptive analysis

Descriptive analysis which involves the cross-tabulation of different education learning outputs and outcomes by individual, household, and community characteristics – was used to build gain a better understanding of education learning outputs and outcomes. The bivariate analysis of education outcome profiles provides valuable information on the status of different education achievements in Uganda and how they have changed over time. For example, breaking down gross enrolment rates by region and by various other dimensions, helps to reveal the degree of inequality that exists in access to education and the effectiveness of various education intervention policies aimed at enhancing equitable access to education.

2.2.3.   Econometric analysis

Econometric analysis is the main tool used to assess the impact of UPE policy in terms of enrolment, delayed enrolment, education attainment, total private cost of education and economic burden of education; returns to education in terms of earnings and household consumption growth (i.e., welfare); and technical and allocative efficiency of primary schools in Uganda.[5]

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[1] Only two UNPS of 1992 and 1999/00 existed.
[2] See http://www.ubos.org/uganda-national-panel-survey/
[3] A parish is the lowest government administrative level, commonly referred to as LC.I (Local Council one).
[4] See http://www.uwezo.net/about-us/
[5] The detailed econometric methodology and results are reported in the proceeding chapters.

SECTION THREE

3.0. UNDERSTANDING EDUCATION LEARNING OUTPUTS AND OUTCOME INDICATORS

3.1. Introduction

Uganda's Government introduced free primary education for four children per household in 1997 and Universal Primary Education in 2000, which gave an enormous boost to enrolments and necessitated substantial investments in primary education sub-sector, specifically in areas of teacher recruitment, teacher training, infrastructure (mainly classrooms) and provision of instructional (mainly books), in order to keep pace with this growth in enrolment. Sixteen years down the road, it is rational to ask: (1) what way have school access (for example, attendance) and learning achievement developed since 2000? and (2) What were the main determinants of these developments?

Education indicators used to monitor education access and learning achievements in Uganda as well as in partner states, can broadly be grouped into: Quality indicators (e.g., qualifications of primary school teachers, pupil teacher ratios, pupil textbook ratios); Access indicators (e.g., gross and net) intake rates, (gross and net) enrolment ratios, attendance, absenteeism, and dropout rates); Efficiency (internal) indicators (e.g., repetition rates, progression rates, completion rates); and Learning achievement indicators (e.g., literacy, numeracy, primary school leaving exams). Both access and learning achievement indicators can be monitored for different groups of pupils (including male/female) and across regions.

This chapter outlines the results of these investments, (mainly) for the years 2006-2015. Section 3.2 focuses on investments in teachers, teaching materials and school infrastructure. Sections 3.3 and 3.4 describe the development of enrolment and learning achievement respectively. The analysis in Section 3.4 is based on PLE and NAPE datasets, Uwezo data and other internationally available information on numeracy and literacy in Uganda. Section 3.5 ends with a brief summary and a few conclusions.

3.2. Outputs: Teachers, Classrooms and Instruction Materials

3.2.1. Teachers

The introduction of free primary education gave an enormous boost to enrolment and this necessitated new investment. It was essential that the number of teachers, classrooms and books kept pace with this growth in enrolment. The recruitment of primary teachers is a responsibility of district service commission. Ever since UPE was introduced, the number of teachers has been increasing and so are the teacher training institutions. Most of the teacher training institutions are owned by the government with a few owned by various religious institutions and private individuals.

Table 3-1 shows the number of teachers (both in private and government schools) by their qualifications. Majority of the teachers (65% and above each year) have attained a qualification of Grade III, which is the minimum level of professional teacher qualification in primary education. Overall, Grade III, DPE, Grade V, Licensed, and Graduate teachers comprise over 94% of the teachers, an indication that the majority of teachers in Uganda are qualified with the minimum required standards.

The big number of Grade III teachers highlights the need for more resources in Primary Teacher Training Colleges (PTTC) in order to improve on the quality of their products. Majority of the teachers are employed by the government. However, the number of teachers employed by the private sector has been increasing rapidly over the years at a much higher rate compared to those employed by the government. Between 2006 and 2015, the number of teachers employed in private schools increased by 156% compared to only 1.6% for government schools.

Table 3-1: Number of Teachers by qualifications, 2006-2015

Year	Diploma	Grade II	Grade III	Grade IV	Grade V	Graduate	Licensed	Others	Total	%(Grade III/Total)
2006	19,527	2,229	97,720	1,662	7,128	2,636	13,303	1,115	145,320	67.2%
2007	22,362	2,094	98,812	1,788	7,125	2,978	9,609	1,179	145,947	67.7%
2008	24,451	2,075	103,388	2,315	7,332	3,431	8,027	1,418	152,437	67.8%
2009	27,830	2,126	107,465	2,581	7,626	4,175	7,358	1,665	160,826	66.8%
2010	28,842	2,318	109,067	2,466	8,082	4,635	6,942	1,784	164,136	66.4%
2011	26,862	1,797	104,808	2,902	8,776	4,527	4,978	1,386	156,036	67.2%
2012	27,769	2,230	113,623	3,048	9,709	5,400	7,086	1,770	170,635	66.6%
2013	27,568	2,320	115,535	3,396	9,923	5,757	7,324	2,188	174,011	66.4%
2014	27,850	2,246	117,774	2,950	9,907	5,899	7,229	2,118	175,973	66.9%
2015	27,392	4,097	110,810	3,102	9,828	6,129	7,782	2,621	171,761	64.5%

Source: NPA calculations based on EMIS database

Majority of Ugandan teachers are employed by the government (Table 3-2). However, the number of teachers employed by the private sector is increasing every year at a much higher rate compared to those employed by the government. Between 2006 and 2015, the number of teachers employed in private schools increased by 156% compared to only 1.6% for government schools.

Table 3-2: Teachers According to school Ownership

Year	Government	Private	Total
2006	124,134	21,186	145,320
2007	124,114	21,833	145,947
2008	123,623	28,814	152,437
2009	125,558	35,268	160,826
2010	124,883	39,253	164,136
2011	123,032	33,004	156,036
2012	128,947	41,688	170,635
2013	125,823	48,188	174,011
2014	128,514	47,459	175,973

2015	123,113	48,648	171,761

Source: NPA calculations based on EMIS database

While gender inequality in pupil enrolment has been eliminated, it remains a challenge in teacher recruitment in both private and public schools. Table **3-3**shows that the number of male teachers more than doubles their female counterparts regardless of the employer, and the situation has not improved much over the last 10 years, highlighting the need for more efforts to increase the number of female teachers.

Table 3-3: Teachers by Gender (2006-2015)

Year	Female				Male		
	Private	Government	Total		Private	Government	Total
2006	9,576	47,019	56,595		11,610	77,115	88,725
2007	9,973	47,328	57,301		11,860	76,786	88,646
2008	13,075	47,485	60,560		15,739	76,138	91,877
2009	15,752	49,066	64,818		19,516	76,492	96,008
2010	17,598	49,398	66,996		21,655	75,485	97,140
2011	14,374	48,768	63,142		18,630	74,264	92,894
2012	18,427	51,900	70,327		23,261	77,047	100,308
2013	21,353	51,006	72,359		26,835	74,817	101,652
2014	20,960	52,481	73,441		26,499	76,033	102,532
2015	21,309	50,813	72,122		27,339	72,300	99,639

Source: NPA calculations based on EMIS database

Uganda continues to experience increase in enrolment growth and hence recruiting, training, and retaining a sufficient number of teachers (both male and female) is paramount and remains a challenge mainly in public schools.

3.2.2. Infrastructure

The rapid enrolment growth necessitated an increase in the number of schools and classrooms in 1996 there were 7,351 primary schools, and as of 2015 it was estimated at 22,600, and approximately 63.7 per cent of these were government owned/aided schools. Moreover, the increase in enrolment and the number of teachers also required large investments in infrastructure. Many new classrooms, pit latrines and teachers' houses were needed. In 2000, 10% of all pupils did not have a seat and 25% had no desk (Byammugisha and Ssenabulya, 2005, p. 117). The ministry set targets for classrooms, latrines and teacher houses in the context of the ESIP. The target for the number of classrooms was determined by the classroom pupil ratio and is based on a maximum of 54 pupils in one classroom. Each new classroom built is furnished with eighteen three-seater desks.19 The target for the number of latrines is set by the latrine pupil ratio and cannot be higher than 40 pupils per latrine. The target for teachers' houses is set at four per school (IOB, 2008, p.64).

The government established a conditional grant (the School Facilities Grant (SFG)) to finance the infrastructure expansion. This grant was created to assist the neediest communities in acquiring school furniture and building new classrooms, latrines (with doors, for girls and boys) and teachers' houses. The grant prioritizes poorest schools and is gender aware as it rewards schools with 48% or more girls' enrolment. SFG funding is channelled through the districts/municipalities and utilised strictly in accordance with the SFG guidelines.

3.2.2.1 Classrooms

As a result of a coherent and targeted government strategy to invest in UPE schools, the number of classrooms has increased from 40,000 in 1996 to 149,000 in 2014 (Namukwaya and Kibirige, 2014; MoES, 2014). Between 2006 and 2014, the total number of classrooms increased by 46% as a result of the continued construction of classrooms under the SFG. However, this is lower than the 60% increase in the number of classrooms built between 2000 and 2005 (see IOB, 2008, p.65), reflecting the significant pressure on infrastructure needs immediately after introduction of UPE. This was mainly due to high enrolments rates experienced during the same period of 2000-2006.

Figure 3-1 illustrates this development. It also shows that the majority of growth in classrooms can be attributed to growth in classrooms by private schools. The growth rate in the number of classrooms for government schools has been slow, and in fact declining, yet classrooms built in the early 2000s are getting old and others already dilapidated and in need of replacement. For example, the total number of classrooms reduced from 14,591 in 2014 to 131,325 classrooms in 2015.

Figure 3-1: Classrooms, 2006-2014

Classrooms (x 1,000)	2006	2007	2008	2009	2010	2011	2012	2013	2014
■ Private	17	19	26	30	38	35	39	44	46
■ Govt	86	86	88	92	107	108	106	105	103
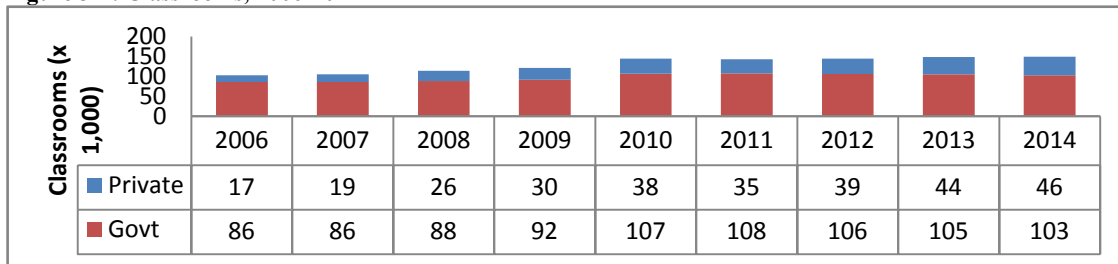
Source: NPA calculations based on EMIS database

3.2.3. Pupil teacher ratios and Pupil Classroom Ratios

Recruitment of new teachers and building of new classrooms were not only necessary to cope with the increase in enrolments, but also aimed at reducing high pupil teacher ratios (PTR) and pupil classroom ratios (PCR). Evidence suggests that this policy has been successful. Figure 3-2 shows that both ratios have improved steadily through the years. The PTR declined from 48:1 in 2006 to 43:1 in 2015. In the same period, the PCR declined from 72:1 to 63:1. However, this performance is much lower compared to what recorded between 2000 and 2006. For example, PTR declined from 60:1 in 2000 to 48:1 in 2006. In the same period, the PCR declined from 110:1 to 71:1. Again, the better performance in earlier years of UPE is a reflection of perhaps stronger government efforts in terms of education sector financing.

Figure 3-2: Pupil teacher ratios and pupil classroom ratios (2006-2015)
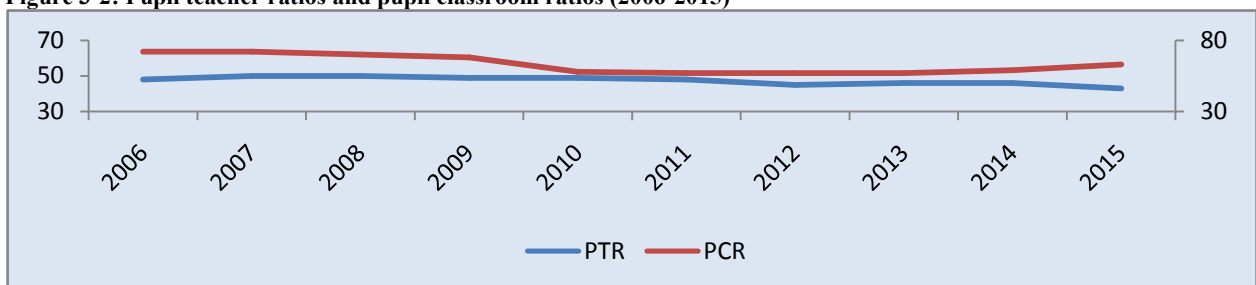
Source: NPA calculations based on EMIS database

The PTR and PCR are high in government schools compared to private schools **(seeFigure 3-3 and 3-4**. This canmajorly be attributed to the fact that there are more pupils in government schools than private schools; however, this may have an impact on pupil performance. For instance, a small pupil classroom ratio implies that the pupils can easily be monitored by the teacher and thus tend to concentrate more than the case of high PCR. This fact could partly explain why private schools perform better than government schools.

Figure 3-3: Pupil teacher ratios and pupil classroom, Government schools
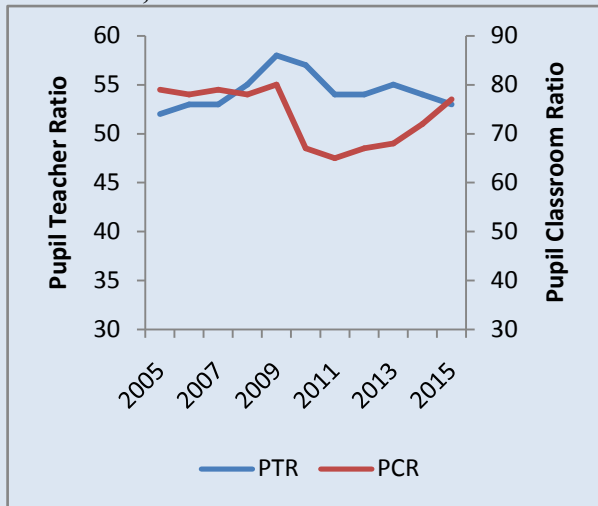
Figure 3-4: Pupil teacher ratios and pupil classroom, Private schools
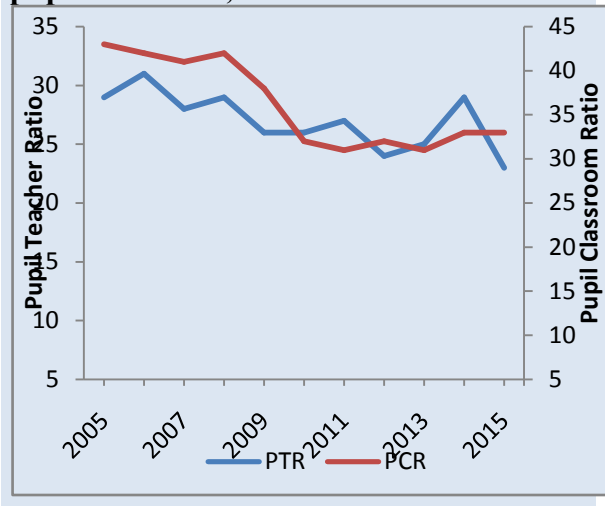
Source: NPA calculations based on EMIS database

However, there are large differences between regions (see Figure 3-5). The relatively low pupil teacher ratio in the Buganda region may be attributed to the high number of private schools in the greater Kampala region (i.e., districts of Kampala, Wakiso and Mukono).

Figure 3-5: Pupil teacher ratios and pupil classroom ratios by region (2015)
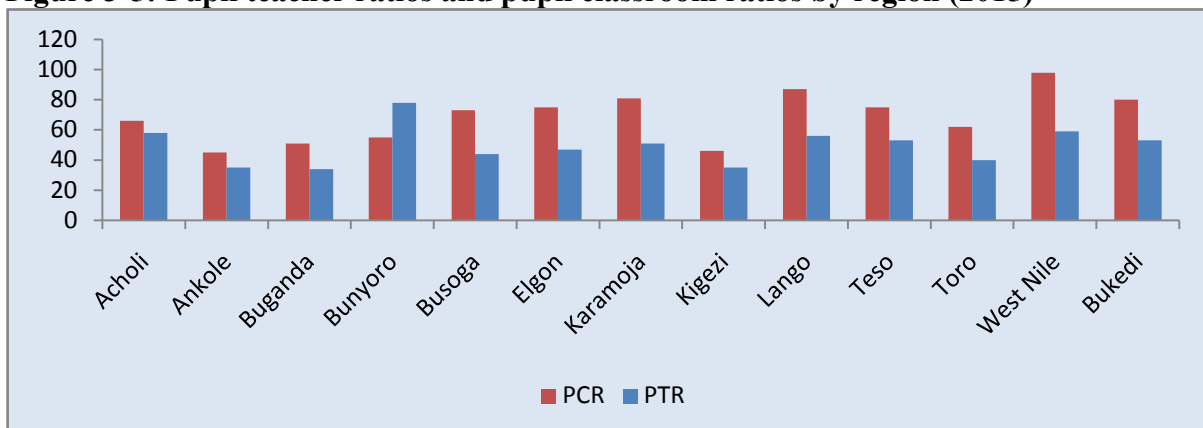
Source: NPA calculations based on EMIS database

3.2.4. Distance

Between 2006 and 2015, the number of (primary) schools increased from 11,512 to 18,887, while the total number of government schools increased from 9,783 to 12,159. The increase in the number of schools reduced the average distance pupils had to walk to school. School

census data contains information on the distance to the nearest primary school. **Table 3-4Table 3-4: Distances to Nearest Primary School (2006-2015)** shows the development of the average distance to the nearest school 2006 and 2015. According to these figures, the average distance has decreased by approximately 22-23% (northern) to 32-33% (eastern).

UNHS 2012/13 contain information on distances to day schools. Information on the distance to the school was collected for all persons that were attending a day school at the time of the survey. Overall, 77% of the persons attending day primary school travelled less than 3 kilometres to school. Compared to 2009/10, there was an increase in the percentage of persons attending school within a radius of 3 kilometres from their homes from 73% to 77%. In urban areas 83% of children travelled less than 3 kilometres compared to 76% in rural areas. Regional differences have decreased, with about 70% of children in Central, Northern and Western travelling less than 3 kilometres. Partly as a result of these distances, fewer parents (2.8% in 2015 compared to 5.5% in 2009/10) reported "school too far" as the main reason for children aged 6-12 years not attending school.

Table 3-4: Distances to Nearest Primary School (2006-2015)

		<1km	1-2km	2-3km	3-4km	4-5km	>5km
Kampala	2006	17%	2%	1%	0%	0%	79%
	2015	16%	3%	1%	1%	1%	78%
Central	2006	31%	16%	11%	7%	6%	29%
	2015	32%	13%	7%	5%	6%	36%
Eastern	2006	33%	24%	15%	8%	4%	17%
	2015	33%	18%	10%	6%	3%	30%
Northern	2006	23%	21%	20%	15%	11%	11%
	2015	23%	18%	17%	12%	10%	21%
Western	2006	32%	20%	15%	9%	8%	17%
	2015	32%	17%	10%	7%	7%	26%

Source: NPA calculations based on EMIS database

3.2.5 Instructional Materials

The high increase in enrolment necessitated new instructional materials for primary schools and Primary Teachers' Colleges (PTCs). These instructional materials included textbooks, teachers' guides, supplementary reading and curriculum support materials, essential reference books (atlases and dictionaries), teachers' pedagogical support materials and teaching and learning aids (non-textbook materials). A proportion of UPE capitation grants (35%) is set aside for schools to purchase supplementary materials (mainly supplementary readers, teacher reference books, wall charts, chalk, blackboards, etc.) in line with established UPE capitation grant expenditure guidelines. Apart from these grants, resources are made available through the government recurrent budget for bulk purchases of these materials. The Instructional Materials Unit (IMU) coordinates these purchases.

The price of textbooks was a problem in Uganda. Textbook publishing, printing and distribution was a (poorly performing) state monopoly (Ward, Penny and Read, 2006, p. 57). In 2000, the government of Uganda implemented the Instructional Materials Reform Programme, resulting in more user-friendly and cost-effective methods of procuring and delivering the necessary instructional materials. The printing and publishing industry was liberalised and most instructional materials are now locally published and printed. Schools are actively involved in decision-making at various stages of the textbook procurement

process. The participatory approach has allowed better utilisation of instructional resources (IOB, 2008).

The development of the number of textbooks is calculated on the basis of the EMIS database and MoES publications. Data is available on ten subjects; Agriculture, English, Integrated Production Skills, Kiswahili, Local Language, Mathematics, Performing Arts & Physical Education, Religious Studies, Science, and Social Studies. **Table 3-6 shows the number of textbooks for the main subjects** (English, mathematics, science and social studies), and others subjects (grouped together).

Between 2006 and 2015, the number of textbooks for the four main subjects declined by 32%. Other subjects saw an increase of 57% mainly due an increase in textbooks for Local languages (which increased by 238%). Overall, the total number of textbooks for all subjects declined by 18% from 12.8 million books to 10.5 million books over the period (**Table 3-5**).

