

Ex-Ante Benefit-Cost Analysis of Individual, Economic and Social Returns from Proposed Investment Scenarios for Pre-Primary Schooling in Uganda

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Acronyms

BRAC	Bangladesh Rural Advancement Committee
CB	Community-based
DHS	Demographic and Health Survey
ECD	Early Childhood Development
EMIS	Education Management Information System
GAR	Gross Attendance Ratio
GDP	Gross Domestic Product
GER	Gross Enrolment Rate
PDV	Present Discounted Value
MICS	Multiple Indicator Cluster Surveys
MoES	Ministry of Education and Sports
NAR	Net Attendance Ratio
NER	Net Enrolment Rate
NGO	Non-governmental Organization
ODA	Official development Assistance
SSA	Sub-Saharan Africa
TORs	Terms of Reference
UNESCO	United Nations Education Culture and Science Organization
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education

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Executive Summary

This report was commissioned by a partnership consisting of the Ministry of Gender, Labour and Social Development, Ministry of Education, National Council for Children, Plan International, Aga Khan Foundation, Save the Children Uganda, and UNICEF Uganda. Considering the important individual, social and economic returns to investment in ECD in general, and in preschool education more in particular, and considering the currently low level of preschool attendance especially among the less advantaged children in Uganda, this partnership was particularly interested in: the benefits of ECD, both in general and in Uganda; the possible benefit-cost ratios of investments in ECD in Uganda; and a concrete and realistic scenario for scaling up preschooling in Uganda in the coming years.

To shed more light on these issues, this report starts with a life-cycle framework, in which favorable conditions as well as risk factors during one phase influence the individual's condition upon entering the next phase. For instance, the child's experiences during the first 1000 days co-determine its need for, and chances to thrive within, preschool education. A multitude of factors play a role in this process such as public policy decisions; decisions of families, including their responses to policy; family resources; markets; potential shocks from the families' environment; and more. To really do justice to all the relevant factors and take them into account in a well-balanced manner is challenging, as there are: hidden factors; factors for which data are lacking; various forms of bias; interaction between the (experiences within) different phases of the life-cycle; uncertainties within the environment, e.g. in terms of prices and labor market conditions; the discount rate; et cetera. The analysis must also strike the right balance between the distributional motives for implementing ECD policies (e.g. poverty reduction) and the motive to enhance overall efficiency. Finally, the benefit-cost ratio of any ECD intervention must always be compared with that of an alternative allocation of the same resources, whether public or private (e.g. from families who may have other things to spend money and time on). Due attention must also be given to the fact that many of the benefits of ECD materialize long after the moment of investment.

It is in light of these caveats that we must see the findings from two prominent reviews (from 2007 and 2011) of ECD programs in developing countries. These found effect sizes (on cognitive development) in the order of 0.30 for 14 Center-based preschool and daycare programs and 8 parenting programs. Again caution is needed: the reviews tended to focus on targeted programs; tended to look at short-term impact; and tended to ignore factors such as age of enrolment, duration of exposure, et cetera. Indeed, there are good indications that the impact is bigger for disadvantaged children than for those from the more advantaged groups, and that quality matters: formal programs tend to be more powerful than community-based ones. Further analysis showed that both comprehensive educational approaches and component-specific approaches to educational improvement have an effect on child outcomes, particularly in cognitive development. Also, the most successful interventions in preschools tend to use child-centered methods adapted to the learning styles of young children. Not yet clear is the value of involving families in improving preschool outcomes, while more work is also needed to determine which are the most cost-effective methods for improving preschool quality and the benefit-to-cost ratios of these improvements.

To arrive at benefit-to-cost ratios, one would, obviously, not only need to know the benefits but also have thorough information about real resource costs of individual ECD interventions in developing countries. This, however, is an important hiatus. Nonetheless, suggestive estimations of benefit-to-cost ratios have been made based on aggregate data for over 70 developing countries, and these are generally well above one: in the range of 14.3 to 17.6 for a 3% discount rate and in the range of 6.4 to 7.8 assuming a 6% discount rate.