Table 3-5: Textbooks for four subjects (2006-2015; millions)

Row Labels	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
English	2.9	2.8	2.6	2.8	2.9	2.8	2.8	2.8	2.7	2.7
Mathematics	2.8	2.8	2.6	2.6	2.7	2.6	2.6	2.5	2.3	2.1
Science	2.6	2.6	2.4	2.4	2.2	1.9	1.8	1.7	1.5	1.3
Social Studies	2.3	2.3	2.2	2.1	1.9	1.7	1.6	1.5	1.3	1.2
Sub-Total	**10.7**	**10.5**	**9.7**	**9.9**	**9.7**	**9.0**	**8.7**	**8.4**	**7.8**	**7.3**
Other subjects	2.1	2.2	2.0	2.2	2.4	2.3	2.4	2.6	2.9	3.3
Grand Total	**12.8**	**12.6**	**11.7**	**12.2**	**12.0**	**11.4**	**11.2**	**11.0**	**10.8**	**10.5**

Source: NPA calculations based on EMIS database

The trend for 2006-2015 is the reverse of the trend observed between 2000 and 2005, where the number of textbooks for the main subjects increased almost 60%, from 6.6 million to 10.3 million (**Table 3-6**). This resulted in pupils' improved access to textbooks. The number of teacher guides on these subjects increased proportional to the number of teachers, from 640,000 to 820,000 (see IOB, 2008).

Table 3-6: Textbooks for four subjects (2000-2005; millions)

	2000	2001	2002	2003	2004	2005
English Mathematics	2.0	2.3	2.4	2.6	2.7	2.8
Science	1.7	1.9	2.2	2.3	2.7	2.7
Social studies	1.7	1.9	2.1	2.1	2.5	2.5
Total	1.2	1.4	1.6	1.9	2.1	2.2
	6.6	7.5	8.2	8.9	10.0	10.3

Source: IOB (2008), Table 4.4

3.3. Outcomes: Access

Section 3.2 focused on investments in teachers, classrooms and instructional materials between 2006 and 2015. This and the following sections evaluate the various results in terms of outcomes: the effects on access and learning achievement. Section 3.3.1 briefly describes

developments in Early Childhood Development (ECD). This is followed by developments in enrolment (3.3.2) and enrolment rates (4.3.3), Attendance (3.3.4), retention, dropout, and progression rates (3.3.4).

3.3.1. Early Childhood Development

As noted before, in Uganda, pre-school for nursery schooling and other preparatory courses (that is Early Childhood Development education) is not part of the official government education system is usually governed in private schools. However, the government of Uganda through the Ministry of Education and Sports has the mandate of ensuring that all pre-primary school going children have access and equal opportunity to education, regardless of their social class, ethnicity, background or physical disabilities. Indeed, the education sector (through the ASC) annually tracks progress towards ECD access and equity through 6 indicators; Number of schools, Enrolment, GER, NER, GIR NIR and Regional Distribution of ECD Centers.

In recent years, Uganda has witnessed a rapid increase in ECD centres. For instance, as of 2010, there were a total of 6,579 ECD centres, the majority, and 5,347 (81.3%) were nursery schools, followed by community-based centres totalling to 1,098 centres (16.7%). Home based centres comprised a total of 85 centers (1.3%) while day care centers comprised the least share of only 49 centers (0.7%) (MoES, 2010). However, ECD's reduced to 5,736 in 2015, an indication that possibly some of the ECD centres upgraded to primary level. Therefore, while not the focus of analysis in this report (see details in MoES, 2016), ECD is a crucial component of effective primary education system. Available evidence shows that at pre-primary education level however, both access and quality are low with enrolment currently standing at 9.5% implying a 90.5% gap (EMIS 2014). An NPA report argues that a weak policy framework, limited access and low quality constitute three main concerns of pre-primary education in Uganda. It recommends that government should take over critical functions like teacher training by integrating the training of pre-primary teachers into the Primary Teacher Colleges (PTCs) curriculum development and policy formulation; (ii) Formulate and enforce national service delivery standards for pre-primary education and (iii) in areas that are least served by the private sector, government should attach a pre-school class for children aged 4-5. This will be budget neutral since they are already enrolled into the primary education system which is free and compulsory.

3.3.2. Enrolment

The introduction of UPE has contributed to a more than threefold increase in total primary school enrolment from 2.7 million in 1996 to 8.3 million in 2015, making the Government the main provider of primary education in 2015, government schools had a total enrolment of 6.85 million pupils compared to 1.42 million pupils in private schools (**Table 3-7**).

Table 3-7: Primary school enrolment by ownership (x 1,000) -2006-2016)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Government schools	**6,610**	**6,669**	**6,778**	**6,872**	**7,186**	**7,172**	**7,037**	**7,080**	**7,090**	**7,061**	**6,848**
Boys	3,337	3,346	3,402	3,444	3,596	3,583	3,513	3,539	3,542	3,532	3,425
Girls	3,273	3,323	3,375	3,428	3,590	3,588	3,524	3,541	3,548	3,529	3,423
Private schools	**602**	**688**	**760**	**1,092**	**1,112**	**1,203**	**1,062**	**1,248**	**1,369**	**1,711**	**1,416**
Boys	299	344	377	544	554	596	527	619	677	846	697
Girls	302	344	383	549	558	607	535	629	692	866	719

| Total Enrolment | 7,211 | 7,357 | 7,538 | 7,964 | 8,298 | 8,375 | 8,098 | 8,329 | 8,459 | 8,773 | 8,264 |

Source: NPA calculations based on EMIS database

Evidence suggests that UPE, together with government measures to further the education of girls, has achieved gender parity in primary education. The proportion of females in the total enrolment increased from 45.4% in 1995 to 49.8% in 2006, and equality was achieved in 2009 (seeFigure 3-6), six years earlier than the MDG target year of 2015.

Figure 3-6: Male and Female enrolment (2006-2015)
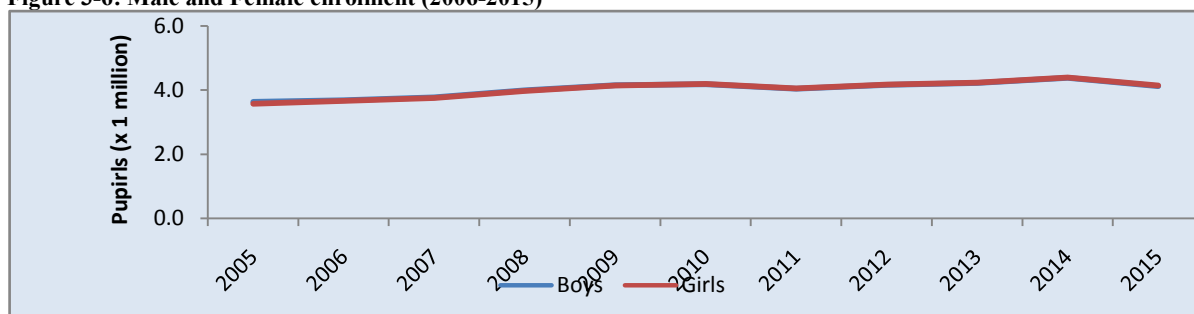
Source: NPA calculations based on EMIS database

Similarly, rural/urban differences and regional differences in enrolment have also reduced significantly. Majority of pupils in government schools are from rural areas compared to those in private schools, which are predominantly located in urban areas (**Table 3-8**)

Table 3-8: Enrolment by Location and Ownership

Year	Rural			Urban			
	Government	Private	Rural Total	Government	Private	Urban Total	Grand Total
2006	4,983,715	202,109	5,185,824	966,587	302,859	1,269,446	6,455,270
2007	5,275,075	209,133	5,484,208	1,015,194	312,682	1,327,876	6,812,084
2008	5,194,222	192,219	5,386,441	981,032	318,849	1,299,881	6,686,322
2009	5,513,054	358,427	5,871,481	1,060,245	446,891	1,507,136	7,378,617
2010	5,507,590	410,248	5,917,838	1,160,214	516,522	1,676,736	7,594,574
2011	5,428,603	398,953	5,827,556	1,197,441	503,774	1,701,215	7,528,771
2012	5,762,700	639,856	6,402,556	1,279,212	645,583	1,924,795	8,327,351
2013	5,775,063	674,748	6,449,811	1,277,558	730,820	2,008,378	8,458,189
2014	5,639,029	712,311	6,351,340	1,265,342	709,473	1,974,815	8,326,155
2015	5,508,323	778,668	6,286,991	1,338,088	638,855	1,976,943	8,263,934

Source: NPA calculations based onEMIS database

While enrolment in government schools has remained relatively constant in the range of 7 million pupils between 2006 and 2015, it has instead more than doubled in private schools for the same period. In 2015, Uganda registered a total of 1,770,971 (government schools: 83.5 per cent; private schools: 16.5 per cent) P1 new entrants representing a 22.6 per cent increase from 1,444,028 (government schools: 91.3 per cent; private schools: 8.7 per cent) in 2006. Going by age, the biggest number of new entrants (52.8%) is above 6 years whereas 42.8% of pupils are 6 years, which is the official government, recognized age of primary school entry, highlighting the fact that one-time increases in enrolment experienced between 1997 and 2003 have phased out.[2] Indeed, this can be seen in slight decline in total enrolment, amounting to 7.2 million in 2005 and 2006. A similar declining trend observed for the period 2006-2015 is therefore consistent with the large increase in the first decade of UPE policy implementation.

While in absolute terms the number of new entrants to government schools is larger than that of private schools, it is the reverse in relative terms. Growth rate of new entrants to P1 in private schools is almost 11 times bigger (132.2 per cent compared to 12.2 per cent) that of government schools. This trend in enrolment and new entrants in private schools could partly be a reflection of poor quality of education in government schools that is forcing parents to change their preferences for public schools in favour of high-quality education private schools.

With the exception of the Buganda region (which is includes highly urbanised areas of Kampala, Wakiso and Mukono districts), there seem to be no major regional differences in the number of new entrants to P1 (Figure 3-7

Figure 3-7: New Entrants to P1 (2006-2015)
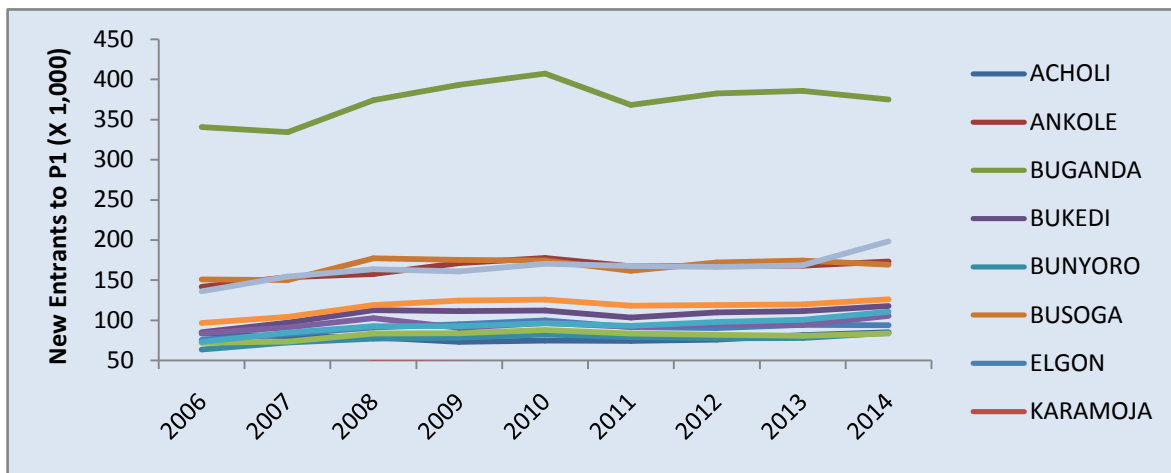
Source: NPA calculations based onEMIS database

This partly explains why, net enrolment in primary school is still less than 100 per cent (see Section 4.3.2). Other strong reasons why children never attended school include cost of education, need to help at home and indifference to education. Indeed, studies suggest that financial constraints remain the most prominent factor explaining both non-enrolment and high dropout rates (Mpyangu, Ochen, Onyango, & Lubaale, 2014). This reflects high out-of-pocket household expenses on scholastic and non-scholastic materials such stationary, meals and uniforms (see Chapter 5). Socioeconomic status, sometimes long distances to school, and obligations towards the family business or farm is major factors explaining primary school dropout rates (Tamusuza, 2011).

The number of pupils repeating a class remains has declined overtime from 13.7% in 2006 to 7.2% in 2015. Nonetheless, this rate remains high, more so in the relation to the automatic promotion policy under UPE. There is need for policy intervention to curb this problem. Large numbers of repeater exacerbate the already relatively high pupil teacher ratio and pupil class room ratio.

3.3.3. Enrolment rates

Gross primary school enrolment remains above 120%, implying that there are more primary school pupils than there are children of official school-going age. This highlights challenges such as late entry, re-entry and grade repetition. The net school enrolment ratio (NER) — which measures the share of children of school-going age who are attending school, increased from 53 per cent in 1990 to 57 per cent by 1996 and then to 87 per cent with the introduction

of UPE in 1997. The NER has remained above 80 per cent ever since reaching 91 per cent in 2015 (**Table 3-9**)

Table 3-9: Enrolment rates (2006-2015)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GER	107.8%	114.4%	113.1%	115.7%	133.3%	128.0%	117.7%	115.4%	111.8%	117.0%	109.0%
Boys	108.8%	117.8%	116.5%	118.8%	134.1%	128.3%	117.9%	115.6%	111.7%	117.0%	107.0%
Girls	106.8%	111.2%	109.9%	113.0%	132.5%	127.6%	117.6%	115.2%	112.0%	118.0%	111.0%
NER	93.0%	92.0%	93.3%	95.0%	96.1%	96.0%	97.5%	95.7%	95.3%	97.0%	91.0%
Boys	93.6%	94.1%	95.0%	96.9%	97.4%	95.6%	97.1%	95.2%	94.6%	96.0%	89.0%
Girls	92.4%	90.1%	91.4%	93.1%	94.7%	96.4%	97.9%	96.1%	96.0%	98.0%	93.0%
GIR	152.8%	129.2%	128.5%	137.1%	168.1%	160.6%	140.1%	133.5%	131.3%	148.0%	152.0%
Boys	156.0%	133.3%	132.5%	140.9%	166.8%	162.3%	142.0%	135.1%	132.7%	149.0%	150.0%
Girls	149.7%	125.4%	124.7%	133.5%	167.5%	159.0%	138.2%	131.5%	129.9%	147.0%	155.0%
NIR	56.0%	56.0%	57.4%	59.0%	60.6%	62.0%	63.9%	60.4%	59.8%	59.0%	65.0%
Boys	55.6%	57.0%	58.0%	59.3%	60.6%	61.9%	63.9%	59.9%	59.9%	58.0%	63.0%
Girls	57.0%	56.0%	56.9%	58.8%	60.8%	62.1%	64.0%	60.8%	60.3%	60.0%	68.0%

Source: NPA calculations based onEMIS database

3.3.4. Attendance

Non-attendance of pupils is one of the main problems in primary education in Uganda, yet there is scanty data on school attendance — *the actual number of pupils actually in school on a daily basis*.[3] Non-attendance may be attributed to a number of factors ranging from socioeconomic status (e.g., poverty levels); sickness; long distances to school; and obligations towards the family business or farm among others. Lack of sanitary pads for girls is also significant factor for non-attendance. Moreover, teacher absenteeism and lack of school feeding programmes also feature as other big contributors to student non-attendance.

For instance, available evidence suggests that feeding children at school stimulates increased enrolments and school attendance rates and thereby, reducing absenteeism. Poverty being a key issue in the community, children often experience inability to eat lunch at school. Considering also that many schools in the countryside are far from each other, children whose parents are unable to provide lunch tends to drop out faster. Evidence shows that schools with functional feeding programmes have significantly enhanced the possibilities of retention of children in school (Mpyangu, Ochen, Onyango, & Lubaale, 2014). The NPA school survey of 2017 found similar evidence. For example, areas like Karamoja sub-region (which frequently experience periodic droughts leading to rampant food shortages) have one of the lowest enrolments and attendance rates in the country.

School feeding programmes are usually undertaken as a strategy to increase access and participation of children in primary education. In Uganda, the UPE policy gives the responsibility of feeding children at school to the parents. There is a wide consensus among parents, communities, technical people (in the field of education such as the District education officers and inspectors of schools) and policy makers that feeding children at school reduces non-attendance and dropout rates. However, the feeding programme policy has not been generally successful in meeting its objective. For instance, evidence from the NPA UPE 2017 survey indicates that while feeding requires payments in all regions of Uganda, it remains a small share (19.5%—urban schools:72.4% compared to rural schools:

65.4%) compared to other expenses such as school fees (40.8%), and scholastic materials-including uniforms (27.7%), that parents pay for in public schools. School feeding costs range between UGX 500 and UGX 500,000 per pupil termly; although on average parents pay UGX 10,000 to cover school feeding costs per term (NPA UPE 2017 survey).

There are marked regional disparities in feeding charges. The regions of Karamoja, Central II West, and Busoga incur feeding charges of less than UGX 40,000 compared to other regions (mainly the Acholi region) where charges are way above UGX 40,000. The positive effects of feeding programmes of Non-Governmental Organizations (NGOs) interventions like World Food Programme (WFP) explain low feeding charges in the Karamoja region while effects of drought in the Acholi region are responsible for the high feeding charges.

Consequently, the rampant pupil absenteeism in the country is partly attributed to lack of institutionalized school feeding program. Efforts to instutionalise the policy are constrained by environmental factors (e.g., drought) and low household income. NGOs play an important role towards subsidizing feeding children at school, mainly in the Karamoja region.

3.3.5.   Retention, Dropout and Completion Rates

The focus of UPE is not only on enrolment but to enable children, especially girls, to start school on time, complete a full cycle of quality primary schooling and achieve the required proficiency levels. Uganda has made considerable progress improving progression rates through primary school. Evidence from UNHS data shows that gross primary completion rate, that is, the number of pupils in the final year of primary school as a percentage of all 12 year-olds, increased from 49 per cent in 2002 to 72 per cent in 2014/15. Furthermore, the previously large gap in completion rates between girls and boys has been eliminated (**Table 3-10**).

Table 3-10: Gross primary completion rate by gender (2006-2013)

	2006	2010	2013
Gross primary completion rate[1]	48%	54%	67%
Boys	55%	56%	67%
Girls	42%	51%	67%
Net completion rate[2]	6%	5%	9%
Boys	5%	3%	10%
Girls	7%	7%	7%

Sources: Ministry of Education and Sports(2013) and (2015); Notes: [1]refers to the number of candidates in the primary-school leaving exam as a percentage of the total number of 12 year olds; [2]refers to the proportion of 13 year olds who have at least completed P7.

A cohort analysis of ASC data—shows how cohorts that enrol at primary 1 pass through the seven grades of primary education—shows that other factors remaining constant, of the 1,488,434 pupils who joined primary one in 2006, only 564,115 were able to complete. This represents a survival rate of only 37.9%. The majority of pupils either dropout or repeat a class(es) (**Table 3-11**).

Table 3-11: UPE Cohorts since 2006

Class	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
P1	1488434	1597922	1530029	1659543	1690350	1652410	1877539	1883433	1834703	1841955
P2	1026912	1073095	1084621	1172210	1181515	1157885	1283899	1307507	1276829	1277897
P3	1045854	1099585	1068309	1208155	1195279	1166730	1291083	1312369	1291417	1283133

P4	926085	994443	984366	<mark>1081364</mark>	1189149	1192595	1299762	1317093	1292529	1272456
P5	820109	868048	855423	950445	<mark>991221</mark>	1015130	1118743	1138534	1120228	1101645
P6	701195	720439	697818	778681	812213	<mark>815489</mark>	892210	919916	915245	901897
P7	446681	458552	465756	528219	534847	528532	<mark>564115</mark>	579337	595204	584951

Source: NPA calculations based onEMIS 2006-2015 database

Figure 3-8 shows the trend in completion and dropout rates based on the enrolment at P1.

Figure 3-8: Trend Analysis of UPE Cohort since 2006
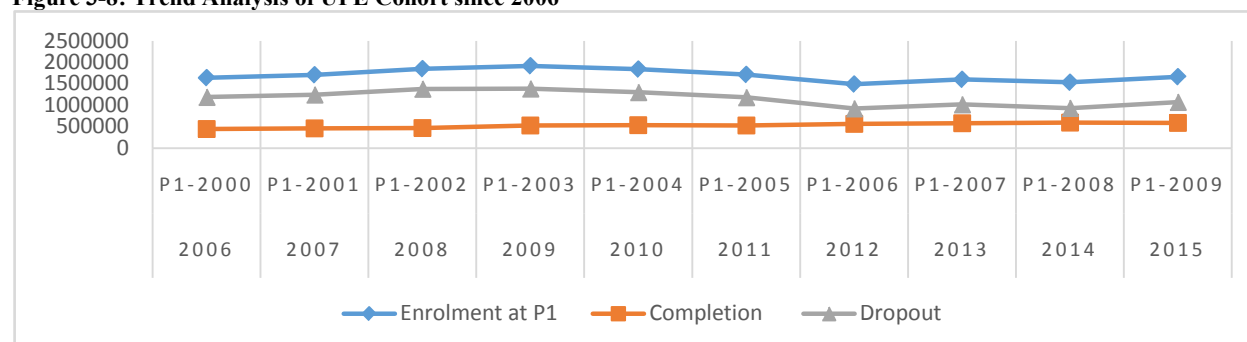
Source: NPA calculations based onEMIS 2006-2015 database

The low completion rate reflects persistently high-class repetition and dropout rates. For example, looking at the number of pupils in P7 and those who complete the cycle up to p7, one observes that completion rates at p7 are still very low (less than 50%) and yet the dropout rates are very high above 60% (see **Table 3-12**), which can be attributed to factors both on the supply-side (the quality of schools) and the demand-side (such as economic obligations, parental attitudes to education and early marriages), all of which have negative effects for the quality of education.