But what does this mean for Uganda? Departing from the findings above, being mindful of their caveats, and combining them with specific data from Uganda, we focus on the benefits in terms of higher life time productivity and earnings. First, providing preschool access to low-income children increases the time that these children stay in school by 2.6 years on average. Second, we applied this to rates of return to schooling found in developing countries generally. Third, we estimated the unit costs (per child per year) of preschool education, partly based on our work in Uganda and partly based on international experience, arriving at an estimate of 10% of the basic wage in Uganda. Fourth, the extra years that children spend in school as an outcome of their preschool attendance bring their own costs as well. These are slightly higher: we assume 15% of the basic wage for each extra year of schooling. Fifth, we assume that beyond the age of 14, children would earn money had they not been in school. These opportunity costs are estimated to be between 0.5 and 1.0 of the basic wage. Sixth, we assume a discount rate of 6% but also explore the implications of discount rates of 3% and 10%. Seventh and last, we took into account that the effects of a substantial increase in preschool participation will spill over to society at large, e.g. by reducing crime and increasing people's participation. This translates in social rates of returns being 10% higher than the private rates, also looking at the possibility of a 25% difference between the two.

Assuming a discount rate of 6%, but varying all other parameters, we find that benefit-to-cost ratios vary from 1.6 to 8.6. So even under the most conservative assumptions, the returns are 60% higher than the initial investment, while under more optimistic assumptions they may be more than eight times that investment. Under the assumption of a 10% discount rate, the benefit-to-cost ratios are in a lower range: 1.1 to 3.6, again depending on the assumptions made in other respects.

The final questions for this report are: what would a realistic expansion scenario look like, what would it cost, and can we readily apply the benefit-to-cost ratios found above? According to official statistics, 6.6% of all children in the relevant age bracket were enrolled in Uganda in 2011, but a household survey found an attendance rate of 23.4%. The difference can be explained partly by the existence of many for-profit nurseries and community-based ECD centers that do not report their enrolments, and partly by the fact that in community-based centers children can attend without being enrolled. So by better registration, more centers and more children can be fully part of the preschool system and their quality can be enhanced. This can boost the enrolment rate at relatively low costs. However, further growth is constrained by the fact that the government has taken the position that it does not subsidize pre-primary education. The for-profit nurseries remain only accessible to those who can afford it; partly this concerns the upper and middle classes, partly the working poor for whom there is a booming sector of low-cost / low-quality nurseries. By far the best chance for Uganda to go to scale in a manner that is inclusive, is through the community-based centers. Promising developments are observed, but parents cover most if not all of the recurrent costs through fees, once again excluding the poorest.

To overcome this, our report proposes a Pact for ECD in Uganda. While communities and parents are likely to remain primarily responsible for the operation of the community-based centers for the years to come, they deserve support from various sides and for various tasks. The Pact for ECD in Uganda is essentially a proposed division of roles and responsibilities among these supporting agencies:

- To obtain land and space is a serious hurdle for a community to create a center. Three main religious communities (Catholic, Muslim and Protestant) have already agreed to make land and structures available near most of the churches and mosques. Village chiefs and elders, civil society organizations, and private companies can do the same.
- Community mobilization is a four to five year process whereby an NGOs starts a dialogue with a community about the creation of an ECD center, and guides and trains people in order to make things happen. Currently, only a handful of NGOs can do this and this is a serious bottleneck. The Pact suggests that these NGOs transfer other tasks (see below) in order to concentrate more on community mobilization, while sharing their expertise with others, such as civil society and faith-based organizations.
- With regards to initial training there is a gap between the limited amount of training that NGOs provide for caregivers in the community-based centers, and the several years of training provided in formal Teacher Training Institutions that cater for the for-profit nurseries. The formal institutions must develop accessible courses that are more tuned to needs of communities and those of their members who want to be a caregiver.
- Refresher training, too, should progressively be transferred to where it belongs: the Teacher Training Institutions. Supervision should eventually be in the hands of the official who is accountable to the Government, i.e. the district Inspector. These two transitions will contribute to making community-based ECD less reliant on the NGOs.
- The last element of the Pact links us back to the key issue of this report: costs and benefits. Having noted that the expansion of community-based ECD is constrained by parents' limited ability to pay fees, it is proposed to introduce a small per capita contribution of 3,000 shillings per child per month, of which 500 Shillings is for stationary and other materials, and 2,500 Shillings for the teacher.

In most regions this contribution will still not be enough to provide a living for the teachers so parents (and communities) must continue to contribute. But based on an in-depth analysis of the costs and funding of community-based centers in various places we estimate that the 3,000 Shillings per child per month will lessen the parents' burden sufficiently for an acceleration of the expansion process.

How much would this eventually cost for the Government on an annual basis? Since expansion processes take time – centers must be created, teachers trained – we focus on the year 2020. We estimated that by that year, about 5 million children of age 3-5 will live in Uganda. Assuming that enrolment in the for-profit nurseries will gradually rise to 40%, this leaves 3 million children to reach

out for. But some regions are prosperous enough – and have high enough enrolment levels – to universalize pre-primary education with their own resources. Therefore we focused on the poorest regions:

- Implementing the per child contribution in the two poorest regions Karamoya and West Nile would eventually cost 15.2 billion shillings annually by the year 2020.
- Adding North and Eastern would bring total costs to 33.4 billion shillings annually.
- Adding East Central to the ones mentioned above would cost 44.4 billion shillings.
- Finally, if we add the Western region, the costs for all six region together would be 55 billion shillings annually.

To put these figures into perspectives, we expressed them as a percentage of the estimated the size of the budget of primary schooling by 2020. For instance, the 33.4 billion shillings that are needed to reach out for the four poorest regions Karamoya, West Nile, North and Eastern will be in the order of 2.5% of the budget for primary schooling (and hardly more than 1% of the entire education budget). The reason for these very low percentages lies partly in the extremely efficient nature of the community-based ECD centers where much is done with very little resources, and partly in the fact that parents continue to pay; the per child contribution lessens their burden but does not replace the fee. With an average real GDP growth rate of more than 5% between 1999 and 2011, this annual cost requirement cannot be insurmountable for the government.

The final question is: can we readily apply the favorable benefit-to-cost ratios that we found for Uganda to the community-based ECD centers? The answer would be negative if we look at some of the centers as they function now. In extreme cases, some of the staff are illiterate and received no more than a few days of initial training. Indeed, a general finding from the program reviews is that formal preschool tends to yield more powerful outcomes than non-formal. However, we assumed that a Pact for ECD in Uganda will improve classrooms; strengthen pre- and in-service training; enhance supervision; and provide a per child contribution that should make it easier for communities to attract and retain able and motivated caregivers. There is no way in which we can enter these assumptions in a model and calculate their impact. But there is every likelihood that if all actors in the Pact deliver their contribution, the per child subsidy of 3,000 Shillings will pay itself back entirely. To say the least.

Section 1. Introduction

The Ministry of Gender, Labour and Social Development, Ministry of Education, National Council for Children, Plan International, Aga Khan Foundation, Save the Children Uganda, and UNICEF Uganda have partnered to implement a national study on Early Child Development (ECD) in Uganda that will help provide tools to advocate for public investment in ECD by highlighting the benefits of investing in ECD and possible models to use nationwide, based on the “categories of ECD centres” stated in the Early Childhood Development (ECD) policy (2007).

Early childhood is increasingly perceived to be the foundation period for children to develop psychomotor and cognitive abilities, social skills, moral values and emotions. These skills and values - in combination - shape the identities, develop coping mechanisms, and enhance individuals’ social and emotional skills, as well as, problem-solving abilities. All individuals require an appropriate environment to develop those competencies to successfully transition to adulthood. The early childhood period, importantly including ages 3 to 5 years, is seen as a critical period when human beings need care and support to be able to achieve strong development in all walks of life. And yet in Uganda, as well as more generally in East Africa and more broadly in the developing world, many children do not receive sufficient support to develop to their full potentials. For example a recent *Lancet* paper on ECD estimates that over 200 million children under 5 years of age in developing countries do not reach their developmental potential, which likely means that they are substantially less able to take advantage of educational opportunities later in life and are less healthy, less productive and attain lower socioeconomic status as adults (Grantham-McGregor et al. (2007).