Table 3-12: Dropout and completion rates

Year	Enrolment	Cohorts	completed P7	Completion Rate	Dropout Rate
2006	6,455,270	P1-2000	446,681	27.3%	72.7%
2007	6,812,084	P1-2001	458,552	26.9%	73.1%
2008	6,686,322	P1-2002	465,756	25.2%	74.8%
2009	7,378,617	P1-2003	528,219	27.6%	72.4%
2010	7,594,574	P1-2004	534,847	29.1%	70.9%
2011	7,528,771	P1-2005	528,532	30.9%	69.1%
2012	8,327,351	P1-2006	564,115	37.9%	62.1%
2013	8,458,189	P1-2007	579,337	36.3%	63.7%
2014	8,326,155	P1-2008	595,204	38.9%	61.1%
2015	8,263,934	P1-2009	584,951	35.3%	64.8%

Source: NPA calculations based onEMIS 2006-2015 database

High dropout rates can be attributed to factors both on the supply-side (the quality of schools) and the demand-side (such as economic obligations, parental attitudes to education and early marriages), all of which have negative effects for the quality of education. The 2017 primary school survey by NPA asked head teachers, UPE beneficiaries and other stakeholders such as school management committee members, about their perceptions of what constitutes the most common reasons for pupil dropout and completion. Evidence from the survey noted transfer to other schools, loss of parents and parental decision are the major causes of drop out in the lower and upper primary levels. It further noted that loss of parents, pregnancies and

marriages as the deter pupils from completing grade 7. UBOS via the UNHS also asks heads of households the main reasons for being out of school. The principal reason is lack of money (see **Table 3-12**). This reason was mentioned by an average of 54% of the respondents. This reason appears to be more important in urban areas (59%) than in rural areas (53%). In addition, it also appears to be more important for boys (60%) than girls (49%), however, for girls, early pregnancies (10%) is an additional reason for dropout.

Despite high dropout rates being one of the main problems in primary education in Uganda, it is unfortunate that since 2002, the annual school census no longer includes information on dropout rates. Nonetheless, these figures can still be calculated based on enrolment and repetition figures from the EMIS database.

Figure 3-9: Reasons for out of school, [UNHS2013]
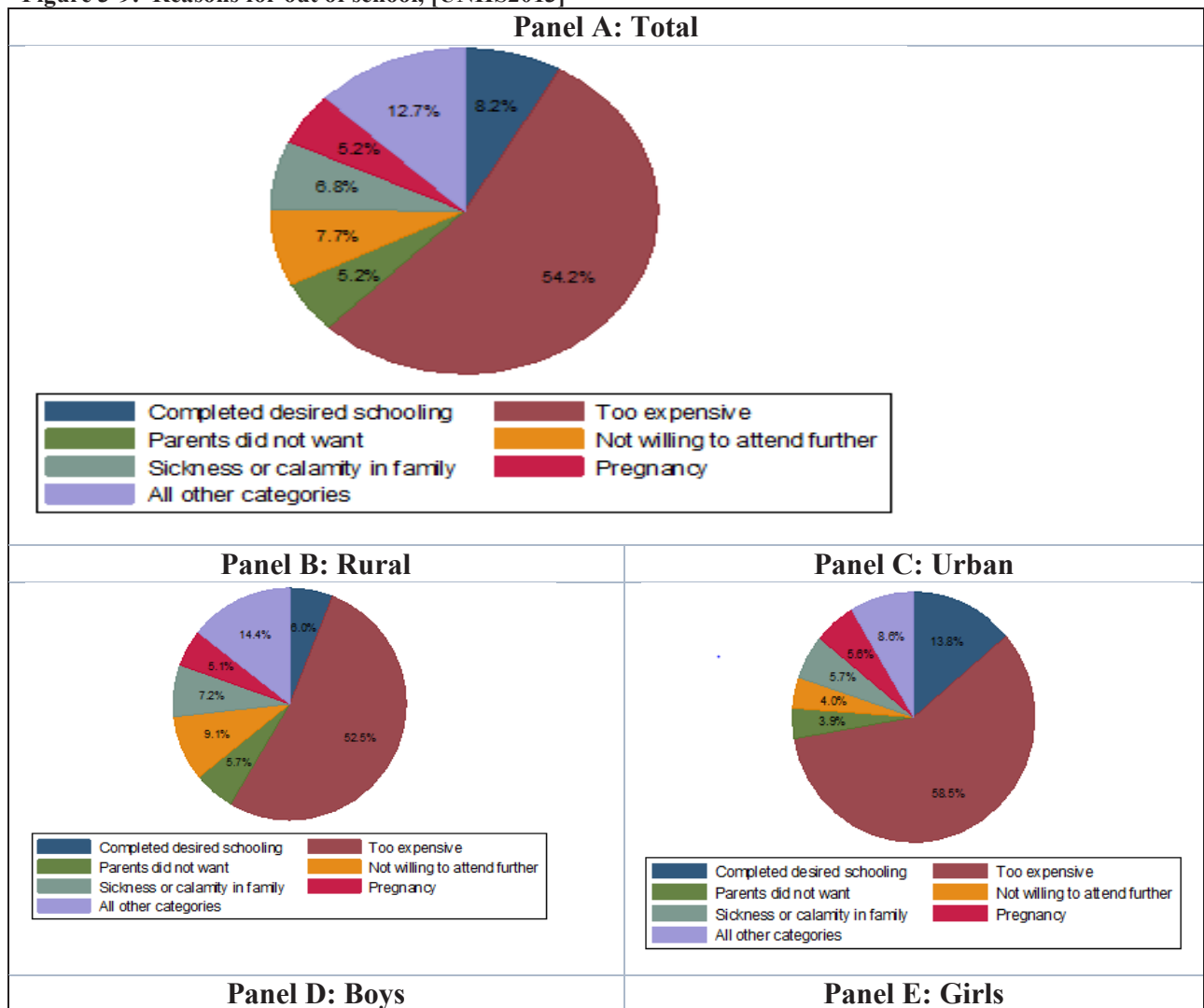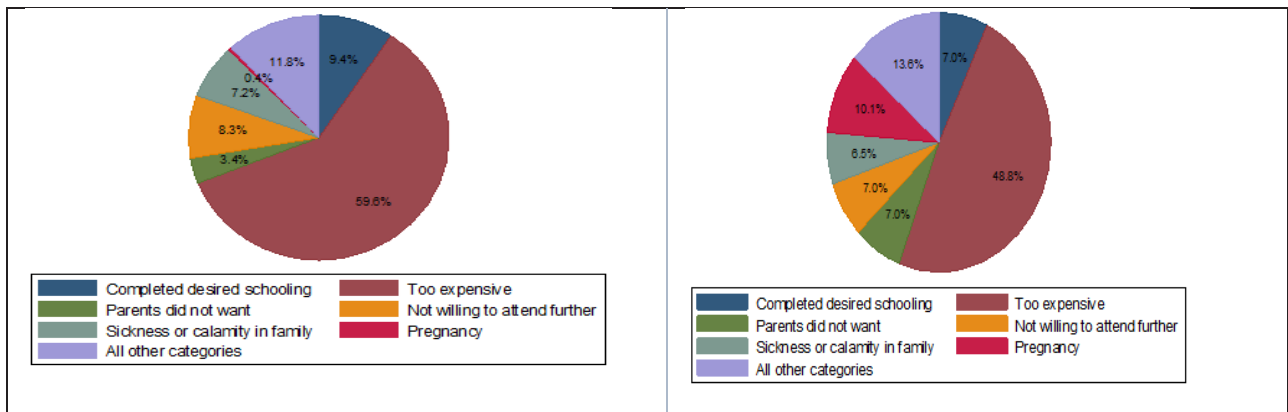
Source: NPA calculations from UNHS 2013 using the World Bank ADePT Tool.

3.4. Outcomes: Learning Achievements

This section describes the developments in learning achievement. The findings in this section largely arise from the analysis of UNEB data on PLE and NAPE test scores. Student achievement levels in English literacy and numeracy at the primary level are still low and fall short of expected levels. Results from the Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) indicate that Uganda's P6 performance in 2007 was below the SACMEQ average scores in reading (an average of 511.8 against Uganda's 478.7) and mathematics (an average of 509.5 against Uganda's 481.9). Between 2000 and 2007, reading test scores declined by 3.7 points while numeracy test scores declined by 24.4 points (Mulindwa & Marshall, 2013).

Evidence from NAPE test results suggests education standards are low and not improving. In 2010, the average achievement score in literacy at the P3 and P6 levels was 47 per cent and 40 per cent, respectively. In addition, 60 per cent of learners in P3 and about 70 per cent in P6 scored below the 50 per cent literacy proficiency level for their respective grades. In numeracy, average student achievement in P6 in 2010 was only 40 per cent; worse still, 70 per cent of learners in this grade performed below the 50 per cent mark (Mulindwa and Marshall, 2013).

Figure 3-10&Figure 3-11 shows the percentage of P3 and P6 pupils who reached defined competency levels in numeracy and literacy between 2007 and 2015. The figures highlight a slow progress over the period, indicating that numeracy and literacy remain challenging subjects for learners especially in upper classes. Recent data shows that between 2014 and 2015, the number of P.3 pupils rated proficient in literacy declined by 4 percentage points from 64.2% (62 % boys; 66.5% girls) in 2014 to 60.2% (59% boys; 61.3 girls) in2015. The decline in pupils' performance in literacy in primary three can be attributed to the longer stories that pupils have to read and limited guidance given to the pupils in the development of skills for reading comprehension. In addition, the percentage of P.3 pupils proficient in numeracy remains relatively high at 71.7% (73.0% boys; 70.6% girls) in 2015 despite a 1 percentage point drop. The P.L.E Pass Rate declined by 2.3 percentage points from 88.30% in 2014 to 86% in 2015. The implication of these results result is that many children leave school without having mastered literacy and numeracy, and this is likely to have a negative impact of overall literacy rates for the entire population aged 10 years and above.

Figure 3-10: Learning outcomes (primary 3 pupils) (2007-2015)
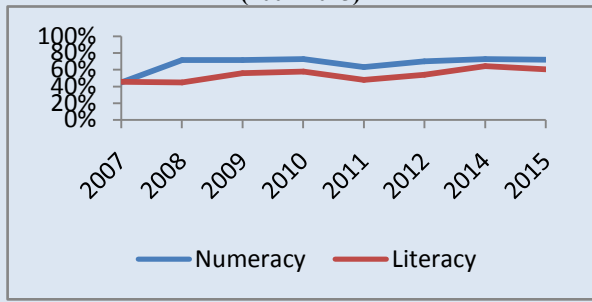
Figure 3-11: Learning outcomes (primary 6 pupils) (2007-2015)
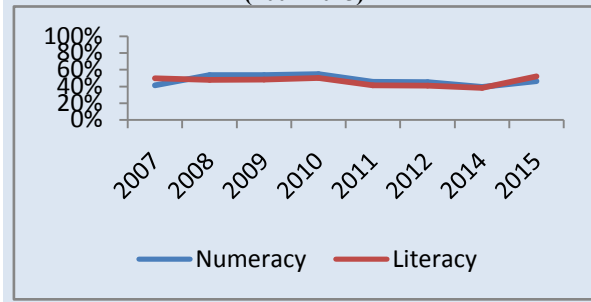
Source: Ministry of Education and Sports (2014). Notes: Shows the proportion of pupils reaching the defined level of competency in literacy and numeracy.

There are major gender, rural/urban, regional and ownership differences in learning outcomes. The percentage of P3 and P6 pupils who reached defined competency levels in numeracy and literacy in 2015 is higher for boys compared to girls (**Figure 3-12** and **Figure 3-13**) and the trend has not changed much since introduction of UPE.

Figure 3-12: Learning outcomes (primary 3 pupils) by gender, 2015
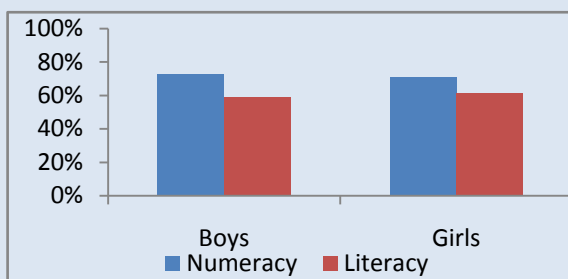
Figure 3-13: Learning outcomes (primary 6 pupils) by gender, 2015
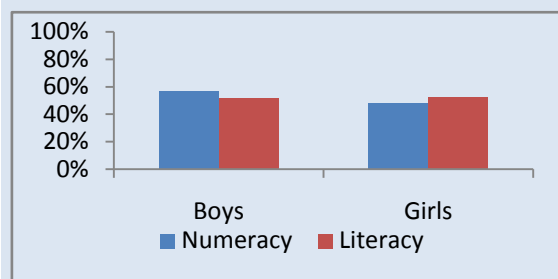
Source: Ministry of Education and Sports (2014). Notes: Shows the proportion of pupils (boys and girls) reaching the defined level of competency in literacy and numeracy.

Similarly, children learning outcomes significantly differ between government and private schools. Numeracy and literacy competences for P3-P6 children private schools are more than 30 percentage points higher than their government schools counterparts (**Figure 3-14**). This can partly be attributed to both demand and supply-side factors (e.g., high PTR and PCR in government schools).

Figure 3-14: Learning outcomes (primary 3 and primary 6 pupils) by school type, 2015
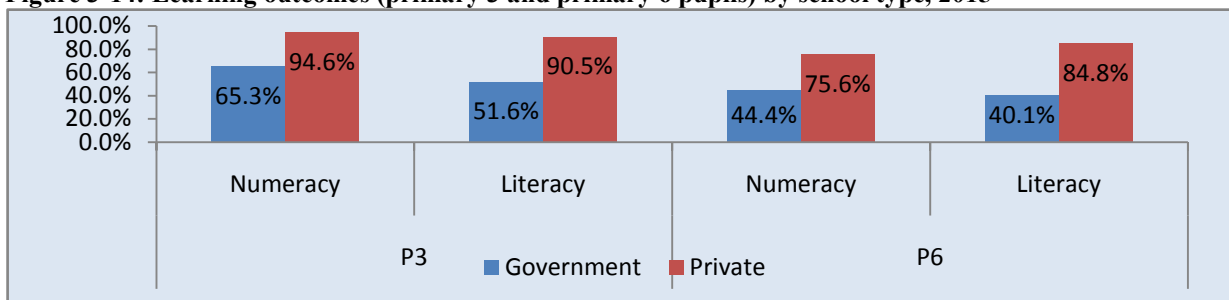
Source: NPA calculations based on EMIS database

The learning achievements results presented so far all point to low levels of achievement across boys and girls in both private and government schools, albeit with a severe situation in government schools. This raises the question of what are the correlates of education quality in PLE schools. In particular, how do the NAPE test correlate with PLE performance? Answering this question requires a panel dataset of NAPE exams and PLE results.

Fortunately, some existing evidence already throws some light on this question. For example, the IOB (2008) impact evaluation report showed that there was high correlation between test results (for NAPE) and PLE results for 2005. "The correlation between test results and examination results was very high; the lowest correlation (0.41) being the correlation between the test results for (numeracy) at primary 3 and the examination results for social studies." (IOB, 2008:p.120).

Table 3-13: Correlations between test results (NAPE) and examination results (2005)

	P3Literacy	P3 Math	P6Literacy	P6 Math	PLELiteracy	PLEScience	PLESocial Studies	PLEMath	TotalPLE
P3Literacy	1.00								
P3Math	0.93	1.00							
P6Literacy	0.75	0.70	1.00						
P6Math	0.67	0.67	0.88	1.00					
PLE Literacy	0.55	0.48	0.75	0.63	1.00				
PLEScience	0.52	0.45	0.70	0.61	0.90	1.00			
PLE Social Studies	0.47	0.41	0.67	0.59	0.91	0.89	1.00		
PLE Mathematics	0.53	0.49	0.64	0.61	0.83	0.81	0.78	1.00	
TotalPLE	**0.55**	**0.48**	**0.73**	**0.64**	**0.97**	**0.96**	**0.96**	**0.89**	**1.00**

Source: Table 5.4, IOB (2008, p.120). Notes: all correlations are significant at the 0.01 level (two-tailed).

Furthermore, findings from the Management and motivation in Ugandan primary schools Report on baseline survey conducted by EPRC also indicate that NAPE exams strongly correlate with PLE results as a measure of school quality (**Table 3-14**). The results, which can be interpreted as marginal effects, show that, for example, schools where NAPE exams are one standard deviation higher are schools with 11 percent more pupils achieving results of Division I or II. Given that the sampled schools had on average only 32 percent of their pupils in these two upper divisions, these measures of school quality appear to be very strong predictors of school success.

Table 3-14: Correlation between NAPE tests and PLE exam results

Panel A dependent variable: Percent pupils achieve Division I or II scores			
P3Literacy	P3Numeracy	P6Literacy	P6Numeracy
0.11***	0.11***	0.20***	0.14***
(0.03)	(0.03)	(0.04)	(0.04)

Panel A dependent variable: Percent pupils achieve Division X or U scores			
P3Literacy	P3 Numeracy	P6Literacy	P6 Numeracy
-0.08**	- 0.08***	-0 .14***	-0.11***
(0.03)	(0.02)	(0.04)	(0.03)

Source: Baseline data, 2008.

By contrast, the dependent, the percentage of pupils receiving incomplete or failing marks on their PLE is measure of *poor* performance. Based on this measure, it appears that the NAPE exams are strongly correlated with this measure of school quality. The coefficient simply, for example, that' schools that are on standard deviation lower in P3 literacy scores have an average of 8 percent fewer pupils in Division X or U (compare with 27 percent of pupils in these bottom divisions on average across all schools in the survey). Taken together with the results of the upper panel, this suggests that the exams are sensitive measures of performance at both the upper and lower end of the distribution" (EPRC, 2010: p.12).

3.5. Conclusions

The introduction of free primary education and the abolishment of school fees, together with the fast growth of the population, have contributed to an enormous expansion of enrolment in primary education. In particular, in the first seven years of implementing UPE, enrolment increased from 2.6 million children in 1995 to 7.2 million in 2005. Between 2007 and 2015, enrolment has slowed down. The rapid increase in enrolment between 1997 and 2007 put massive pressure on supply-side requirements; classrooms, learning materials, teachers among others.

UPE has not only been associated with a dramatic increase in primary school attendance, but also inequalities in attendance related to gender, income, and region, have substantially reduced or even eliminated, thanks to increased investments in the education sector, mainly through expansion of school facilities and the reduction of financial and social barriers to education. For example, because of the large-scale investments, the pupil teacher ratio decreased from 60:1 in 2000 to 43:1 in 2015 and the pupil classroom ratio from 108:1 to 63:12.

Notwithstanding the impressive performance in access to education, there are concerns regarding the general decline in the quality of education; dropout and repetition rates are high, resulting in low progression rates and low completion rates. High repetition rates not only clog the system by increasing PTR and PCR but also waste resources as government spends on the same student twice or more. Low completion rates in upper grades, suggest high indirect costs for older children. These quality concerns suggest that, in order to lead to sustained improvements in attendance and to transform these into higher levels of human capital, the policy needs to be complemented by improvements in school quality and accessibility of secondary education. With regard to the latter, government introduced Universal Secondary Education in 2007 but there are concerns of trade-off effects between the two policies, particularly in terms of financing needs. The budget for the UPE has declined over time since the introduction of USE, suggesting a limited or perhaps a resource envelope for the two policies.

Quality improvements would be essential for retaining pupils at upper grades. Moreover, while the UPE policy reduces the costs of primary education, more comprehensive rural development strategies should increase the benefits from primary education so that the expected benefits exceed the total costs of the direct and indirect costs of education.

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[1] Unfortunately, ASC does not include information on about the number of desks at the school level.

[2] Enrolment doubled between 1995 and 1997 (from 2.6 million to 5.3 million). After 1997, enrolment continued to rise steadily and reached a level of 7.6 million in 2003.

[3] For example, the ASC of the MoES nor does any of the UBOS surveys capture information of the actual number of pupils that attend school on a daily basis.

SECTION FOUR

4.0. PUBLIC AND PRIVATE EDUCATION INVESTMENTS &DISTRIBUTIONAL IMPACTS

4.1. Introduction

Investment in education is one of the major ways of accumulating human capital necessary for economic growth and reaping demographic dividends. Heckman (2006) underscores the importance of investing in early childhood education. Currie (2001) reviewed several education improvement programs in the United States and concluded that most programs, which targeted poor households, were significant through improvement of educational attainment, increased earning, reduction of dependency and crime. Similarly, Basu (2002) showed that education plays a critical role in reducing fertility, which is the necessary factor for attaining demographic dividends.