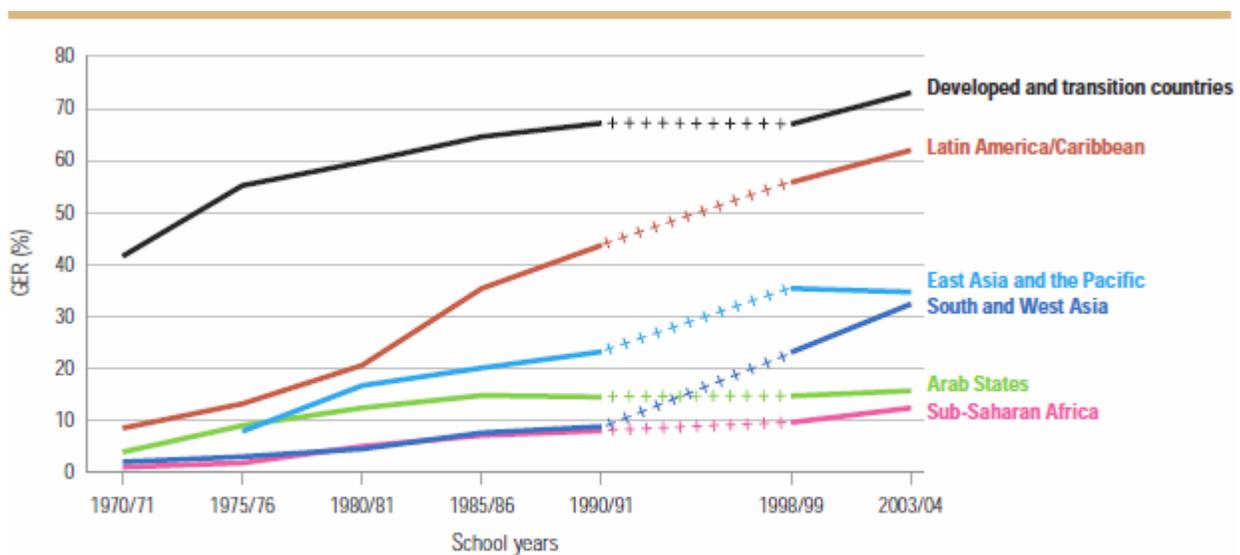
Interventions in the first few years of a child’s life are increasingly emphasized as important in determining and shaping children’s future successes in life. Development in preschool-age children includes domains such as cognition, language and behavior. Delays in children’s development occur cumulatively and start as early as conception. These delays may be very costly or almost impossible to reverse during school years and adulthood. Thus Heckman (2006), Doyle et al. (2010), and others have argued that policies to improve human development are most cost-effective if they are high quality, begin as early as possible and are targeted to the most disadvantaged groups.^{1,2} They also have argued that ECD investments are “win-win” in that anti-poverty and productivity goals can be pursued together rather than face productivity-poverty alleviation tradeoffs as for many policies.

1 Presumably this argument for investing more in early life is based on perceptions that the marginal rates of returns to investing in early life, versus the alternative of investing in later life-cycle stages, are relatively high. But it does not mean that more and more resources should be shifted from later-life to early-life investments. If enough resources are shifted from later-life to early-life investments, presumably the marginal rates of return to early-life investments will decline and those to later-life investments increase until the two are equated -- at which point any further shifts in investments from later-life to early-life investments are not warranted from a productivity point of view.

2 Improvements in quality presumably require resources that have an opportunity cost in terms, for example, of expanding program coverage or pursuing other desirable goals like improved health. Therefore it is not that useful to say, as seems too often be the case, that better quality is desired without indicating how to think about to what point more resources should be used to improve quality. Presumably resources should be invested in improving quality of preschool or other ECD programs as long as the social rate of return to quality improvements is at least as great as the social rate of return to alternative use of these resources, but not beyond that point (see Behrman and Knowles (1998) for discussion of this point in the context of other social policies).

That is, because the impacts are greatest when targeted to the most disadvantaged groups rather than when targeted towards middle- and upper-income groups, reducing poverty and increasing productivity go hand in hand. This is consistent with the possibility of substantial *social returns* as well as *individual* and *economic returns* – to use the terms emphasized by the partnership that is supporting this study and that are discussed more below – to improved investments in preschool programs targeted towards disadvantaged groups in Uganda.

Advocacy for and resources devoted to ECD has increased rapidly, particularly in developing countries. Enrollments in preschool programs have increased substantially in developing countries over the past several decades. Figure 1 shows the trend from 1970 through 2003, suggesting that over the long term, preschool enrollment rates for children have increased monotonically in all of the included world regions, though there is a fair amount of variance across regions in both levels and trends. By the end of the period covered, Latin America and the Caribbean and Central and Eastern Europe had enrollment rates of about 65 percent, and over the previous 30 years had increased enrollment more rapidly than North America and Western Europe. None of the other developing regions included, however, had enrollment rates over 45 percent, and enrollment rates for the Arab states and Sub-Saharan Africa were still less than 12 percent in 2003/4.



Note: Data for East Asia and the Pacific are for developing countries only; Australia, Japan and New Zealand are included under developed countries. The broken line signifies a break in the data series due to a new classification.

Sources: 1970/71, 1975/76, 1980/81: UNESCO (1991); 1985/86: UNESCO (1998); 1990/91: UNESCO (2000); 1998/99, 2003/04: UIS database.

Figure 1. Trends in pre-primary enrollment over 30 years (Global Monitoring Report, UNESCO, 2007 as presented in Behrman et al. (2013)).

This monotonic trend is less clear in recent data. Figure 2 gives more detailed and recent preschool gross enrollment rates for children 3-5 years for selected years starting in 1990 through 2008 for major world regions. Figure 2 illustrates that there have been slow increases in preschool attendance since 1990 in most regions, although in both Central and Eastern Europe, and Central Asia, the ending of the government-funded child care system of the Soviet Union resulted in rapid declines in the percent of children enrolled, which subsequently has begun to increase. Attendance rates have

increased most rapidly in Latin America and the Caribbean and South and West Asia. Levels of enrollment are still low in Sub-Saharan Africa and the Arab states, although rising in sub-Saharan Africa.

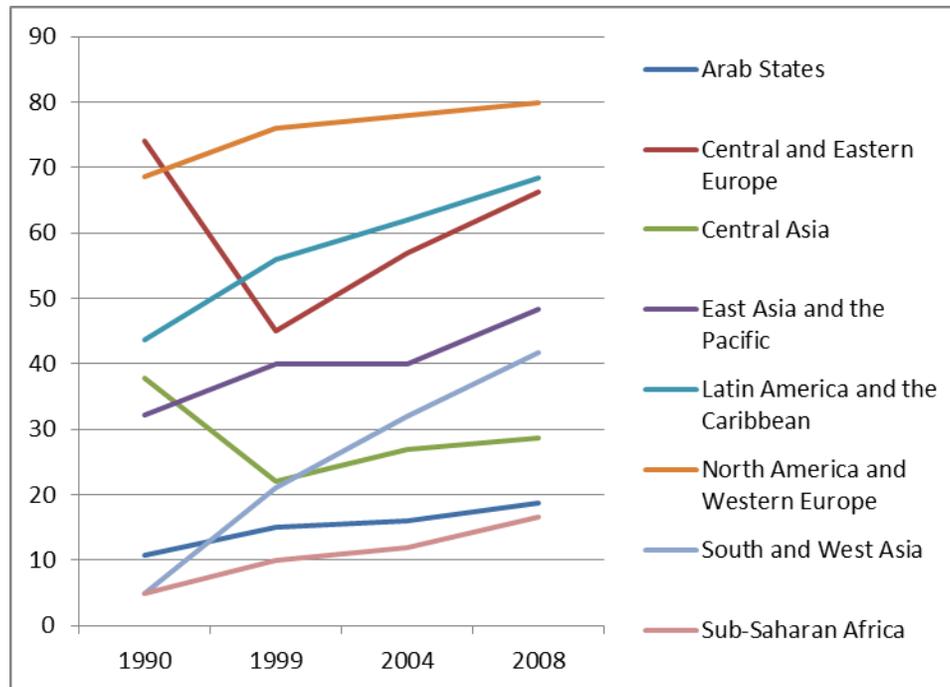


Figure 2. Weighted mean gross enrollment ratios of preschool and pre-primary enrollment by year and by region: Data from Global Monitoring Reports, UNESCO (UNESCO Global Monitoring Reports 2006, 2011 as presented in Behrman, Fernald and Engle (2013)). (Child age is defined by country; ranges from 3 to 6).