Existing empirical evidence on the linkage between education and fertility rates is particularly important for a country like Uganda, which is struggling with the challenge of high fertility rates and bulging youth age structure. The burden of the youth on the working population (child dependency ratio) continues to be high and therefore constraining the capacity of households to save and get on board to the wealth creation process currently advocated for by government. According to recent estimates by UBOS from UNHS 2016/17, over half of Uganda's population (55%) is under the age of 18 years, where the share of the primary school age population (6 – 12 years) alone is 22%. Youth (18 – 30 years) constitute 21% of the population compared to the working age population (15—64 years) of 51%. The elderly (65+ years) make up about three percent of the total population. Moreover, over half of the labour (50.3%) is under the age of 30 (UBOS, 2017). This bulging youth population calls for urgent need by government to invest in both education and health sectors (e.g., primary health care and population control programmes) if Uganda is to benefit from the demographic dividend.

The Government of Uganda continue to direct public investments in education sector through several education policies and programmes such as the Universal Primary Education (UPE); Universal Secondary Education (USE); Business, and Technical, Vocational Education and Training (BTVET); and tertiary education.

This chapter examines public and private education expenditure as well as trends in public funding, subsidy and utilization of government services for the period 2002/03—2012/2013 financial years. It is important to note a prior, that, while this study comes at a time when Uganda and the rest of the world are implementing the Sustainable Development Agenda (SDGs), the period 2002/03—2012/13 was the preferred study period of analysis of public and private spending on education. Our choice of the 10-year period was motivated by the fact that a bigger part of UPE and USE implementation period coincided with the global MDGs agenda (implemented between 2000 and 2015). The MDGs mainly focused on the social sectors mainly the education sector (primary and secondary levels) and health and played a major role in directing donor funds to the respective sectors.

The household education expenditure profile shed light on the adequacy of human capital investment at each age. This is particularly important for children and the youth as they prepare for labor market/productive part of their life cycle. We make use of the population

and enrolment figures from the UNHS 2012/13 to estimate the levels of private spending on education by age groups.

4.2. Public and Private Education Investments

Households can access human capital-related services from either public or private providers. Private Service providers have expanded rapidly over the last 15 years, particularly in the education sector,[1] but Government continues to play the central role in ensuring equitable access. Public spending on education grew significantly between 2002/03 and 2016/17, but at a slower rate than GDP. Public education spending was 2.4% of GDP in 2016/17, compared to 4.0% of GDP fifteen years earlier (**Panel A in Figure 4-1**). This partly reflects concerns regarding value for money in public service delivery, and the high priority accorded to transport and energy infrastructure, particularly since the launch of the National Development Plan (NDP) in April 2010. Enrolment growth has been significantly lower than GDP growth, helping to explain the decline in education spending as a share of GDP.

Figure 4-1: Public education spending (% of GDP)
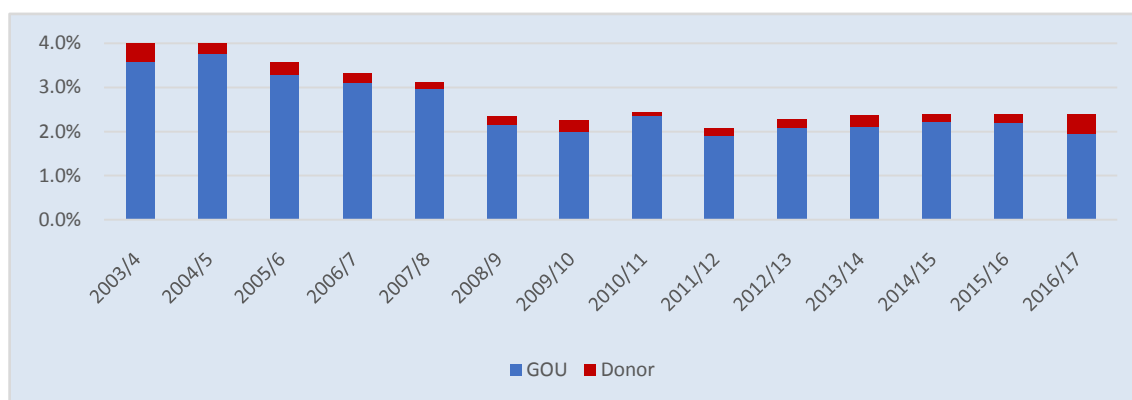
Source: NPA calculations based on Ministry of Finance, Planning and Economic Development, Annual Budgetary Central Government Finance Statistics. Note: shows total (recurrent and development) education expenditure based on the Classification of Outlays by Functions of Government (COFOG) as a share of GDP at market prices.

Although the government provides funding for different levels of education, there is no administrative data on the level of public spending on education by age. Consequently, we use the levels of education to identify age groups. According to the Ministry of Education and Sports, children aged 6-12 years are expected to be in primary school while those aged 13-18 are supposed to be in secondary school. Tertiary education enrolls students aged 19 years and above. The government funding at the different levels cover part of recurrent and capital expenditures. Due to introduction of UPE and USE, public expenditure on education has been increasing (in absolute terms) especially for the secondary subsector. For example, in absolute terms, public spending on the education sector grew by 183% between 2007/08 and 2015/16, with the secondary subsector growing at 183% compared to 145% for the primary subsector. However, a different picture emerges when public spending is looked at in relative terms. The share of public spending on education in total government budget fell from 17.7% in 2007/08 to 13.2% in 2015/16. A similar trend is observed across different education subsectors. Public spending on primary education as a share of public spending on education sector fell from 54.6% in 2007/08 to 49.2% in 20015/16. Similarly, public spending on secondary education fell from 23.5% to 17.5% over the same period. This shows that while government is putting emphasis on educating Ugandan children, funding levels remain low in relative terms.

Figure 4-2 illustrates that public consumption profile for education reveals extremely large transfers to the younger population. Total public consumption on education increases sharply from age 4 peaking at age 19 years. It then declines sharply initially until age 22. This result is similar with public consumption profile in several other countries like Kenya (Mwabu et al., 2011) and Ghana (Amporfu et al.2014). The findings confirm that public consumption on education in Uganda is driven by spending on primary and secondary education due to UPE and USE policies. However, the per capita public spending on each education level is small ranging between UGX.59,000 and UGX.67 000.

Figure 4-2: Age profile of per capita Public Consumption Expenditures on Education by facility level (in Uganda Shillings)
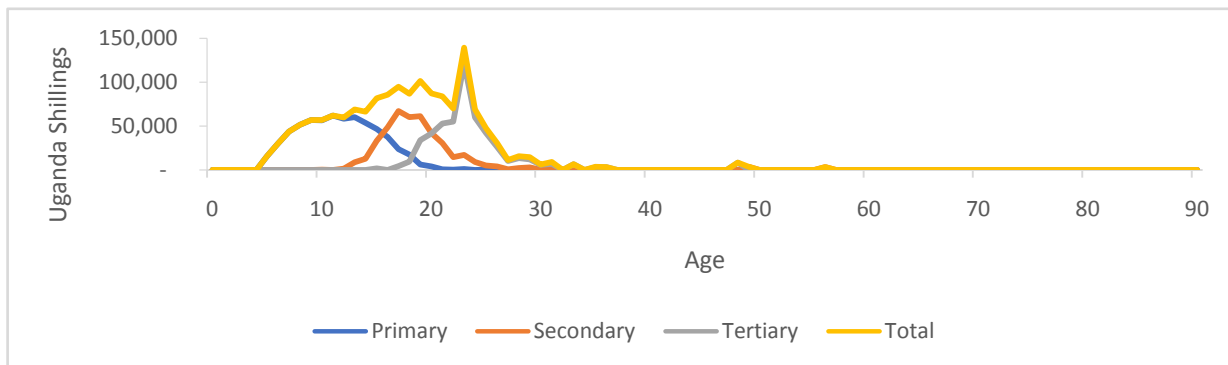
Source: NPA calculations based on UNHS2012/13 and MoES Unit costs for primary, secondary & tertiary education

The pattern for 2016/17 is similar but as mentioned earlier, the lower allocations to the secondary education sub-sector in FY 2016/17 lowers the per capita public spending so much the extent that public spending on education is largely influenced by the primary education sector (**Figure 4-3**).

Figure 4-3: Age profile of per capita Public Consumption Expenditures on Education by facility level (in Uganda Shillings), 2016/17
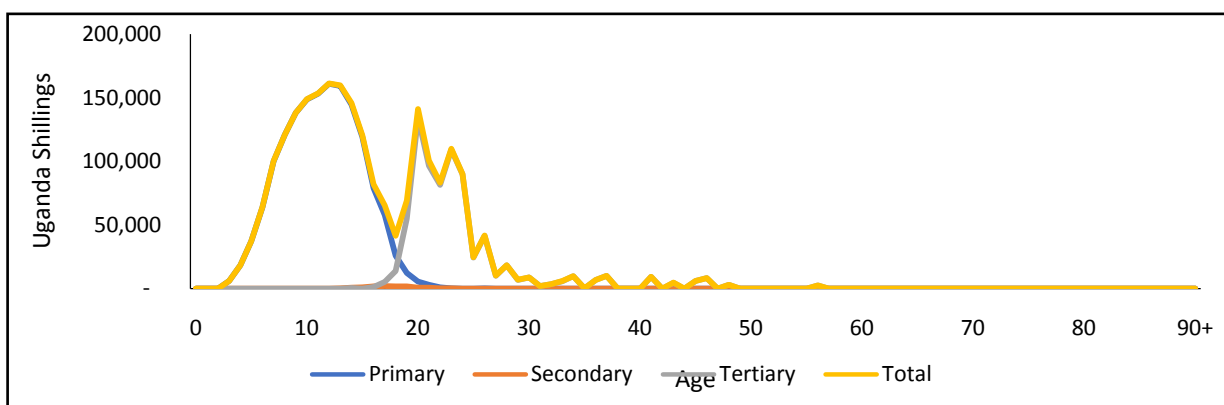
Source: NPA calculations based on UNHS2016/17 enrolment rates and MoES Unit costs for primary, secondary & tertiary education.

Private education expenditure comprises of households' expenditure on school and registration fees, boarding fees, uniforms, books and school supplies, and other expenses. Currently, 69% education education expenditure is financed directly by households, up from 53% a decade ago.

Figure 4-4 shows that there is no private education consumption below ages 2 and after age 55. It also shows that the mean private education expenditure rises after age 3 and reaches a maximum of UGX 532,598, at age 20. The steep rise in private education expenditure between age 13 and 20 reflects the cost of secondary education and first year of tertiary education. Generally, private education expenditure is high between ages 14 and 26 years. Between age 6 and 13, the average expenditure is approximately UGX 105,000 in 2013 and UGX 187,000 in 2017, representing an increase of approximately 78% in private spending for the primary school age group in the last five years. However, this is relatively low compared to that of secondary school age group (13-18 years) which ranges between UGX 270,000 to UGX 330,000 for the same period. The average per capita spend for the 19-26 year age group is UGX 285 in 2013 compared to UGX 338,000 in 2017. The relatively lower per capita spending on education for the primary school age group may be attributed to the subsidized primary education through Universal Primary Education. After age 27, private education expenditure is relatively very small, with many age groups indicating no consumption of private education. This is not surprising given that majority of Ugandans who join tertiary education complete between ages 24 to 26 years.

Figure 4-4: Age profile for per capita private education spending: 2012/13*—2016/17
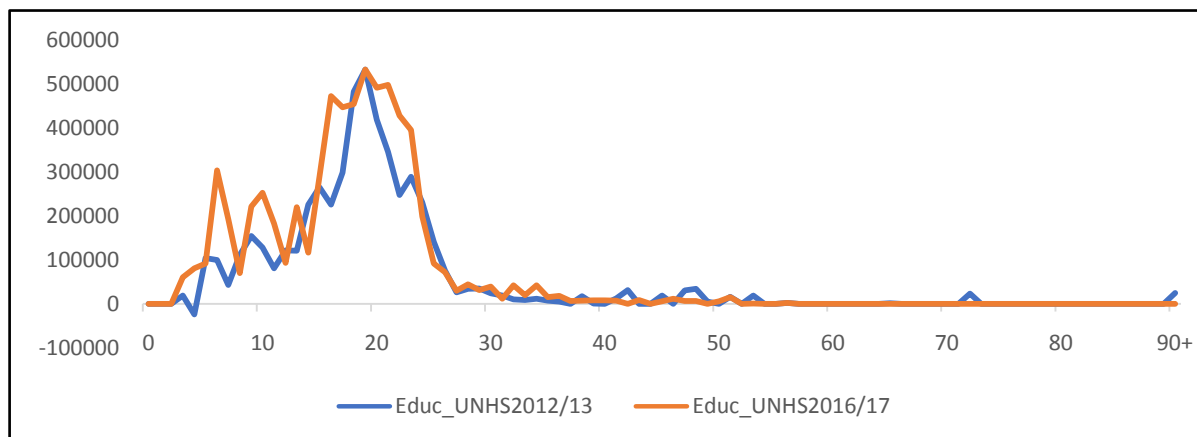
*Source: NPA calculations based on UNHS 2012/13 and 2016/17. Notes: *Inflated to 2016/17 prices using consumer price index (CPI).*

Table 4-1 provides a breakdown of public and private education spending in per capita terms for the different schooling levels over a fifteen-year period: 2002/3—2016/17. It shows that public spending in education declined at an average rate of 0.6% per year for the entire schooling age group (ages 6-24 years). A similar average growth rate is observed for the ages 6-18 years and ages 19-24 years. The primary school age (6-12 years) experienced the lowest decline at an average rate of 0.2% per annum. The relatively small average growth rates in public per capita spending can be partly attributed to the school-age population that has grown significantly more than the overall population. For example, the share of Uganda's population aged between 6 and 18 years increased from 37.6% in 2002/03 to 40.3% in 2012/13 but declined slightly to 35.3% in 2016/17 (various UNHS reports).

The comparison between public and private per capita spending highlights significant differences. For the school age population (6-24 years), private education spending has been growing at a rate faster than the growth in public spending of almost 10% per annum in the last 15 years. The trend cuts across all the sub age groups for school age population. The growth rate in private education spending has been particularly faster in the last five years (2012/13-16/17) registering an average rate of 11% compared to 9% a decade ago. This implies increased burden on households to meet education expenditures. Therefore, access to education could have been affected for individuals from poor households

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[1] According to the 2016/17 household survey estimates close to three in every ten communities (29%) reported that they had at least one private school within their LC I while 31 percent revealed that the private primary school was outside of the LC I. Eight three percent (83%) of communities with private schools outside the LC I revealed that the schools are less than 3 kilometers from the center of the village. In addition, less than three in every ten communities (27%) reported that they use the available private primary schools.

Table 4-1: Average Public Education spending per person by Age Group

Age group	Spending	2002/3 Shillings	2002/3 Share	2012/13 Shillings	2012/13 Share	2016/17 Shillings	2016/17 Share	Real growth 2002/3-12/13	Real growth 2002/3-16/17	Real growth 2012/13-16/17	Annualized 2002/3-12/13	Annualized 2002/3-16/17	Annualized 2012/13-16/17
Ages 6-24 years	Public spending	95,316	56%	94,787	35%	87,600	24%	-0.6%	-8.1%	-7.6%	-0.1%	-0.6%	-2.0%
	Private spending	75,502	44%	178,250	65%	281,520	76%	136.1%	272.9%	57.9%	9.0%	9.9%	12.1%
	Total spending	170,818	100%	273,037	100%	369,120	100%	59.8%	116.1%	35.2%	4.8%	5.7%	7.8%
Ages 6-18 years	Public spending	120,032	53%	119,118	32%	112,531	21%	-0.8%	-6.2%	-5.5%	-0.1%	-0.5%	-1.4%
	Private spending	107,564	47%	258,473	68%	411,972	79%	140.3%	283.0%	59.4%	9.2%	10.1%	12.4%
	Total spending	227,596	100%	377,591	100%	524,503	100%	65.9%	130.5%	38.9%	5.2%	6.1%	8.6%
Ages 13-18 years	Public spending	316,109	56%	289,231	36%	278,346	26%	-8.5%	-11.9%	-3.8%	-0.9%	-0.9%	-1.0%
	Private spending	244,020	44%	523,757	64%	790,353	74%	114.6%	223.9%	50.9%	7.9%	8.8%	10.8%
	Total spending	560,129	100%	812,988	100%	1,068,699	100%	45.1%	90.8%	31.5%	3.8%	4.7%	7.1%
Ages 19-24 years	Public spending	462,915	63%	464,053	44%	395,397	33%	0.2%	-14.6%	-14.8%	0.0%	-1.1%	-3.9%
	Private spending	270,287	37%	591,443	56%	792,795	67%	118.8%	193.3%	34.0%	8.1%	8.0%	7.6%
	Total spending	733,202	100%	1,055,496	100%	1,188,192	100%	44.0%	62.1%	12.6%	3.7%	3.5%	3.0%

Ages 6-12 years		2002/3		2012/13		2016/17		Real growth			Annualized		
		Shillings	Share	Shillings	Share	Shillings	Share	2002/3-12/13	2002/3-16/17	2012/13-16/17	2002/3-12/13	2002/3-16/17	2012/13-16/17
	Public spending	193,511	53%	202,528	53%	188,901	33%	4.7%	-2.4%	-6.7%	0.5%	-0.2%	-1.7%
	Private spending	174,954	47%	414,863	47%	632,918	67%	137.1%	261.8%	52.6%	9.0%	9.6%	11.1%
	Total spending	368,465	100%	617,391	100%	821,818	100%	67.6%	123.0%	33.1%	5.3%	5.9%	7.4%
							23%						
							77%						
							100%						

Sources: NPA calculations based on UNHS 2002/3 and 2012/13; and Ministry of Finance, Planning and Economic Development, Annual Budgetary Central Government Finance Statistics. Notes: shows total spending per person aged between 6 and 18 years, based on UNHS population estimates. Public spending includes recurrent and development spending financed by GOU and development partners. Education spending are inflated to 2012/13 prices using the respective GDP deflators.

The high per capita private education spending also highlights the burden for the poor households. The trend towards higher private spending on education has not only been driven by better-off households but has occurred across the income distribution. Average education spending by the poorest 20% of households grew by 11.6% per year between 2002/3 and 2016/17 (**Table 4-2**). Private education spending growth was in fact highest among less-well-off households. Public education spending has barely kept pace with the school-age population and this may have increased the burden on households to use their own resources. While there are no longer tuition fees in UPE or USE schools, it is common for households to spend their own resources – on private service providers or for associated costs such as school uniforms, scholastic materials or transport. **Table A4- 1—Table A4- 3** present Household expenditure on primary, secondary and post-secondary by different background characteristics. The tables reveal that annual average education spending per child attending ranges between approximately UGX.550, 000 for primary education to UGX.3, 600,000 for post-secondary education. On average, urban household's expenditure is two and half times higher than their rural counterparts are. There are no significant gender differentials in per capita education spending.

Table 4-2: Average household education and health spending per person by welfare quintile

| | | 2002/3 | 2012/13 | 2016/17 | Real Annualized growth rate | | |
					2002/03-12/13	2012/13-16/17	2002/03-16/17
Education	Poorest quintile	13,322	42,970	62,045	12.4%	9.6%	11.6%
	Second quintile	32,044	73,955	115,598	8.7%	11.8%	9.6%
	Third quintile	53,150	132,189	193,150	9.5%	9.9%	9.7%
	Fourth quintile	92,200	232,024	337,239	9.7%	9.8%	9.7%
	Richest quintile	395,573	783,050	1,258,294	7.1%	12.6%	8.6%
	Average for all households	107,564	258,473	411,972	9.2%	12.4%	10.1%

Source: NPA calculations based on UNHS 2002/3, UNHS 2012/13 and UNHS 2016/17. Notes: shows total spending per person aged between 6-18 years based on UNHS population estimates. Education spending are inflated to 2016/17 prices using the respective GDP deflators

4.3 DISTRIBUTIONAL IMPACTS OF PUBLIC SPENDING ON EDUCATION

Findings on per capita spending by both government and households has shown a relatively increased spending burden to the households. Therefore, it is worth examining further the distribution of government spending. With many competing priorities for public resources and limited fiscal space, improving human development outcomes in Uganda depends crucially on effective targeting and the overall efficiency of public service delivery.

The standard technique for measuring the equity impact of public spending is benefit incidence analysis (BIA). The essence of BIA (see Box 1 in the Appendix) is to reveal which income groups receive the benefits of public expenditure in the education sector. The distribution of benefits depends on both Government behavior, including the level and

composition of public spending, and on household behavior, (e.g. whether parents choose to send their children to public schools).

Table 4-3 presents the per-student government subsidy (or unit cost) by facility level (focusing on primary and secondary schools). The aim is to illustrate differences in education spending for families with children in primary and secondary schools and examine whether there are any substitution and crowding out effects arising from increased spending on secondary education. Government spending per-Pupil/student has increased over time but remains lower at primary level compared to secondary level. In 2002/03, government spent on average UGX 136,923 and UGX 279,373 for primary and secondary levels respectively. A decade later (2012/13) the subsidy increased for secondary (UGX 349,230) but declined for primary (UGX 104,861). However, due to reduced enrolment in primary in 2016/17, the per unit subsidy for primary increased to UGX 247,237. The sharp decline in the per unit subsidy for the secondary education may be attributed to very low government allocations to the secondary sub-education sector in the financial year 2016/27; records from the government financial statistics of the MFPED show that in 2016/17 the actual outturn for the secondary education was only UGX 9.5 compared to UGX 1456 billion for the primary education.