The regional averages in Figures 1 and 2, however, do not illustrate variance by familial socioeconomic status. As Figure 3 shows, there are dramatic differences within some countries in preschool attendance by income level and these differences appear to have increased in some countries over time. For eight countries, four of which are in sub-Saharan Africa though none in East Africa, data are included on preschool attendance and income quintile for both the nationally representative 2000 UNICEF Multiple Indicator Cluster Surveys (MICS) samples and 2005 MICS samples. Figure 3 shows the ratio of preschool attendance in the wealthiest and poorest quintile. For example, in Ivory Coast, in 2000 a child in the highest quintile was about eight times as likely to attend preschool as a child in the lowest income quintile. By 2005, a child in the highest quintile was about 24 times more likely to attend preschool than a child in the lowest income quintile.

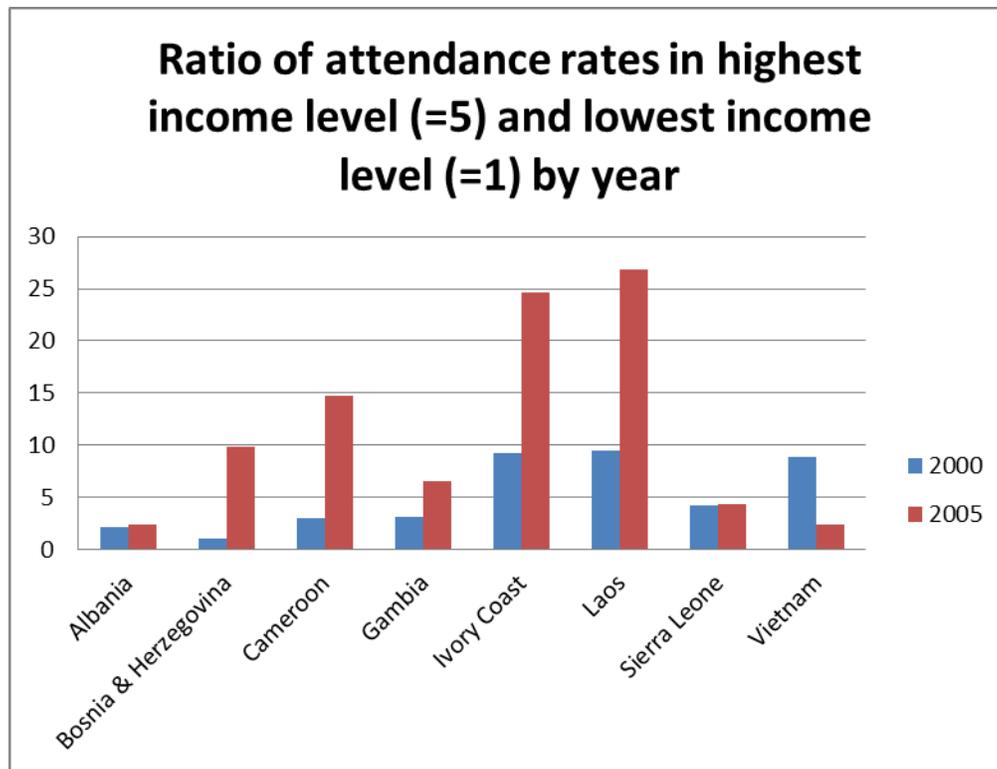


Figure 3. Distribution of preschool attendance by income levels: ratio of attendance in the highest within-country wealth quintile to attendance in the lowest income quintile for 3 and 4 year olds from 2000 to 2005 (UNICEF Multiple Indicator Cluster Surveys MICS 2 and MICS 3 data; analyses by Behrman, Fernald and Engle (2013)).

The partnership supporting this study suggests that the main benefits of participating in ECD are *individual, economic and social*:

- **Individual:** Quality ECD services help prepare young children to succeed in school and in life. They support children to have good physical and emotional development as they have stronger social and learning skills. These skills will be exhibited by their behaviours in society later on in life.
- **Economic:** Children who receive quality ECD tend to earn more as adults than their counterparts and as ECD spreads, the individual benefits can spread to the rest of the society with multipliable effects on the economy and national productivity. Not only there are benefits for the children as they are educated, but also ECD services help working parents to fulfill their other responsibilities and ECD centres themselves also create economic opportunities for work. Also, children who received quality ECD services tend to have higher income as adults and are more prepared to respond to the labour needs of their country.

Social: Good early childhood services help to improve socialization, strengthen cohesion (promoting non-discrimination and inclusion) in society and reduce negative outcomes - such as crime. ECD also can lead to a more equitable society if it is focused sufficiently on

inclusion of the most vulnerable children from families in the lower part of the income distribution.