Table 4-3: Per-Pupil/student Government Subsidy for Enrolment by Facility Level (in Uganda shillings), 2002/03—2016/17

Education Level	UNHS 2002/03	UNHS 2012/13	UNHS 2016/17
Primary	136,923	104,861	247,237
Secondary	279,373	349,230	9,123

Source: NPA calculations based on UNHS 2002/03, 2012/13, and 2016/17; and MFPED data sets. Notes: The per-student subsidy is calculated as total government expenditures (separately for primary and secondary) for each financial year divided by the total education users per facility levels (estimated from the UNHS data set). Public spending excludes development spending financed by GOU and development partners as the focus is on analysing benefits accruing from government recurrent expenditure allocations. Per unit subsidy for 2002/03 and 2012/13 is inflated to 2016/17 prices using the respective education GDP deflators.

The higher per-unit cost at the secondary level in the last decade can be attributed to the introduction of USE in 2007. Between 2007/08 and 201/13, government expenditure on secondary level education increased by 81% compared to 62% for the primary level, indicating marked inequality in per-pupil/student subsidy between the two levels, in spite of gross enrolment differentials (**Table 4-4-Table 4-6**).

Table 4-4: Estimated School Enrolments by Income Quintiles and Facility Level, 2002/03

	Income Quintiles					
	Poorest	Poor	Middle	Rich	Richest	Total
Primary	1,596,789	1,517,216	1,393,128	1,172,441	679,406	6,358,980
Secondary	31,200	61,452	106,073	128,157	182,894	509,776
Total	1,627,989	1,578,668	1,499,201	1,300,598	862,300	6,868,756

Source: NPA calculations based on UNHS 2002/03

Table 4-5: Estimated School Enrollments by Income Quintiles and Facility Level, 2012/13

| | Income Quintiles | | | | | |
	Poorest	Poor	Middle	Rich	Richest	Total
Primary	2,054,446	1,868,926	1,454,321	1,184,040	664,811	7,226,544
Secondary	95,561	170,977	214,156	234,368	326,284	1,041,346
Total	2,150,007	2,039,903	1,668,477	1,418,408	991,095	8,267,890

Source: NPA calculations based on UNHS 2012/13

Table 4-6: Estimated School Enrollments by Income Quintiles and Facility Level, 2016/17

| | Income Quintiles | | | | | |
	Poorest	Poor	Middle	Rich	Richest	Total
Primary	1,758,321	1,557,165	1,193,577	934,133	444,281	5,887,477
Secondary	113,047	162,914	192,717	211,638	322,467	1,002,783
Total	1,871,368	1,720,079	1,386,294	1,145,771	766,748	6,890,260

Source: NPA calculations based on UNHS 2016/17

Figure 4-5 reveal that the poorest received on average 25% of all government expenditures on primary education in 2002/03 compared to an average of 11% received by the richest (fifth quintile). While on average the primary education benefits to the poorest increased to 28% and 30% in 2012/13 and 2016/17 respectively, they instead declined for the richest (9%). Thus, the distribution of primary education spending in Uganda is pro-poor. In the secondary level, the poorest quintile received 6% and the richest 36% of benefits from the government in 2002/03. A decade later (in 2013) the poorest benefits increased to 9% and by 2017 it had increased to 11%. The richest group accounted for 32% of the secondary level benefits in 2017. This result can partly be attributed to the introduction of USE in 2007, which saw government expenditure on secondary level education increase by 81% between 2007/08 and 201/13 compared to 62% for the primary level.

Figure 4-5: Distribution of Public Education Spending Benefits by population quintiles and facility level (percentage)

Panel A: UNHS2002/03

Panel B: UNHS2012/13
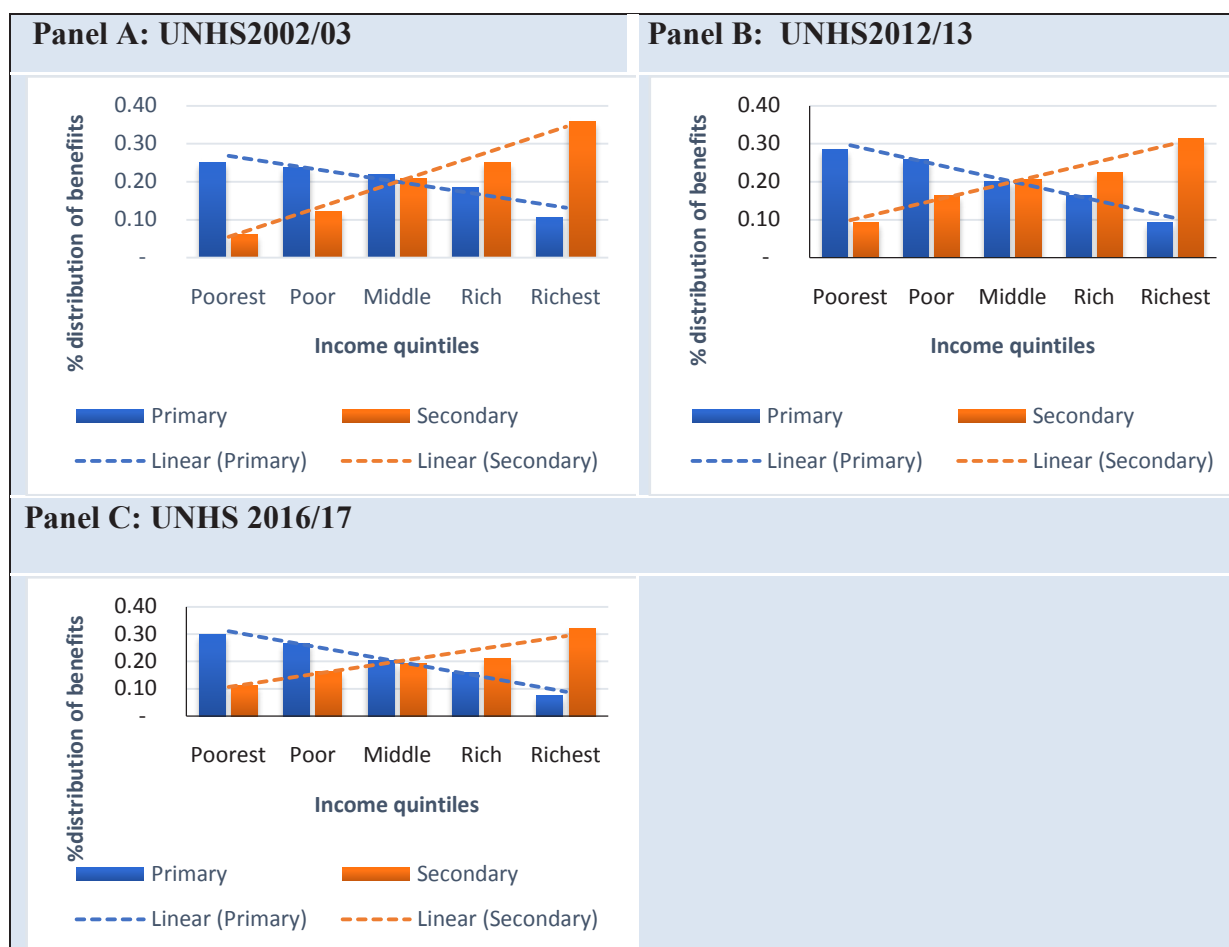
Panel C: UNHS 2016/17

Source: NPA calculations based on UNHS 2002/03, 2012/13, 2016/17; and MFPED.

Figure 4-6 (Panels A, B & C) present graphically the benefit incidence of the 2002/03, 2012/13 and 2016/17 public spending on education using income quintiles based on national population instead of household population. It can be seen from the figures that government spending on primary education is progressive in absolute terms, i.e., pro-poor and pro-rich for the secondary education, as the concentration curve for primary lie above the diagonal (or line of perfect equality). This can be attributed to the fact that (i) richer households prefer private schooling to public schooling; and (ii) households in the poorer quintiles have more children than those in the richer quintiles. This finding is in line with international empirical evidence, which suggests that expenditure on primary education tends to be pro-poor, whereas expenditure on higher education is more likely to be pro-rich, although the precise level of education at which the rich benefit more varies across countries (Selden and Wasylenko, 1992; Filmer 2003). The finding that public spending on primary education is pro-poor can partly be attributed to enrolment rates at the different facility levels, that is, enrolment is higher at primary and becomes progressively lower with increase in levels.

Figure 4-6: Concentration curve of Education Subsidy by population quintiles and facility level (percentages)

Source: NPA calculations based on UNHS 2002/03, 2012/13 and MFPED.
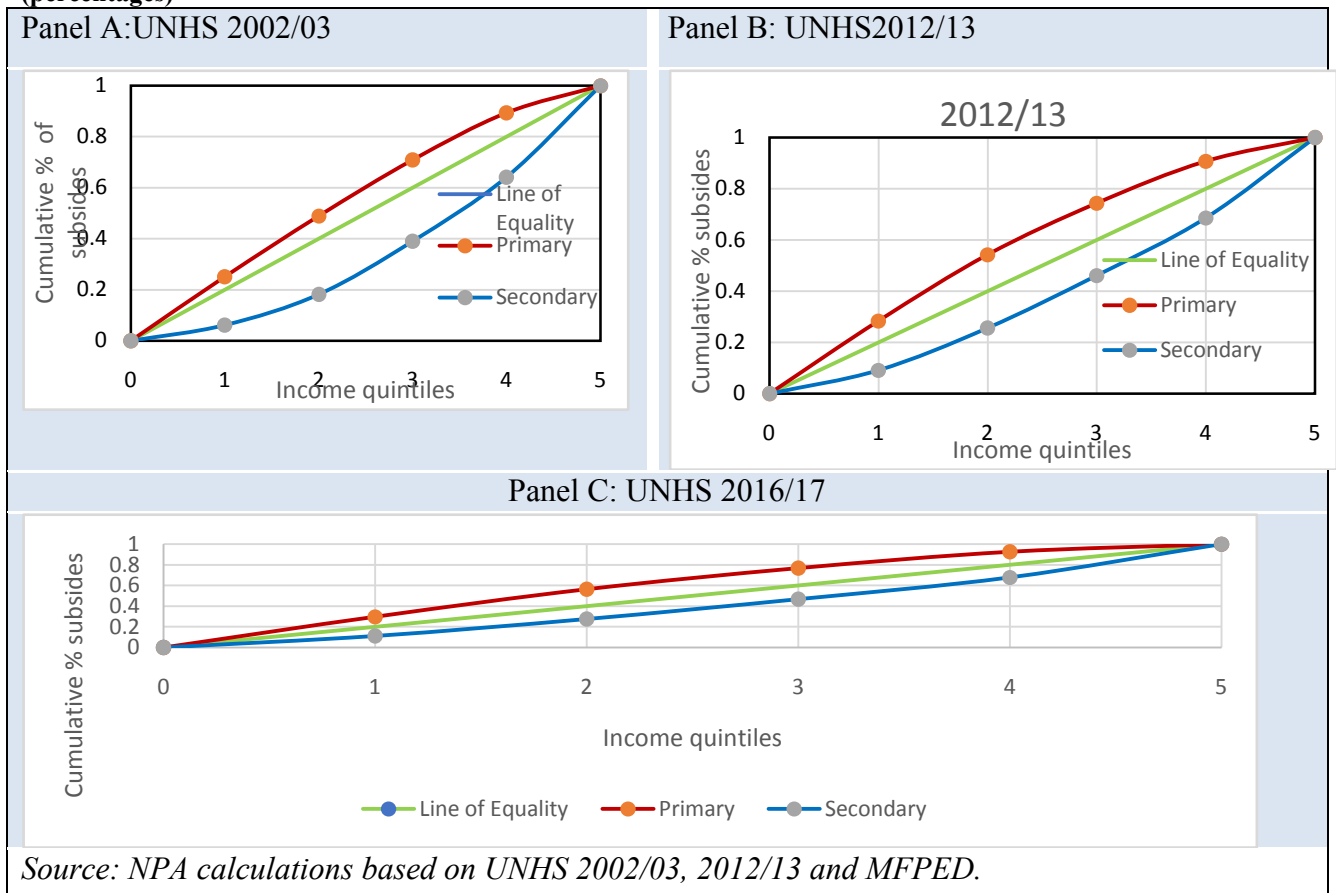
4.4. Drivers of Private Education Spending

In light of education spending trends shown in Sections 1 and 2 of this chapter, it is important to empirically examine the factors that drive private spending on education under UPE policy in both rural and urban areas, and across different regions in the country.

Using simple Ordinary Least Square (OLS) regression model, the drivers of private education spending at the household level can be estimated using Equation 4.1:

$$\ln(educexp_j) = f(HD_j, H_j, R_j, CD_j)) \quad \dots 4.1$$

Where $educexp_j$ is the annual expenditure on education in log for household j, HD_j is a set of household head characteristics; H_j is a set of household characteristics; R_j is a set of area area/regional dummies; and CD_j captures household child characteristics.

In addition, we also assess how the influence of the same explanatory factors in Equation 1 on the economic burden of education, defined as the proportion of education expenditure in the total household expenditure, B_j and estimated using Equation 4.2.

$$\ln(educburden_j) = f(HD_j, H_j, R_j, CD_j)) \dots 4.2$$

where $educburden_j$ is education expenditure share of total expenditure in household while the

4.4.1 Estimation Results and Discussion

According to the regression results in Table 4-7the education expenditure at the primary education level is positively associated with education level of the household head, per capital household expenditure, household assets, number of children in the household aged 6-12 years, and the area of residence dummy. Households with young household heads in the 20s and 30s spend significantly less on primary education than older households in their 40s. Households with heads of catholic belief also spend significantly less than those of other beliefs. Households living in both rural and urban areas of the different regions of Uganda spend significantly less on primary education than those living in urban areas of greater Kampala (consisting of urban areas of Kampala, Mukono, and Wakiso districts). This result is not surprising since greater Kampala has the largest concentration of high quality private schools in the country. Furthermore, households with only female children spend significantly less on primary education. This suggests that households spend less for girls' education. Without expenditure information at the child level, however, we are not able to draw a concrete conclusion on gender disparity in terms of education spending. Besides, statistics on school enrolment in Uganda do not indicate any gender bias in enrolment ever since the introduction of UPE.

In terms of the economic burden of education, the age of household head, having only female children, being of Muslim/Catholic/ protestant belief, living in any of the non-greater Kampala regions (except the Northern region) are significant factors that are negatively associated with the economic burden. In contrast, higher levels of education (secondary and above), female headed households, urban areas, per capita household expenditure, household assets as well as the number of children aged 6-12 years contribute positively to economic burden of education. The low proportion of household expenditure on education for households with only girl child/ren suggests a low priority placed on girls' education.

Table 4-7: UNHS 2013/13: Determinants of total private cost of education and economic burden of education: primary and secondary level (households with children aged 6–18)

	Primary Level		Secondary Level	
	ln(Education expenditure)	%Economic burden	ln(Education expenditure)	%Economic burden
HH Head characteristics				
Head aged 20-29 (=1)	-0.91***	-13.81***	-0.76***	-12.84***
	(0.08)	(1.51)	(0.09)	(1.58)
Head aged 30-39 (=1)	-0.35***	-8.46***	-0.19***	-7.53***
	(0.06)	(1.25)	(0.06)	(1.28)
Head aged 50-59 (=1)	0.08	2.18	-0.00	1.75
	(0.07)	(1.67)	(0.07)	(1.68)
Head aged 60+ (=1)	-0.31***	-6.06***	-0.37***	-6.31***
	(0.08)	(1.65)	(0.07)	(1.64)
Female head	0.02	5.06***	-0.02	4.91***
	(0.05)	(1.18)	(0.05)	(1.17)
Catholic (=1)	-0.16**	-3.76***	-0.17***	-3.79***
	(0.06)	(1.44)	(0.06)	(1.45)
Protestant(=2)	-0.09	-2.53	-0.08	-2.46
	(0.07)	(1.68)	(0.07)	(1.68)
Muslim(=3)	-0.08	-4.19**	-0.06	-4.04**
	(0.08)	(1.85)	(0.08)	(1.84)
HH head completed Primary educ. (=1)	0.21***	2.71**	0.18***	2.55**
	(0.05)	(1.08)	(0.05)	(1.10)

	(1)	(2)	(3)	(4)
HH head completed Secondary educ. (=1)	0.45***	8.52***	0.48***	8.65***
	(0.07)	(1.58)	(0.07)	(1.59)
HH head completed Post-sec educ. (=1)	0.67***	15.64***	0.71***	15.91***
	(0.11)	(3.35)	(0.11)	(3.37)
Household characteristics				
ln (per capita expenditure in USD)	0.83***	8.59***	0.76***	8.29***
	(0.04)	(1.18)	(0.04)	(1.19)
ln (assets-value in Ushs)	0.18***	2.14***	0.21***	2.23***
	(0.02)	(0.37)	(0.02)	(0.37)
Household child characteristics				
Only girl child/ren (=1	-0.51***	-6.82***	-0.51***	-6.68***
	(0.06)	(1.19)	(0.06)	(1.14)
Number of children aged 6-12 years	0.28***	1.35**		
	(0.02)	(0.52)		
Number of children aged 13-18 years			0.38***	2.23***
			(0.03)	(0.63)
Area				
Urban (=1)	0.38***	5.66***	0.39***	5.74***
	(0.07)	(1.45)	(0.06)	(1.45)
Region (Greater Kampala=rfc)				
Central (=1)	-0.28***	-4.21*	-0.35***	-4.63**
	(0.09)	(2.16)	(0.09)	(2.17)
Eastern(=1)	-0.64***	-6.03**	-0.74***	-6.63***
	(0.09)	(2.42)	(0.09)	(2.42)
Northern (=1)	-0.70***	-2.05	-0.80***	-2.66
	(0.10)	(2.41)	(0.10)	(2.42)
Western(=1)	-0.53***	-5.06**	-0.62***	-5.57**
	(0.09)	(2.27)	(0.09)	(2.28)
Constant	7.59***	-26.58***	7.65***	-26.55***
	(0.24)	(5.37)	(0.23)	(5.31)
R^2	0.491	0.220	0.499	0.222
Observations	4080	4080	4080	4080

Source: NPA calculations based on UNHS 2012/13 dataset. Notes: Standard errors in parentheses; *** 1 percent level, ** 5 percent level, * 10 percent level. Regression results exclude households with zero education expenditure.

4.5. Conclusion

Human capital development remains high on Uganda's development agenda. In line with the National Development Plan, Government continue to direct more public funds to the education sector through several education policies and programmes, including the Universal Primary Education (UPE); Universal Secondary Education (USE); Business, and Technical, Vocational Education and Training (BTVET); and tertiary education, in order to harness human capital development.

This chapter examined public and private education expenditure trends as well as trends in public funding, subsidy and utilization of government education services for the financial years 2002/03—2016/17. In addition, it provided household education expenditure age profile in order to shed light on the adequacy of human capital investment at each age, particularly for Ugandans of school going age. This is particularly important for children and the youth as they prepare for labor market/productive part of their life cycle. Overall, the analysis is important for evaluating whether government spending under the UPE policy has been adequate and thus reducing the education-spending burden for households.

The findings indicate that overall, there has been an increase in public spending on education. While this is a positive development, there are various areas where government need to increase or prioritize its efforts in public spending in the education sector.

While there is indication that public spending on education grew at an average rate of 0.7% per year for the entire schooling age group (ages 6-24 years), this has grown at a much lower pace owing to the significant increase in the level of the school-age young population. This therefore calls for further allocation of resources to this age group. While much emphasis has been put on the primary age group (resources increasing by 1.2 percent per capita), this is still not sufficient to meet the increasing population under this age group. Per capita spending on both primary and secondary education levels remain small ranging between 59,000 and 67,000 Uganda shillings even compared to peer countries like Kenya (Mwabu et al., 2011) and Ghana (Amporfu et al.2014). Overall, a bigger share of public consumption on education is driven by spending on primary and secondary education. This is expected in light of the two government policies on education; UPE and USE.

In addition, It is found that there is disproportionate burden of spending on education by poorer households, with private spending of the poorest quintile growing at annual rate of 11 percent compared to a national average of 10 percent over the last 15 years. This would therefore call for better targeting of government programs.

Lastly, public spending in real terms has fallen much faster under the NDP compared to the PEAP development frameworks. The NDP mainly prioritizes investments infrastructure to support economic growth while PEAP prioritized investments in social sectors to reduce poverty. For instance, annualized growth rate for public spending on education per person for children aged 6-12 years was -0.2% between 2002/03—12/13 compared to -1.7% between 2012/13—16/17. This means that a more balanced approach to spending on social sectors and infrastructure development needs to be adopted.

SECTION FIVE

5.0.   RETURNS TO EDUCATION

5.1.   Introduction

A measure of the success of an education system is the productivity of various levels of educational attainment (e.g., primary, vocational, secondary, and degree) or years of schooling. One common way to measure, this productivity is to look at the economic returns to education—that is, the net financial return of additional schooling. Intuitively, an individual's decision to continue studying will depend on the difference between the cost of pursuing additional studies and the added earnings received as a result. Information on returns to additional education provides an idea of the incentives students face when deciding to continue their formal education. High rates of return may induce students to spend more time in school; low rates may discourage them from staying in school longer.

Understanding returns to education is of particular importance especially in the context of one of UPE's objectives —reduce poverty by equipping every individual with basic skills. A productive education system is one that provides the population with the required skills and knowledge to exploit the environment for self-development as well as national development, for better health, nutrition, and family life, and the capability for continued learning to be able to contribute to the building of an integrated, self-sustaining and independent national economy.

In this chapter, returns to education are looked at from two fronts. First, since one of the objectives of UPE was to reduce poverty, we start by examining the return to education in terms of changes in household welfare. Second, we analyze the net financial (i.e., wage earnings) return of additional schooling.

The analysis of economic and household welfare returns to schooling not only complements the analysis on the effects UPE has had on enrolment and other learning outcomes, but also provide empirical evidence about convergence of returns to education across regions and sub-regions of Uganda in the last two decades.

5.2. Methods

In the literature, returns to education is usually estimated using the standard Mincerian regression specification that relates wages to years (or educational attainment levels), controlling for other determinants of earnings, namely, individual, household, occupation, sector and regions characteristics.

The widely used Mincer earnings function is shown in Equation 5.1:
$$\ln\omega_i = \alpha + \beta yrs_i + \gamma X_i + \varepsilon_i).....5.1$$

where $ln\omega_i$ is the natural log of hourly wages of individual i, yrs_i is years of education, and X_i is a set of control variables (e.g., experience and its square–to capture the diminishing marginal effect of experience; dummies for gender, marital status, area/region of residence; household size; dummies for permanent/temporary and public/private jobs; and occupational and industry dummies). Equation 5.1 estimated using OLS assumes that each additional year of education, has an equal impact on earnings.

An alternative specification of the Mincer earnings function uses binary variables for the level of schooling. For example, the return to primary school compared with less than primary or secondary or the return to more than four years of higher education.

To estimate Equation 5.1, we rely on UNHS 2012/13 data in order to expose the stylized facts concerning wages and employment in Uganda. UNHS 2012/13 contains data for 6,896 households from all districts in Uganda and offers detailed information about education, labour market activities, demographic and economic characteristics of 36,606 individuals. On the other hand, we use three waves of panel data for the period 2005/06 —2011/12, to examine the welfare impacts of educational attainment and years of schooling. Having data on the same households at more than one point in time makes is possible to observe dynamic concepts such as returns to education, chronic and transitory poverty, and makes it easier to analyze causal relationships – and therefore identify the drivers of returns to education and its impact on poverty reduction and household consumption growth. The mentioned datasets have rich information on the aforementioned characteristics, thus enabling us to capture not only wage differentials caused by challenges of education and labour market policy, but also by sub-regions.

5.3.   Estimation Results

Table 5-1shows OLS estimates of wage equation for the working population. It indicates that the annual economic return to university education in Uganda is high (30.2%). For individuals who just finished secondary education, this information is very valuable. It indicates that they could expect to increase their annual earnings by about 30% by completing a university education. In contrast, the decision to continue from primary to secondary education is less clear: the annual economic returns of adding secondary education are low (4.0%) compared to 10.2% for primary education. The results suggest that some education policy intervention may be needed to increase the relevance of secondary education (post-primary education in general) to the labor market. The return to primary school compared with less than primary of 10.2% supports support Government's emphasis on UPE as a means to increase household income and reduce poverty, by equipping every individual with basic skills and knowledge, to exploit the environment for self-development as well as national development. Therefore, primary education is key in reducing insufficiency and deprivation in literacy and education levels that undermine adequate functioning and limit one's comprehension of the world and oneself to live a fulfilling life.

Overall, the results in (Error! Reference source not found.**)** reveals that educational investment in Uganda deliver a significant return in the wage employment. In particular, higher education levels - measured by years of schooling or by highest level of education - significantly raise wages thereby showing a significant average rate of return to education. Furthermore, there are variations in educational wage differentials around this average rate of return, linked to gender and to urban/rural location— women have higher returns to education than men do; and the returns to education are higher in the urban areas. Our findings and conclusions are similar to those by Crespo Cuaresma & Raggl, (2016), who examined the dynamics of returns to education in Uganda at both national and sub-national levels using the 2002/03 and 2005/06 UNHS.

Table 5-1: Returns to education, by background characteristics, [UNHS2013]

	Coefficients			
	Years of schooling	**Primary**	**Secondary**	**More than 4 years of higher**
Total	**4.2**	**10.2**	**4.0**	**30.2**
Gender				
Boys	4.1	8.2	5.1	29.1
Girls	4.8	14.1	2.2	33.6
Area of residence				
Urban	5.3	12.2	4.7	28.3
Rural	2.2	5.5	1.1	33.1
Residence and gender				
Urban - Boys	6.0	15.2	5.6	26.0
Urban - Girls	4.4	8.0	3.3	34.3
Rural - Boys	1.9	2.5	2.6	33.1
Rural - Girls	3.3	11.7	-2.0	35.7
Household wealth				
Quintile 1	-3.8	-12.0	-1.3	-46.8
Quintile 2	-0.5	1.2	1.4	41.3
Quintile 3	2.2	1.8	2.3	45.8
Quintile 4	3.7	11.2	4.2	17.5
Quintile 5	3.9	6.2	3.2	25.6
Gender of the household head				
Male	3.8	8.7	5.2	24.3
Female	4.9	12.7	1.1	46.6
Education of the household head				
No education	-1.3	-13.8	9.3	
Incomplete primary	0.0	0.9	6.4	30.9
Primary	-0.7	-4.8	4.6	
Incomplete secondary	-2.1	-3.1	7.1	-53.6
Secondary	-4.4	-27.0	0.4	5.0
Some higher	1.9	1.6	-5.7	31.7
Region				
Greater Kampala	5.5	9.5	5.0	27.2
Central	2.5	8.7	-1.7	38.2
Eastern	0.7	2.6	7.1	10.3
Northern	4.1	9.3	4.5	32.0
Western	3.8	7.0	1.3	37.7
Karamoja	2.7	20.6	-4.8	-60.1

Source: NPA calculations based on UNHS 2012/13 using the World Bank ADePT software

While the results in (**Table 5-1**)point to possible wage differentials around this average rate of return linked to gender and rural/urban areas, there seem to be no consensus in the Ugandan context, about the wage differential with respect to gender. For example, using a sample of 3,123 households, which appeared in both the UNHS 2005/06 and UNPS 2009/10, Lekfuangfu, Machin, & Rasul, (2012) estimate returns to education of both survey waves from two main function forms of education attainment: total years and qualification level. They found that one additional year of education raised log earnings of male wage earners, in both urban and rural residences, by 5.1-5.5 percent in 2005/06, and the estimates were slightly larger in 2009/10 at 5.9-6.3 percent. By contrast, they did not find significant effect of an additional year of education for female workers despite the magnitudes being much smaller at 3.3 percent in urban areas and 1.9 percent in rural areas in 2005/06 compared to a ate 8.7 percent for urban areas and 5.7 percent in rural areas in 2009/10. Kavuma, Morrissey, & Upward (2015) used the same data and disaggregated it by worker type, and found that on average, male in wage-employment earn 34% more than females in wage-employment, but the difference was somewhat lower (24%) for self-employment. They attribute the observed gender wage gap to lower education levels for women compared to men. However, with no individual data on workplace environment, Kavuma, Morrissey, & Upward (2015) could not rule out discrimination at the workplace.

Nonetheless, in most studies marginal returns to education for women are higher than for men (Schultz 2003; Kingdon and Söderbom 2007b). This disparity implies that the supply of educated women is growing less than their demand, which is the case in Uganda. This mirrors the constraints faced by women in accessing education in most developing counties, which induces higher returns for the successful ones. It is expected that as more and more women access quality education, because of Government education programmes such as UPE and USE, their marginal returns to education will reduce.

The Welfare impacts of Education attainment and years of schooling presented in (**Table 0-2**)support Government's emphasis on technical and vocational training as a means to improve labour productivity and earnings from self-employment. Completing vocational training compared to primary training is estimated to increase consumption by between 7.1% and 7.6% compared to a reduction of 4.4% In.**Error! Reference source not found.Table 5-2**. The estimated return to vocational training exceeds that of an additional year of formal education. However, the reverse is true for primary and secondary education levels. The return to formal education is estimated to be relatively high in the lagged-dependent variable (LDV) model – illustrating that the better-educated tend to have higher consumption – but the insignificant fixed effects (FE) estimate (in the case of vocational training) suggests this relationship may not be causal.[1] A low return to schooling may reflect concerns regarding the quality of education, as well as segmentation of the labour market – meaning that the supply of good jobs is rationed such that large differences in earnings cannot be explained by individual characteristics. An negative return to primary education level reflect concerns regarding the basic skills and knowledge to exploit the labour opportunities.

Table 0-2: The Welfare impact of education and vocational training, FE and LDV estimates

VARIABLES	Vocational Level		Primary Level		Secondary Level	
	(1)	(2)	(3)	(4)	(5)	(6)
Average years of education for adult HH members	0.006	0.066***	0.006*	0.070***	0.007*	0.068***
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)

HH member has completed vocational training	0.076***	0.071**				
	(0.027)	(0.028)				
HH member has completed primary level			0.003	-0.044**		
			(0.017)	(0.020)		
HH member has completed secondary					-0.005	0.035
					(0.039)	(0.047)
Constant	11.084***	6.395***	11.085***	6.388***	11.085***	6.373***
	(0.029)	(0.138)	(0.029)	(0.138)	(0.029)	(0.138)
R-squared	0.044		0.043		0.043	
Observations	10,851	4,732	10,851	4,732	10,851	4,732

Source: NPA calculations based on UNPS 2005/06-2011. Notes:*;** and *** indicate the estimated impact is statistically significant at 10%; 5% and 1% levels respectively. In all columns, the dependent variable is log consumption per adult equivalent (commonly known as welfare). Columns (1), (3) and (5) controls for household-level fixed effects; column (2), (4) and (6) controls for household consumption in the previous period (i.e., lagged-dependent variable). Both regressions controlled for household demographic variables (e.g., household size and dependency ratio (not reported).

5.4. Conclusion

The aim of this chapter was to examine dynamics of returns to education particularly in the context of one of UPE's objectives —reduce poverty by equipping every individual with basic skills. The returns to education looked at in terms of changes in household welfare and net financial (i.e. wage earnings) return of additional year of schooling. The findingsindicate that educational investment in Uganda deliver a significant return in the wage employment, with higher levels of schooling significantly raising the average rate of return to education. Furthermore, there are variations in educational wage differentials around this average rate of return, linked mainly to gender and to urban/rural location. However, with no individual data on work environment and type of work, we could not conclusively rule out discrimination at work. With respect to welfare impacts of education attainment, the findings support Government's emphasis on skilling the youth especially through technical and vocational training as a means to improve labour productivity and earnings from self. Completing vocational training compared to primary training is estimated to increase consumption by between 7.1% and 7.6% compared to a reduction of 4.4%.

The findings on net financial gains of education indicate that a low return to schooling and a negative return to primary education. The former may reflect concerns regarding the quality of education, as well as segmentation of the labour market– meaning that the supply of good jobs is rationed such that large differences in earnings cannot be explained by individual characteristics. The latter reflects reflect concerns regarding the basic skills and knowledge acquired at primary level to exploit the labour opportunities.

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[1]This may in part reflect limited variation in educational attainment within households over time, but the close-to-zero effect is estimated relatively precisely (standard error= 0.004).

SECTION SIX

6.0. IMPACT OF UPE EDUCATION POLICY

6.1. Introduction

The findings in Chapters 3 and 4 showed that while Uganda has increased access to education, it still grapples with challenges of high dropout and repetition rates and low quality of education as measured by pupil performance on NAPE tests and PLE examination results. This chapter analyses the effectiveness of educational interventions based on a statistical (econometric) approach.

The purpose of an impact analysis of learning outputs and outcomes is to combine all relevant factors that have an impact on learning achievement. In line with previous impact studies the word impact here refers to effects – positive or negative, intended or unintended – on individual households, institutions, and the environment caused by a given development activity, such as a programme or project (Baker, 2000; World Bank, 2005). Examples are the number of teachers, classrooms and books. It is impossible to analyze these factors in isolation. Moreover, various other interventions or exogenous factors may also have an impact on access and learning. Therefore, a detailed assessment of factors affecting access and learning achievement requires taking into account specific school and pupils characteristics and exogenous factors such as pupils' households.

Overall, results suggest that demographic and socio-economic factors still have a significant influence on overall education attainment in primary education even when the tuition is free under the UPE policy. This assertion is supported by the earlier analysis of drivers of education expenditure in Chapter 4.

We adopt the regression-based approach, with school-level interventions or outputs as regressors and access and learning achievement as dependent variables. This approach is known as the 'estimation of education production functions' (see Glewwe and Kremer, 2005). The production function approach stresses the linkage between school inputs and cognitive achievements.

Using the production approach, differences in access and learning achievements are explained by: 1) characteristics of the pupils (gender, age, where they live, work at home); 2) specific characteristics of households (such as welfare and education of parents,); and 3) school-related factors (such as distance to school, availability of desks and books, qualifications of teachers, contact hours, teacher absenteeism).

Three approaches of analysis can be suggested: (1) a regression analysis of factors affecting access at the household level; and (2) a descriptive analysis of learning achievements, namely grade repetition and dropout rates, by different background characteristics, (3) the regression analysis of learning achievements at the school.

The focus of this section is on the first two approaches. Previous evaluation of UPE by IOB(2008) provided a detailed regression analysis of learning achievements at the school level. The study assessed the effect of UPE intervention of on access and learning at the school level. In particular, the study analyzed the effects of (changes in): pupil teacher ratio, classroom availability, and availability of toilets, teacher education, teacher training, head teacher qualifications, and distance to the nearest primary school on learning achievements. It

also controlled for the effects of (differences in): school type (public, private, and community), location (urban, peri-urban, and rural), region, socio-economic differences, percentage girls, and percentage orphans.

6.2. Regression Analysis of Factors affecting access to Schooling at Household Level

UPE not only aimed at increasing access to education (through enrolment) but also ensure that pupils who enroll are able to progress through the primary education system and complete the primary education cycle. To this end, therefore, it is important to the determinants of enrolment, progression, and completion. In particular, we focus on analyzing factors associated with school enrolment and educational attainment to grades 6 and 7.

We use the UNHS 2012/13 to conduct this analysis. To investigate the impacts of the UPE policy on educational attainments, we compare two datasets that covers enrolment patterns and detailed information on out-of-pocket expenses on education by households. UNHS data is available for the period 1992/93 —1996/97 (pre-UPE era) and from 1999/00 —2012/13 (UPE era). Moreover, since UNHS 2012/13 includes children who were aged six and younger when the UPE was implemented in 1997, it is possible to evaluate the impacts of the UPE on primary educational attainments by comparing the pre- and post-UPE cohorts.

6.2.1. Determinants of Enrolment

To investigate the determinants of school of enrolment, we construct a dummy variable, E_{ij}, which takes one if child i of household j attends school and zero otherwise, and estimate the following model with logit at the child level— for children of primary (secondary) school-age (6 -12 years) (13-18 years) as well as for boys and girls separately.

$$\text{Prob}\left(E_{ij}\right) = f(HD_j, H_j, R_j, CD_j) \ (6.1)$$

The regression results in Table 6.1 below suggest that different factors affect the school enrolment of boys and girls aged 6–12. Among girls, we find that the age of the child, per capita expenditure, household assets, and education of the household head, urban and regional dummies are the factors that have a positive and significant impact on enrolment. Households headed by a female and the number of siblings aged 6 to 18 years negatively affect girl child enrolment. Younger girls tend to be out of school, which will result in delayed enrolments. The same factors affect enrolment for boys, albeit sex of the household head has no significant effect. Unlike previous studies (Nishimura, Yamano, & Sasaoka, 2008) we find that expenditures increase enrolment for both boys and girls in both young and older age groups, indicating that there is no gender preference for boys over girls and vice versa.

Among children aged 13 to 18, socio-economic factors have strong impacts on enrollment. Because some of them attend secondary schools, which are not free, the results are as expected. Gender differences in the estimated coefficients appear strong among this age group. Education of the household head is strongly related to enrolment for this age group regardless of gender. The estimated marginal effects increase with the level of the household level of education. Being a male orphan reduces the likelihood of school enrolment. Protestant religion is a positive factor only for girls. Furthermore, a girl is likely to be out of school when her household head is elderly (in the 60s), while boys are not affected by the age

of household head. One possible explanation is that girls living with the elderly are the caretakers. Boys in the western region and girls in the central region are likely to be in school. In the eastern region, both girls are more likely to be in school. Overall, for the age group, it appears that the principal reason or not being in school is lack of money. This reason is more pronounced in urban areas (59%) than in rural areas (53%). In addition, it also appears to be more important for boys (60%) than girls (49%). However, for girls, early pregnancies (10%) is an additional reason for dropout.

Table 6-1: Determinants of enrolment by gender and age group: primary &secondary level, Estimated Marginal Effects, UNHS2012/13

	Primary level (Age 6-12)		Secondary level (Age 13-18)	
VARIABLES	Female	Male	Female	Male
Child characteristics				
Age	0.048***	0.052***	-0.046***	-0.036***
	(0.003)	(0.003)	(0.006)	(0.005)
Orphan	0.034	-0.003	0.039*	-0.035*
	(0.023)	(0.025)	(0.022)	(0.018)
HH Head characteristics				
Head aged 20-29 (=1)	0.049**	-0.002	0.029	
	(0.023)	(0.024)	(0.136)	
Head aged 30-39 (=1)	0.016	0.009	-0.006	0.009
	(0.013)	(0.015)	(0.019)	(0.018)
Head aged 50-59 (=1)	0.007	-0.032*	-0.023	0.013
	(0.018)	(0.019)	(0.019)	(0.018)
Head aged 60&above (=1)	-0.020	-0.036	-0.068***	-0.001
	(0.025)	(0.027)	(0.025)	(0.023)
Gender of Head (female=1)	-0.025*	-0.016	-0.033	-0.007
	(0.015)	(0.016)	(0.021)	(0.017)
Catholic (=1)	-0.030*	-0.001	0.021	-0.017
	(0.017)	(0.020)	(0.022)	(0.022)
Protestant (=1)	-0.002	0.004	0.046*	0.005
	(0.019)	(0.021)	(0.026)	(0.024)
Muslim (=1)	0.004	-0.015	0.004	-0.042
	(0.024)	(0.025)	(0.032)	(0.027)
HH head completed Primary educ. (=1)	0.075***	0.069***	0.087***	0.062***
	(0.012)	(0.014)	(0.018)	(0.016)
HH head completed Secondary educ. (=1)	0.101***	0.094***	0.115***	0.118***
	(0.020)	(0.022)	(0.031)	(0.030)
HH head completed Post-sec educ. (=1)	0.107***	0.110***	0.200***	0.141**
	(0.038)	(0.042)	(0.072)	(0.071)
HH characteristics				
ln (per capita expenditure in USD$)	0.071***	0.075***	0.074***	0.052***
	(0.012)	(0.014)	(0.016)	(0.014)
ln (assets –value in Ushs)	0.008*	0.007	0.011*	0.006
	(0.005)	(0.005)	(0.006)	(0.006)
Number of siblings aged between 6 and 18	-0.007*	-0.005	0.005	0.010**
	(0.004)	(0.004)	(0.005)	(0.005)
Urban (=1)	0.036*	0.034*	0.024	0.036
	(0.020)	(0.020)	(0.025)	(0.026)
Region (Greater Kampala=rfc)				
Central (=1)	0.130***	0.079*	0.098*	0.050
	(0.039)	(0.045)	(0.056)	(0.049)
Eastern(=1)	0.149***	0.103**	0.159***	0.100**
	(0.038)	(0.044)	(0.057)	(0.049)

	Primary level (Age 6-12)		Secondary level (Age 13-18)	
VARIABLES	Female	Male	Female	Male
Northern (=1)	0.093**	0.088*	0.069	0.079
	(0.037)	(0.045)	(0.055)	(0.050)
Western(=1)	0.116***	0.086*	0.052	0.086*
	(0.037)	(0.044)	(0.052)	(0.049)
Observations	2,988	2,945	1,610	1,748
Pseudo R-squared	0.236	0.172	0.224	0.132

Source: NPA calculations based on UNHS2012/13. Notes: Standard errors in parentheses; *** 1 percent level, ** 5 percent level, * 10 percent level

6.2.2. Determinants of Educational Attainment up to Grades 6 and 7

To examine the determinants of educational attainment up to grades 6 and 7, we use dummy variables, $A6_{ij}$ and $A7_{ij}$, which take one if child i of household j completed grade 6 and grade 7, respectively, and zero otherwise. Estimating the overall impacts of UPE on primary educational attainment necessitates data from the population that has already completed primary education. For example, we can estimate equation (6.2) for young adults aged 25 to 34 and regard those who are aged 25 to 29 in 2013 (thus aged 9 to 13 in 1997) as the post-UPE cohort and those who are aged 30 to 34 in 2013 (thus aged 14 to 18 in 1997) as the pre-UPE cohort. Then, we can estimate Equation 6.2 with logic at the individual level:

$$\text{Prob}\left(A6_{ij} \quad OR \ A7_{ij}\right) = f\left(UPE_{ij}, HD_j, H_j, R_j, CD_j\right) \text{ (6.2)}$$

where the UPE cohort dummy variable in this model takes one for middle-age adults aged 25 to 29 in 2013.

The results in Table **6-2** indicate that the UPE policy has marginally increased educational attainment in primary school. According to the results, the completion rates of the sixth grade increased by 2.2 percentage points for middle-aged female adults aged 25-29 in the post-UPE cohort. In contrast, the completion rate of the sixth grade did not increase significantly for young male adults in the post-UPE cohort. We attempted the same equations for the seventh grade, but the UPE cohort did not show a statistical significance for both male and female young adults. Thus, we conclude that the UPE policy has mild positive impacts on the completion rates of primary education up to the sixth grade for female students but not for male students.