However, current access to ECD services in Uganda is extremely low. There is a strong ECD policy but not a budget to implement the policy. Currently provision of ECD education in Uganda continues to be dependent on NGOs and multilateral organisations, such as Plan International, Save the Children, Aga Khan Foundation, Child Fund and UNICEF. As a consequence, the official enrolment rate to pre-primary education in the country is very limited with approximately 6.2% of children officially enrolled in nurseries and ECD centres and with high disparities between urban and rural areas and among different socio-economical levels. A recent MICS study in Uganda suggests higher levels of pre-primary attendance, but this will be elaborated later in this report.

The purpose of this study is to provide empirical evidence to inform decisions regarding investments in ECD in Uganda for children aged 3 to 5. The strategies that the partnership supporting this study suggest should be used to:

- Highlight *individual*, *economic*, and *social* returns when investing in ECD.
- Provide possible ECD scenarios based on “categories of ECD centres” stated in ECD policy, including costs and long-term consequences.
- Identify the role of all partners, and more specifically the government on ECD in Uganda.

The research questions posed for consideration in this study include:

1. What is the current situation of ECD in Uganda (the main actors, policies, budget, programmes), and current research on ECD in Uganda.
2. What scenarios will ensure equity and quality relevant for the Uganda context and what are the costs, particularly if ECD were government-funded. Models should include the ECD centers themselves based on “categories of ECD centres” stated in ECD policy, and also how the structure in the country should look like at the government and national level, such as what would be the role of the government and each of the partners in ensuring quality ECD services in the country that foster long term equity? (including monitoring, education for ECD professionals, etc). Costing should focus on proposed ECD models and on the country/government to run each of the proposed models.
3. What does the international literature says about ECD investment returns (*individual*, *economic* and *social*) in developing countries? What are the lessons learned from them that can be applied to Uganda? Focus should be on the region, but also good practices on how other developing countries that have successfully been able to incorporate ECD in the national government structure, including funding, staff, curriculum in universities, etc.
4. Ex ante cost-benefit analysis regarding the investments in the scenarios. This will include, what are the comparative long lasting effects in society of children attending ECD centres in

proposed scenarios? Including educational, social, and cognitive and how ECD could impact on the future of Uganda.

To investigate these research questions, the terms of reference for this study indicate that it will be desirable in this study to:

- Undertake a literature review, including
 - Policies, regulations, NGOs and development partner's research.
 - Address why ECD is important and factors that affect cognitive and social development
 - International evidence on importance on investing in ECD (with a special focus on East Africa) in developing countries and the long-term benefits for countries that have invested in ECD, including individual, societal and economic impacts)
 - Describe Ugandan context (demographics, education, economic, etc.) that might have an impact on the importance of investing on ECD.
 - Main policies related to ECD in Uganda
 - Accurate description of the situation in Uganda regarding ECD programmes, what type of existing programmes are available in the country that we could build upon. Data should be collected from, but not limited to Government, NGOs, BFO and development partners.
- Develop conceptual argument on how ECD programmes can benefit Uganda long term.
- Assess possible roles of ECD in the transformation of Uganda into a middle income country, including:
 - Individual benefits; as children move through the life cycle
 - Economic benefits; with particular reference to Uganda's aspirations as a middle income country. These benefits will work in part through the schooling system (by improving successful transition rates, increasing student retention at school, job opportunities, etc.)
 - Social benefits; related with social cohesion, crime, citizenship, cost savings, including the excluded.
- Develop comparative assessment of benefits versus other areas of education including secondary and tertiary schooling.