Demographic and socio-economic factors influence education attainment. In particular, living in a female-headed household or an middle-aged headed household (50-59 years) significantly reduces education attainment for females. On the other hand, completion rate of the grade sixth increases significantly by between 3-5 percentage points for females living in the Eastern, Western and Central regions. We could not find a similar statistically significant effect for young adult males. Overall, results suggest that demographic and socio-economic factors still have a significant influence on overall education attainment in primary education even when the tuition is free under the UPE policy. This assertion is supported by the earlier analysis of drivers of education expenditure in Chapter 4.

Table 6-2: Determinants of attainment up to grade 7 by gender (cohort of age 25-34), UNHS 2012/13

	Grade 7 attainment (A7ij =1)			Grade 6 attainment (A6ij =1)		
VARIABLES	All	Female	Male	All	Female	Male
Child characteristics						
UPE cohort (age 25-29=1)	0.013	0.016	0.010	0.002	0.022*	-0.022

VARIABLES	Grade 7 attainment (A7ij =1)			Grade 6 attainment (A6ij =1)		
	All	Female	Male	All	Female	Male
	(0.009)	(0.011)	(0.015)	(0.010)	(0.013)	(0.015)
HH Head characteristics						
Head aged 20-29 (=1)	0.051***	0.054***	-0.000	-0.007	-0.032	0.003
	(0.017)	(0.020)	(0.019)	(0.016)	(0.022)	(0.021)
Head aged 30-39 (=1)	0.038**	0.043**	-0.001	0.011	0.005	-0.003
	(0.016)	(0.017)	(0.023)	(0.014)	(0.016)	(0.024)
Head aged 50-59 (=1)	0.037*	0.045*	-0.000	-0.063**	-0.052*	-0.051
	(0.022)	(0.024)	(0.023)	(0.025)	(0.031)	(0.032)
Head aged 60&above (=1)	0.036	0.040	-0.012	0.013	0.006	0.000
	(0.023)	(0.026)	(0.024)	(0.020)	(0.027)	(0.024)
Gender of Head (female=1)	-0.023***	-0.021**	-0.013	-0.001	0.007	0.004
	(0.008)	(0.011)	(0.010)	(0.010)	(0.015)	(0.016)
Area of residence (urban=1)	0.012	0.020	0.002	-0.006	-0.020	0.005
	(0.010)	(0.013)	(0.009)	(0.010)	(0.015)	(0.009)
Catholic (=1)	0.004	-0.003	0.010	0.012	0.005	0.015
	(0.012)	(0.014)	(0.011)	(0.012)	(0.016)	(0.013)
Protestant (=1)	0.005	0.005	0.006	0.008	-0.008	0.019
	(0.012)	(0.014)	(0.012)	(0.013)	(0.017)	(0.013)
Muslim (=1)	0.007	-0.004	0.012	0.013	-0.011	0.026*
	(0.015)	(0.018)	(0.014)	(0.015)	(0.021)	(0.015)
Head has completed primary	0.105***	0.065***	0.083***	0.122***	0.107***	0.089***
	(0.013)	(0.017)	(0.019)	(0.014)	(0.020)	(0.019)
Head has completed secondary	0.005	0.047**	-0.094***	0.024	0.077***	-0.072***
	(0.018)	(0.020)	(0.023)	(0.018)	(0.023)	(0.023)
Head has completed degree & above	0.002	0.042*	-0.064**	-0.074**	-0.033	-0.098**
	(0.023)	(0.024)	(0.031)	(0.033)	(0.042)	(0.040)
Household characteristics						
ln (per capita expenditure per adult equivalent in Ushs)	-0.000	-0.000**	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region and area of residence						
Central (=1)	0.019*	0.046***	-0.007	0.034***	0.047***	0.013
	(0.010)	(0.014)	(0.009)	(0.011)	(0.017)	(0.010)
Eastern (=1)	0.010	0.025*	-0.003	0.032***	0.035**	0.021*
	(0.010)	(0.013)	(0.010)	(0.011)	(0.015)	(0.011)
Western (=3)	0.051***	0.080***	0.011	0.025**	0.045***	0.002
	(0.012)	(0.017)	(0.011)	(0.011)	(0.017)	(0.009)
Area of residence (urban=1)	0.012	0.020	0.002	-0.006	-0.020	0.005
	(0.010)	(0.013)	(0.009)	(0.010)	(0.015)	(0.009)
Pseudo R-squared	0.095	0.071	0.199	0.101	0.065	0.205
Observations	4,013	2,145	1,868	4,013	2,145	1,868

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

6.4. Descriptive analysis of learning achievements by household background characteristics

Several household level factors have an impact on learning achievement. Examples include gender, location (rural/urban), household wealth, and education of the household head among others. The analysis in this section sheds light on how learning outcomes in Ugandan primary schools are affected these background characteristics. The analysis is based on UNHS 2012/13 dataset.

The repetition rate by grade in primary school is the proportion of students in a given grade of primary school who were enrolled in the same grade the previous school year. The primary completion rate is the total number of students of any age in the last grade of primary school minus the number of repeaters in that grade, divided by the number of children of official graduating age. The completion rate can exceed 100 percent if many over-age students in the system graduate.

The results presented in **Table 6-2** has relatively repetition rates in grade 1 for both boys and girls and grades 6 and 7 for boys. A bigger proportion of children in rural areas (26%) repeat grade 1 compared to only 17% in urban areas. High repetition rate in grade 1 may be due to some children that start schooling at a young age (<6 years). It is also possible that teachers will choose to allow repetition just in order to prevent dropout. The NPA (2016) primary school survey confirms this hypothesis: some teachers do not support the automatic promotion system and defend repetition by claiming that there is no point in promoting a child if it lacks the knowledge to function effectively at the next grade level. According to them, repetition is likely to prevent dropout. They claim that repeaters receive extra attention (for instance, after official school hours). In the northern and western regions, repetition rates (especially in grade 1) are (considerably) higher than in the central districts. Repetition rates are (considerably) lower for children from households headed by someone with at least secondary education. A similar trend is observed for rich households. A high number of repeaters in primary 6 suggest that a major reason for repetition is that it helps pupils to perform better at the PLE.

The challenge of over-aged children in the primary system is evident when one looks at the completion rates; all the five regions have completion rates above one 100, an indication that many children graduate out of the primary education system are over-age. Looking at other background characteristics, we observe an expected disparity in completion rates by gender, wealth, rural/urban areas and levels of education.

Table 6-3: Repetition rate by single grade of primary education and Completion rate, according to background characteristics, [UNHS2013]

	Repetition rate (%)							Completion rate for primary, (%)
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	
Total	**24.9**	**11.5**	**12.2**	**17.7**	**16.1**	**19.3**	**17.3**	55.1
Gender								
Boys	25.3	12.5	12.7	17.7	16.1	22.5	18.9	63.6
Girls	24.4	10.6	11.7	17.7	16.1	15.4	14.9	47.9
Area of residence								
Urban	16.9	11.8	14.5	16.1	13.4	11.2	12.4	69.0
Rural	26.4	11.5	11.8	18.1	16.7	21.6	19.3	52.0
Residence and gender								
Urban - Boys	20.4	10.3	14.3	15.0	15.2	10.9	15.8	73.4
Urban - Girls	13.0	13.3	14.6	17.0	11.7	11.4	6.5	65.5
Rural - Boys	26.3	13.0	12.3	18.3	16.3	25.0	20.2	61.5
Rural - Girls	26.6	9.9	11.2	17.9	17.1	16.8	17.8	43.7

	Repetition rate (%)							Completion rate for primary, (%)
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	
Household wealth								
Quintile 1	29.3	15.9	9.3	20.3	23.4	22.8	30.4	42.6
Quintile 2	24.2	10.8	12.1	17.6	12.2	20.9	16.2	53.1
Quintile 3	28.2	10.2	13.1	19.7	20.7	19.4	11.3	53.8
Quintile 4	23.1	9.9	16.7	18.0	14.7	19.0	13.8	65.4
Quintile 5	14.6	9.4	11.2	9.8	7.3	13.0	20.4	69.6
Gender of the household head								
Male	24.0	10.8	12.0	17.7	15.9	18.8	16.8	54.9
Female	27.3	13.4	12.4	17.9	16.6	20.4	19.0	55.3
Education of the household head								
No education	25.2	10.8	9.6	13.8	17.3	22.7	22.8	44.6
Incomplete primary	27.0	12.8	10.3	19.7	16.1	18.3	19.9	56.0
Primary	29.3	8.7	16.3	23.4	7.3	19.3	12.0	56.7
Incomplete secondary	17.5	11.5	15.4	16.1	18.7	21.6	17.2	58.8
Secondary	6.9	0.0	19.8	20.3	25.3	0.0	0.0	142.7
Some higher	21.2	7.6	23.8	7.3	11.8	14.7	0.0	76.2
RECODE of district (DISTRICT)								
Kampala	3.5	0.0	0.0	4.9	1.3	2.7	8.8	107.9
Central	43.2	22.4	30.7	28.2	28.1	32.8	20.0	107.3
Eastern	33.4	14.8	15.5	29.2	17.2	26.9	28.7	133.2
Northern	97.8	46.9	57.1	74.4	74.2	73.5	85.3	113.8
Western	48.5	18.9	14.9	23.3	26.5	39.7	29.2	102.0

Source: NPA calculations based on UNHS 2012/13 and the World Bank ADePT tool

The target of actions taken through the UPE program was a 54% primary completion rate. However, after nearly 20 years, results from the National Education Accounts (NEA) report show a completion rate of 67.4% in in 2013, which is (considerably) higher than the 55.1% estimated from UBOS data. The differences in EMIS and UBOS data explain the observed disparity. There has been slow growth rate in completion rates. This raises the question of education efficiency in Uganda. The persistently high dropout rates and low completion rates are evidence that the resources committed to primary education are not resulting in the expected outcomes.

6.5. Conclusions

The purpose of this chapter was to conduct an impact analysis of learning outputs and outcomes by combining all relevant factors that have an impact on learning achievement. Overall, results suggest that demographic and socio-economic factors have a significant influence on access and quality of education even when the tuition is free under the UPE policy. This conclusion is supported by the analysis of drivers of education expenditure that highlighted a significant education expenditure burden for households.

The findings also indicate considerably high repetition rates especially in lower grades even when there is an automatic promotion policy under UPE. Rising repetition rates lead to overcrowding, which raises costs. Therefore, reducing grade repetition is key to improving overall efficiency and attaining equity and quality education. Low completion rates highlight the challenge of high repetition and dropout rates in primary education system.

SECTION SEVEN

7.0. TECHINCAL EFFICIENCY OF UGANDA'S PRIMARY SCHOOLS

7.1. Introduction

The main objective of this chapter is to examine the efficiency of Uganda's primary education system in enabling as many pupils as possible progress through primary school education. Two distinguishable types of efficiency are highlighted in literature: (i) efficiency in resource allocation (Allocative efficiency), that, is the capacity of decision-making units (DMUs) to adequately select input amounts in light of their relative prices, and (ii) technical efficiency, which is DMUs' capacity to maximize output given a certain level of inputs. This chapter is concerned with the latter. Measuring technical (or productive) efficiency enables us to determine whether outputs (e.g., pupil test scores) can be increased by simply raising efficiency, without needing to increase input quantities (Farrell, 1957). It also makes it possible to rank and evaluate schools analyzed, thus permitting the design of incentive mechanisms to reward the best performers, as well as policies to raise efficiency (Lovell, 1993).

7.2. Estimation model, Data and Variable Description

Traditionally, technical efficiency measure is derived using the stochastic frontier production function model, originally based on the ideas of Aigner et al (1977) and, Meeusen and Van den Brock (1977). The empirical stochastic primary school production frontier model can be written following the following Battesse and Coelli (1992) model as follows:

$$Y_i = \alpha + X_i'\beta + \varepsilon_i \quad (7.1)$$

$$\varepsilon_i = v_i - u_i$$

$$v_i \sim N(0, \sigma_v^2$$

$$u_i \sim N(0, \sigma_u^2)$$

Where Y_i represents the output produced by school i (measured by the pass rate of school i) ; X_i is a vector of factor inputs (pupils, teachers, classrooms, toilets, and average class size); and β is a vector of parameters. The composed error term ε_i is the sum (or difference) of two identically and normally distributed disturbance terms, v_i, representing measurement and specification error, and u_i, representing inefficiency of school i. In other words, u_i reflects the fact that the output of each school must lie on or below its frontier. Any such deviation is the result of factors under the control of the school, for example inefficiencies resulting in both student and teacher absenteeism.

7.2.1. Data and Variable Description

This study used a school-level cross-sectional EMIS data on the performance of government and private primary schools in 2015.

Output variable: Following Muvawala and Hisali (2012), the dependent variable used is the performance index[1] of pupils that sat primary seven in the year 2015. Muvawala and Hisali (2012) argue that the performance index is a preferred measure of output because education is a

value-added product. Ideally, every year of schooling increases the knowledge level of pupils, implying that education outcomes can be measured using the knowledge test (e.g., PLE) and the competency test (e.g., literacy and numeracy tests).[2]Other studies (see Yawe, 2014) also use the PLE as the output variable. However, instead of constructing a performance index, the author uses the number of students that passed in division 1; division 2; division 3; and division 4 as four separate outputs.3 Moreover, student academic achievement, as measured by examination and other test scores, has been the most extensively studied educational benefit both in the developed and developing world (Simmons and Alexander, 1978).

Input variables: Six inputs were constructed, namely number of teachers; number of pupils; number of classrooms; number of toilets/latrine stances (lumped together and not decomposed by sex); average class size (constructed by dividing the total pupils population by the number of classrooms in the school), and pupil-teacher ratio. Average class size is commonly known as "Pupil-class ratio" and is widely considered a significant measure of school input in efficiency analysis. However, class size may be endogenous or correlated with school management (see for instance Glewwe and Kremer, 2005) and probably also correlated with school choice which is influenced b (probably well-educated) parents who normally take their children to schools with low pupil-teacher ratios. Many studies have attempted to measure the impact of class size on learning achievement and many of these have come to the conclusion that there is no significant – or even no positive (IOB, 2008). Failure to control for endogeneity in class size could be one of the reasons for the lack of significant relationship between class size and learning achievement.[4]To this end, we did not use the input class size in estimating inefficiency of schools.

7.3.   Descriptive and Correlation Analysis

7.3.1.   Descriptive Statistics

Table 7-1 presents summary statistics of the performance index by school ownership — government aided schools and private schools. In 2015, the performance rate for private schools stood at 80.2% compared to only 54.6% in government-aided schools, and this explains the low overall meanperformance index (55.9%). Muvawala and Hisali (2012) used a panel dataset covering 2001-t0-2008 period and found that the overall mean performance index was only 44% and was strongly influenced by government-aided schools, which constituted the overwhelming majority (97.3%) of schools at the time. The disparities in performance index between government-aided and private schools is affirmed by the coefficient of skewness of the distribution of the performance index, and itexhibits a high peak in the distribution (**Figure 7-1**).

Table 7-1: Descriptive statistics for the PLE Performance Index

	All schools	Government-aided school	Private schools
Number of observations	5174	4916	258
Mean	0.559	0.546	0.802
Minimum	0.147	0.147	0.256
Maximum	1	0.975	1
Standard deviation	0.148	0.137	0.135
Skewness	0.188	0.019	-1.114
p1	0.256	0.255	0.371

p99	0.919	0.834	0.993

Source: NPA Calculations based on EMIS, 2015 data

Figure 7-1: Distribution of performance index, by school ownership

Panel A: Private schools	**Panel B: Government-aided schools**
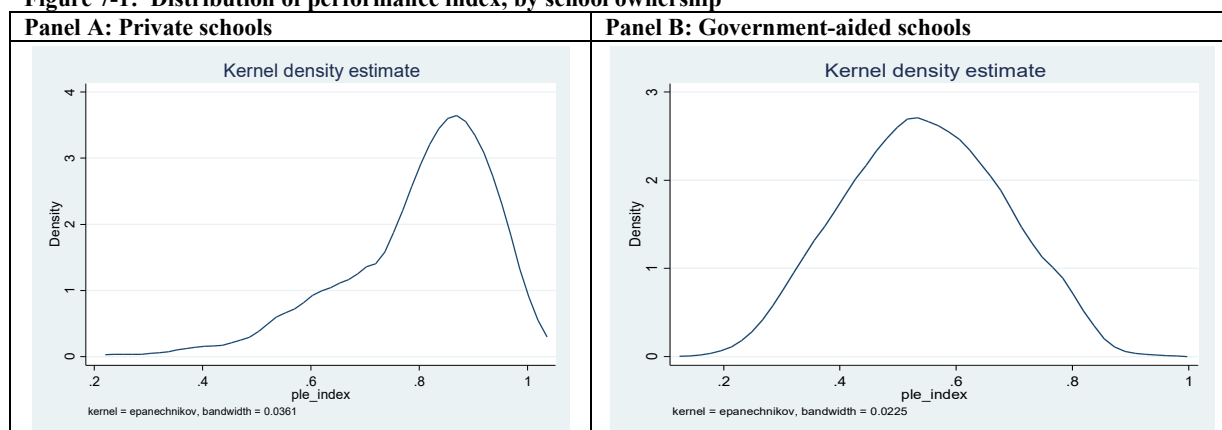
Source: NPA calculations from EMIS, 2015 data

7.3.2. Correlation Analysis

Table 7-2 presents the Pearson correlation matrix of input and output variables for the both government and private schools in 2015. Overall, correlation coefficients are significant but small in magnitude. It is clear from **Table 7-2** that all input variables are correlated with the output variable. The pupil-teacher ratio is negatively correlated with the performance index, an indication that overcrowded classes are likely to work against the good academic performance of pupils. The number of pupils is highly and positively correlated with the number of teachers. It is also positively correlated with all other inputs, albeit with smaller magnitude. The number of classrooms and toilets are positively correlated.

Table 7-2: Pearson pairwise correlations coefficients for inputs (PLE performance index) and output

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Performance index	1.000					
(2) Total Pupils	0.050*	1.000				
(3) Total teachers	0.273*	0.609*	1.000			
(4) Total classrooms	0.084*	0.155*	0.207*	1.000		
(5) Total latrine stances	0.128*	0.259*	0.302*	0.200*	1.000	
(6) Pupl-teacher ratio	-0.076*	0.361*	-0.194*	-0.001	0.039*	1.000

*Source: NPA calculations based on EMIS, 2015. Notes: * shows significance at the .05 level*

Similar correlations can be observed when we use different divisions of PLE as input variables. In particular, pupil-teacher ratio is negatively correlated with divisions 1 and 2, but positively correlated with divisions 3 and 4. One again, this implies that the schools with bigger pupil numbers are likely to register poor performance.

Table 7-3: Pearson pairwise correlations coefficients for inputs (Divisions) and output

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Division 1	1.000								
(2) Division 2	0.400*	1.000							
(3) Division 3	-0.115*	0.295*	1.000						
(4) Division 4	-0.128*	0.095*	0.668*	1.000					
(5) Total pupils	0.091*	0.347*	0.423*	0.303*	1.000				
(6) Total teachers	0.369*	0.455*	0.226*	0.115*	0.609*	1.000			
(7) Total classrooms	0.097*	0.126*	0.051*	0.029*	0.155*	0.207*	1.000		
(8) Total latrine stances	0.148*	0.179*	0.122*	0.068*	0.259*	0.302*	0.200*	1.000	
(9) Pupil-teacher ratio	-0.037*	-0.000	0.143*	0.136*	0.361*	-0.194*	-0.001	0.039*	1.000

*Source: NPA calculations based on EMIS, 2015. Notes: * shows significance at the .05 level*

7.4. Estimation Results

The stochastic frontier approach described in Subsection 7.2.2 was used to generate estimates for measuring technical efficiency in Ugandan primary schools. Following Muvawala and Hisali (2012), the SFA was specified in linear-log form, by transforming all the independent variables into natural logarithms, while the dependent variable is an index bounded between 0 and 1. Then, four separate production function models were run for private/government[5]-aided samples and rural-urban samples respectively. The results are presented in **Tables 7.4** and **Table 7.5** respectively. The estimate of the inefficiency term is taken as a measure of the percentage by which the particular observation (the school) fails to achieve the frontier, that is, the ideal performance index (Green 2008).

7.4.1. Frontier Estimates, By School Ownership: Government-Aided vs Private Schools

Table7.4 shows the values of the estimated percentage standard deviations of the inefficiencyerror. This suggests that neither type of school operates along their respectivefrontiers. That is, they do not achieve their expected ideal performance rates,and thus, exhibit technical inefficiency. However, the level with which each type of school fails to reach the frontier (i.e., sigma_u) is much higher for private schools (11.8%) compared to 0.38% in government-aided schools. With the estimated standard percentage of deviation for government schools, we cannot reject the hypothesis that government-aided schools are inefficient. However, the null hypothesis is rejected for private schools at 5% percent level of significance.

Table 7-4: Technical efficiency estimates of government-aided and private Schools

	Government-aided schools		Private Schools	
	Estimate	Standard error	Estimate	Standard error
Sigma_u	.0038	.0123	.1181	.0119
Sigma_v	.1311	.0015	.0461	.0073
lambda	.0291	.0127	2.566	.0169

Source: NPA calculations based on EMIS, 2015

7.3.3. Frontier estimates by location: Rural vs Urban Schools

The frontier estimates for rural and urban schools presented in **Table 7.5** are similar to those of government- aided and private schools, respectively, an indication that most government-aided schools are in rural areas, and most private schools are in urban areas. The estimated standard percentage of deviation by which a given urban school fails to attain the frontier is is only 5.7%, compared with 0.39% for a given rural school. The implication is that both rural and urban schools are inefficient. The results also show that the estimated percentage ratio of technical

inefficiency (sigma_u) to measurement/specification error, lambda, is far greater for urban than rural schools.

Table 7-5: Technical efficiency estimates of Rural and Urban Schools

	Rural		Urban	
	Estimate	Standard error	Estimate	Standard error
sigma_u	.0039	.0378	.0575	.0122
sigma_v	.1323	.0019	.1234	.0059
lambda	.0294	.0389	.4659	.0172

Source: NPA calculations based on EMIS, 2015

The findings presented here are in line with previous studies (Muvawala and Hisali, 2012; Yawe, 2014' Wakadala, 2012). For example, Muvawala and Hisali(2012) findings show that urban and private schools are more efficient compared to rural and government-aied schools, majority of which are in rural areas. Using the management and motivation in Ugandan Primary Schools baseline survey dataset conducted by UNEB in 2008 in four districts of Apac, Iganga, Hoima and Kiboga, Wakadala (2012) found that textbook-pupil ratio, classroom-pupil ratio and teacher-pupil ratio exhibited increasing returns to scale on literacy and numeracy. The author estimated an overall national technical efficiency index of 46% for literacy and 53% for numeracy. They also found that textbook-pupil ratio, classroom-pupil ratio and teacher-pupil ratio have positive elasticities on the two subjects while the rest have varying effect signs, respectively. Specifically, head teacher experience and per pupil family expense have positive elasticity on literacy and negative on numeracy, with returns to scale of 0.11 and -0.10 of school inputs on the former and latter, respectively. The negative scale implies that the increase of all the school factor inputs leads to less than the proportional increase in the school achievements in literacy and numeracy. They concluded that probably, government's effort on improving school resource inputs such as textbooks, hiring teachers and constructing classrooms in primary schools following huge increase in enrolment between 2003 and 2007 may somewhat be linked to improved school outcomes.

7.3. Conclusion

This Chapter analysed technical efficiency of the Ugandan primary schools using PLE performance index as a proxy for school outputs and teachers, classrooms, and toilets as school inputs. Four separate models—rural, urban, government-aided schools and private schools were estimated. Overall, the findings show that the level of technical inefficiency in rural and government-aided schools is much higher than that of urban and private schools. The findings are similar to those of Muvawala and Hisali (2012), Yawe (2014) and Wakadala (2012). The implication is that both rural and urban schools are inefficient. Technical inefficiency in primary schools given government's effort on improving school resource inputs such as textbooks, hiring teachers and constructing classrooms in primary schools, calls for the need to harness the monitoring of government inputs, outputs and outcomes in order to improve the effectiveness and efficiency of primary schools.

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[1]Muvawala and Hisali (2012) compute the performance index by weighting each candidate such that passing with the best grade carries a high weight, and failure is given a zero weight. The weights are summed and expressed as a ratio of the expected maximum weight, which is estimated by multiplying the highest weight by the number of candidates who sat the exam. For example, suppose a particular school had a total of 100 PLE candidates that sat the exam. Assign weights for the five divisions ranging from 5 to 0, 5 for the best grade and 0 for failure. If all 100 student passed in Division 1, the expected maximum weight would be 5*100=500. Suppose 1 pupil passed in DIV1, 10 in DIV2, 20 in DIV3, 29 in DIV4, and 40 failed, then the weighted sum is: 1*5+2*10+3*20+4*29+40*1=293. The PLE index is then obtained as 293/500.

[2]The Uganda National Examinations Board (UNEB) administers both knowledge (PLE) and competency (NAPE) tests, but in principle, the two tests vary; knowledge test gauges knowledge, whereas the competency test determines mastery of certain competencies such as numeracy and

literacy. On the other hand, the NAPE tests of literacy and numeracy are diagnostic rather than continuous in that different respondents (even within the same school) are tested each time. This can be a challenge for longitudinal analysis that requires continuous data. Therefore, the only continuous dataset available is the knowledge test at P7 (PLE), compiled annually by the UNEB.

[3]UNEB classifies PLE candidates' performance into several divisions. Qualifying for Division 1 entails obtaining between 4 and 12 aggregates; Division 2 (obtaining between 13 and 23 aggregates); Division 3 (obtaining between 24 and 29 aggregates); Division 4 (obtaining between 30 and 34 aggregates). Those that score 35 and above and those that cannot be graded are classified into Dision X and U respectively.

[4] Other studies have argued that while class size is one of the central variables for learning achievement, it is not clear as to what defines class size. For instance, IOB (2008: 110) notes that "pupil classroom ratio is not necessarily the best indicator of class size" especially in the Uganda context where in some areas it is not uncommon for teachers to teach under trees implying that lack of classrooms does not mean lack of classes (or learning)

[5]

SECTION EIGHT

8.0. Conclusions and Policy Recommendations

This report titled "***Comprehensive Evaluation of the Universal Primary Education (UPE) Policy in Uganda: Education Modelling and Forecasting***" is part of the8.0. four thematic areas of the main evaluation of UPE policy in Uganda, that came into effect in 1997 following the abolition of school fees (direct costs).

The modelling and forecasting theme aimed conducting evidence-based analytical analysis of the UPE policy interventions in order to assess the achievements, effectiveness, efficiency, relevancy, and sustainability of the UPE policy. Specifically, the report took stock of the gains and identified the underlying constraints that must be addressed to accelerate and sustain progress.

The findings presented in this report shed more light on a number of central and pertinent questions:

In what way have school attendance and learning achievement developed since 2000?

(1) What were the main drivers/determinants of these developments?
(2) Which interventions have had the largest and most cost-effective impact on educational outputs?
(3) How has UPE contributed to returns to education and the overall household welfare?
(4) How has the level of technical efficiency of Uganda schools evolved over the UPE implementation period?

Using a wide range of available datasets combined with existing evidence on pupil learning outcomes—PLE and competency (numeracy and literacy) test scores, and other education learning outcomes, this report presents findings in this report remind us of the journey Uganda has trekked in a bid to deliver on the objectives of the UPE policy. Government aimed at creating conducive conditions for the expansion of equitable access to quality primary education. This enormous work could not have been done without support and collaborations with development partners. Indeed, developments through either their direct government support of via international development agendas such as the MDGs helped Uganda to pool financial and technical capacity to harness implementation of the UPE policy interventions.

Without doubt, the UPE policy is an important policy for enhancing human capital development in Uganda. Through UPE, Uganda has registered significant progress in a number of areas, notably equitable access and increased public funding for the education sector. However, minimal progress has been registered in the area o quality of education and learning achievements. With significant improvements in access to and demand for education, maintaining and enhancing quality is a major challenge. Learning outcomes are poor and showing few signs of improvement. If pupils attending lessons are learning little, it is no surprise that almost one in five are not in school. The implication is that the quality and responsiveness of education public services are key factors limiting their effectiveness in UPE policy. These

challenges also reflect the limited capacity of Uganda's education system to innovate and learn – what can be termed systemic capability.

On the demand-side, many factors undermining the effectiveness of UPE policy are beyond the control of service providers. Economic conditions and social attitudes and norms often prevent individuals from accessing education. For instance, financial constraints continue to drive non-enrolment and school dropout rates, reflecting household expenses on stationary, meals and uniforms, and the economic obligations that many children have. Social attitudes and cultural practices also remain important barriers, particularly for girls to remain in school and for some women to access maternal care.

These demand-side constraints have reduced significantly over the last 15 years. Uganda's inclusive economic growth and rapid reduction in poverty have significantly increased the financial resources at the disposal of households. This has allowed real private per capita spending on education to grow an annualized rate of 11.6% between 2002/03 and 2012/13. This also illustrates the increasing priority Ugandans have accorded to these areas, and the impact of public policy in raising awareness and addressing cultural constraints even among the poorest households.

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APPENDICES

Appendix A

Box 1 Benefit incidence analysis

BIA estimates the value of government subsidies, in say, healthcare services in order to assess the real family (household) burden by expenditure. In other words, for service use, benefits are based on the need for social sector services such as healthcare and universal primary and secondary education. Providing insights on the distributional effects of public spending on the education and health sectors for the different population sub-groups in Uganda is important because the two sectors are crucial for maintaining a healthy and quality population, and developing the required human resource for effective engagement in profitable economic activities in Uganda.

The essence of BIA is to reveal which income groups capture the benefits of public expenditure in these sectors. The distribution of benefits depends on both government behaviour – including the level and composition of public spending – and on household behaviour (e.g. whether parents choose to send their children to public schools).

Official government data on the level of total public recurrent spending on public education and health sectors was used to compute the per-user unit cost per facility level. This was combined with survey data on household service use/utilisation and welfare to gain insights into the distribution of public social sector spending benefits in Uganda. The approach used to identify the benefit incidence of publicly provided education and health services was the mean subsidy approach, implying that it was assumed that the government subsidy for one unit of education (health) service is the same for all individuals, regardless of income/expenditure level and geographic location within population area. This approach has been widely used in benefit incidence studies. The analysis was done for a ten year period: 2002/03—2012/13, to assess trends in public funding, subsidy and utilisation of government services. For the education sector, the analysis was done for only primary and secondary levels, covering the population aged 6—18 years to emphasize SDG focus on both primary and secondary levels of education. In generating the health unit/centre variable using the survey data, health centre, community health worker, HomePAK drug distributor, government health unit and health unit NGO were combined. The hospital variable constitutes the government and hospital and NGO hospital variables.

Appendix for Chapter 4

Table A4- 1: Household expenditure on primary education, [UNHS2013]

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Total	96.1	548,391.8	39.5	26.1	2.0	16.3	16.0
Gender							
Boys	95.9	541,586.3	39.1	26.4	2.1	16.4	16.0
Girls	96.4	555,507.4	40.0	25.8	1.9	16.2	16.1
Area of residence							
Urban	96.1	1,120,740	50.3	19.5	2.5	12.6	15.2
Rural	96.1	418,469	37.1	27.6	1.9	17.1	16.2
Residence and gender							
Urban - Boys	96.2	1,069,650	49.4	19.7	2.3	13.5	15.0
Urban - Girls	96.1	1,174,225	51.2	19.2	2.7	11.6	15.3
Rural - Boys	95.8	421,626	36.8	27.9	2.0	17.1	16.2
Rural - Girls	96.5	415,168	37.5	27.3	1.8	17.2	16.2
Household wealth							
Quintile 1	98.6	168,221	29.3	33.0	0.9	20.7	16.1
Quintile 2	96.7	266,138	33.0	30.5	1.9	19.1	15.5
Quintile 3	96.0	438,463	42.4	23.6	1.8	15.1	17.0
Quintile 4	95.6	669,647	46.8	21.0	2.4	13.5	16.4
Quintile 5	92.3	1,645,020	52.8	18.3	3.8	10.2	15.0
Household wealth and gender							
Quintile 1 - Boys	98.4	154,756	28.7	33.2	1.1	21.4	15.6

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Quintile 2 - Boys	96.5	261,405	32.2	30.7	1.9	19.0	16.3
Quintile 3 - Boys	95.4	457,197	43.0	23.9	1.9	14.7	16.6
Quintile 4 - Boys	95.8	702,326	48.9	20.1	2.4	12.9	15.7
Quintile 5 - Boys	91.2	1,604,798	50.1	19.3	4.1	10.6	15.9
Quintile 1 - Girls	98.7	183,259	30.0	32.7	0.7	19.9	16.6
Quintile 2 - Girls	96.9	271,368	33.8	30.4	2.0	19.2	14.7
Quintile 3 - Girls	96.6	420,043	41.9	23.4	1.7	15.5	17.5
Quintile 4 - Girls	95.4	637,395	44.8	21.8	2.4	14.0	17.0
Quintile 5 - Girls	93.3	1,685,852	55.4	17.3	3.5	9.7	14.0
Gender of the household head							
Male	96.0	568,447	38.9	26.2	2.0	17.1	15.9
Female	96.5	496,962	40.8	26.1	2.1	14.5	16.6
Education of the household head							
No education	97.5	306,734	36.6	30.9	1.1	15.7	15.8
Incomplete primary	96.7	425,174	36.6	27.2	1.9	17.7	16.6
Primary	95.8	575,923	44.9	23.1	2.3	13.7	16.0
Incomplete secondary	93.5	879,679	45.7	21.8	2.6	15.3	14.6
Secondary	94.9	1,257,980	56.6	14.4	3.6	12.9	12.4
Some higher	92.6	1,833,722	53.2	15.6	3.9	11.7	15.5
RECODE of district (DISTRICT)							
Kampala	97.2	2,598,795	70.5	9.8	3.3	6.4	10.1
Central1	96.9	1,056,252	52.2	22.9	1.8	6.4	16.6
Central2	97.2	731,817	47.9	22.2	2.0	8.5	19.4
East Central	98.0	359,355	28.7	30.6	1.4	15.6	23.6

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Eastern	94.2	359,016	24.9	33.6	2.7	25.6	13.2
Mid-North	96.6	348,470	42.8	23.9	1.9	19.4	12.0
North East	93.1	188,915	21.8	42.7	2.7	21.9	10.9
West Nile	95.6	233,049	33.0	27.4	0.7	20.2	18.6
Mid-West	96.3	548,925	49.3	20.8	2.3	13.6	14.1
South-westrn	96.1	682,351	50.4	19.3	2.0	12.7	15.6

Source: Authors' calculations based on UNHS 2012/13 using he World Bank ADePT software

Table A4- 2: Table D2: Household expenditure on secondary education, [UNHS2013]

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Total	94.9	1,319,582.8	50.4	19.5	3.1	10.3	16.8
Gender							
Boys	95.4	1,330,217.3	51.8	18.2	2.8	10.8	16.4
Girls	94.2	1,306,301.3	48.6	21.0	3.5	9.6	17.2
Area of residence							
Urban	95.0	1,977,558.4	57.2	18.6	3.9	6.6	13.8
Rural	94.8	990,973.7	47.1	19.9	2.7	12.0	18.2
Residence and gender							
Urban - Boys	95.2	1,958,431.6	58.5	18.7	3.6	6.8	12.3

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Urban - Girls	94.7	2,000,082.7	55.6	18.4	4.2	6.4	15.4
Rural - Boys	95.4	1,028,643.2	48.7	17.9	2.4	12.6	18.3
Rural - Girls	94.0	942,520.0	45.1	22.3	3.2	11.3	18.0
Household wealth							
Quintile 1	98.1	516,941.6	40.7	24.4	0.4	16.2	18.3
Quintile 2	96.3	578,281.4	42.9	22.5	3.0	14.0	17.6
Quintile 3	95.6	907,053.6	46.6	20.1	2.3	11.7	19.3
Quintile 4	95.2	1,181,650.0	53.1	19.4	3.1	8.3	16.1
Quintile 5	91.7	2,618,061.3	60.1	15.1	5.0	6.0	13.8
Household wealth and gender							
Quintile 1 - Boys	98.3	557,669.6	45.5	23.3	0.5	17.7	13.1
Quintile 2 - Boys	96.8	569,911.5	42.4	19.0	3.0	14.8	20.8
Quintile 3 - Boys	96.5	907,803.0	48.5	19.1	1.2	11.2	20.0
Quintile 4 - Boys	95.6	1,233,794.3	56.2	17.4	3.5	8.8	14.1
Quintile 5 - Boys	91.4	2,800,324.5	60.5	14.9	4.7	6.3	13.5
Quintile 1 - Girls	97.8	441,469.1	31.6	26.6	0.2	13.4	28.2
Quintile 2 - Girls	95.8	587,225.9	43.5	26.1	3.1	13.2	14.1
Quintile 3 - Girls	94.3	906,038.8	44.1	21.4	3.8	12.3	18.4
Quintile 4 - Girls	94.6	1,105,458.5	49.0	22.0	2.5	7.7	18.8
Quintile 5 - Girls	91.9	2,441,295.4	59.7	15.3	5.2	5.7	14.1
Gender of the household head							
Male	94.8	1,474,740.1	51.9	17.7	3.1	10.9	16.4
Female	95.1	1,002,786.1	47.0	22.9	3.2	9.3	17.6

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Education of the household head							
No education	97.4	713,278.2	39.2	23.2	1.4	15.2	21.0
Incomplete primary	95.3	994,369.8	47.4	22.0	2.6	10.7	17.4
Primary	94.3	1,159,245.7	53.3	17.3	3.9	9.1	16.4
Incomplete secondary	94.2	1,785,031.3	54.5	17.4	3.2	9.2	15.6
Secondary	91.4	1,844,842.1	58.3	15.9	7.2	7.5	11.0
Some higher	91.4	2,898,183.2	65.9	10.8	5.4	5.3	12.5
RECODE of district (DISTRICT)							
Kampala	95.1	2,750,881.2	67.0	12.7	5.5	6.0	8.8
Central1	96.0	1,945,806.3	52.3	24.2	2.7	5.0	15.9
Central2	96.1	1,561,566.9	52.8	21.1	2.4	8.4	15.3
East Central	95.6	759,539.4	39.7	21.5	3.8	12.5	22.4
Eastern	93.1	695,109.1	37.7	23.8	4.3	16.7	17.6
Mid-North	91.2	989,908.3	60.2	15.4	3.2	9.3	12.0
North East	84.2	1,010,403.4	42.6	20.9	2.0	10.8	23.8
West Nile	86.1	1,320,839.1	61.1	10.3	1.6	8.0	18.9
Mid-West	96.0	1,375,178.4	53.6	16.5	1.8	10.1	18.0
South-western	96.8	1,264,348.7	60.7	13.4	2.0	9.1	14.9

Source: Authors' calculations based on UNHS 2012/13 using he World Bank ADePT software

Table A4- 3: Table D3: Household expenditure on post-secondary education, [UNHS2013]

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Total	95.7	3,586,804.1	62.0	9.6	10.4	2.8	15.1
Gender							
Boys	97.9	3,725,427.8	64.0	6.7	9.3	1.4	18.7
Girls	92.5	3,375,353.5	59.3	13.8	12.1	4.9	9.9
Area of residence							
Urban	96.6	4,570,202.9	64.8	7.7	10.7	1.5	15.4
Rural	94.3	1,975,214.9	57.9	12.6	10.0	4.9	14.7
Residence and gender							
Urban - Boys	98.0	4,128,360.3	64.6	6.9	9.7	1.4	17.4
Urban - Girls	93.0	5,725,850.9	65.3	9.7	13.3	1.6	10.1
Rural - Boys	97.8	2,555,618.5	62.2	6.1	7.9	1.4	22.3
Rural - Girls	92.2	1,574,632.4	55.1	16.6	11.3	7.1	9.8
Household wealth							
Quintile 2	83.4	820,630.3	61.8	19.1	4.5	13.9	0.8
Quintile 3	99.5	2,289,954.9	57.0	7.9	16.9	3.7	14.4
Quintile 4	100.0	1,955,366.4	59.2	7.8	4.7	3.4	25.0
Quintile 5	95.6	4,554,901.5	63.6	9.1	11.7	1.1	14.4
Household wealth and gender							
Quintile 2 - Boys	100.0	1,350,587.7	76.7	8.2	3.8	3.4	7.9
Quintile 3 - Boys	98.7	4,355,801.8	70.8	7.1	1.5	2.0	18.5
Quintile 4 - Boys	100.0	1,887,387.8	60.6	5.6	5.7	2.5	25.6

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Quintile 5 - Boys	97.3	4,252,380.7	64.0	6.9	10.9	1.0	17.2
Quintile 2 - Girls	81.6	691,014.1	60.1	20.2	4.6	15.0	0.0
Quintile 3 - Girls	100.0	1,118,336.0	49.2	8.4	25.7	4.7	12.1
Quintile 4 - Girls	100.0	2,095,151.3	56.5	11.7	3.0	5.1	23.7
Quintile 5 - Girls	92.0	5,175,993.0	62.7	13.7	13.4	1.4	8.9
Gender of the household head							
Male	94.9	3,701,269.9	64.6	8.9	8.9	3.1	14.6
Female	97.7	3,331,773.5	55.9	11.4	14.1	2.2	16.4
Education of the household head							
No education	97.9	2,802,264.4	74.0	14.3	6.0	3.1	2.6
Incomplete primary	92.2	3,035,183.5	64.6	9.6	15.3	4.7	5.9
Primary	100.0	929,126.8	59.0	7.8	0.6	5.8	26.8
Incomplete secondary	93.0	3,609,061.6	67.5	10.8	9.9	6.6	5.3
Secondary	100.0	4,127,446.5	82.5	5.3	10.9	0.0	1.3
Some higher	94.8	5,819,479.2	56.1	7.2	7.3	1.4	28.1
RECODE of district (DISTRICT)							
Kampala	96.0	6,160,255.0	72.4	7.1	12.3	1.2	7.1
Central1	97.0	5,070,957.5	61.1	10.7	18.6	1.1	8.4
Central2	96.2	4,250,036.6	55.6	12.3	3.9	2.7	25.5
East Central	97.4	3,066,262.0	78.9	6.1	6.8	1.7	6.4
Eastern	90.6	787,153.4	55.7	15.0	18.2	10.9	0.2
Mid-North	98.2	2,865,560.4	48.6	6.4	5.9	1.9	37.2
North East	99.5	2,787,897.0	66.0	5.7	5.4	1.2	21.8
West Nile	88.5	1,388,249.7	64.6	5.5	0.0	0.1	29.8

	Education share of household expenditure, (%)	Annual average education spending per child attending	School registration fees	Books and school supplies	Transportation to/from school	School uniforms	Other educational expenditures
Mid-West	98.3	2,150,082.6	55.4	15.1	7.0	0.7	21.8
South-western	95.1	1,747,512.4	52.9	7.2	4.4	1.8	33.7

Source: Authors' calculations based on UNHS 2012/13 using he World Bank ADePT software

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