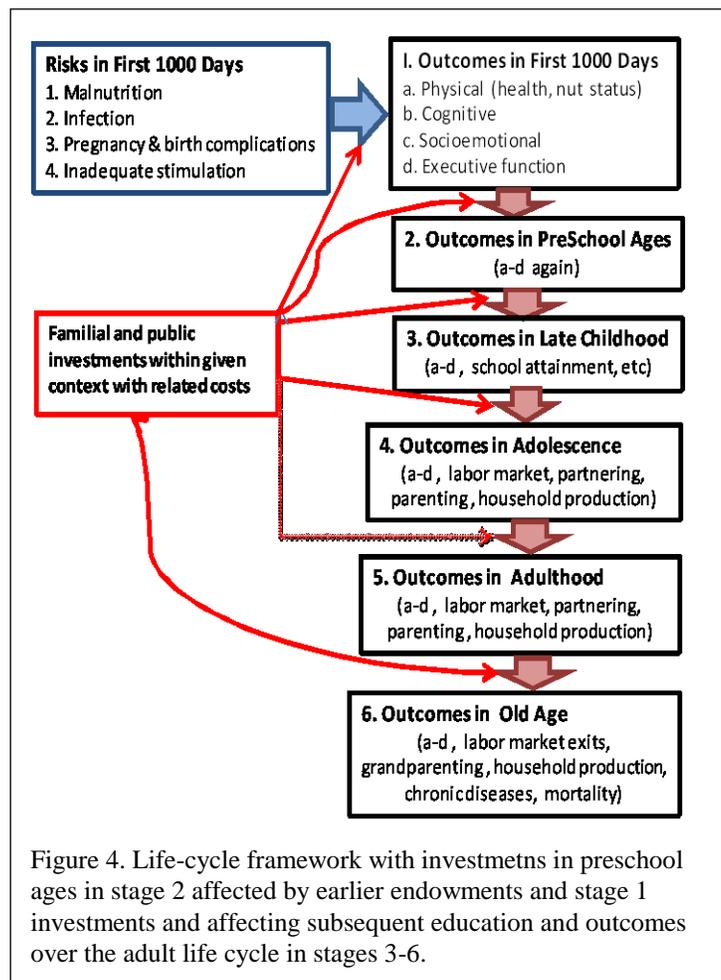
Section 2 of this report first presents a framework for analyzing the benefits and costs of ECD investments over the life cycle. Section 3 summarizes knowledge on ECD currently in Uganda. Section 4 reviews evidence on benefits and costs of ECD programs in other developing countries. Section 5 presents a concrete and realistic scenario for the expansion of pre-primary education in Uganda and estimates its costs. Section 6 draws conclusions.

Section 2. Framework for Analyzing Benefits and Costs of Preschool Programs

2.1. Lifecycle Framework for Preschool Program Benefits

An explicit framework of human development over the life cycle is helpful for investigating systematically the effects of preschool programs over the life cycle, how these effects might be mitigated by familial and public investments in children and the robustness and the limitations of related empirical estimates and alternative estimation strategies. We consider a life-cycle framework, with six life-cycle stages (s): (1) the “First 1000 Days” up to age 2, (2) the “preschool ages” in subsequent early childhood (i.e., from the end of the First 1000 Days of life to the normal school-entry age ~ 5 or 6 years) in which preschool programs may be attended and of particular interest for this study, (3) late childhood, (4) adolescence, (5) adulthood and (6) old age. We conceptualize children as starting life with a vector of genetic and environmental endowments. Conditional on these endowments, ECD is directly affected by investments. In this framework, risk factors such as poverty are likely to have greater impact when investments are low. There are two types of investments in human development: (i) Familial investments (F_p) such as the nature and extent of family-provided stimulation and nutrition and (ii) Public investments (P_p) (public in the sense that their supplies depend on public policy decisions) such as the accessibility and quality of public preschool programs.

Figure 4 presents a simplified overview of this framework. Risk factors (e.g., malnutrition, infection, poor management of pregnancy and birth complications, lack of cognitive stimulation and nurturing) that are indicated in the box in the upper left corner affect outcomes in the First 1000 Days such as physical (health and nutritional) status, cognitive skills, socio-emotional skills and executive function (in the box at the upper right), which in turn affect outcomes in the subsequent preschool age (stage 2) and the other sequential life-cycle stages (stages 3-6). Familial investments and public investments, in the box in the center left of the figure, may moderate not only the risk factors and their impacts on outcomes in the First 1000 Days of life but also how the outcomes of the First 1000 Days have impacts over the life cycle including the stage 2 preschool ages and



also the impacts of investments in children during the preschool age stage 2, as well as the impacts of investments in children during the preschool age stage 2 on outcomes in subsequent life cycle stages. As noted in the box, these investments occur within a particular context and have resource costs associated with them. Across contexts, the effects of these investments and their resource costs are likely to vary. The opportunity costs of women's time devoted to ECD, for example, are likely to differ in Uganda from that in developing countries that differ in terms of women's education and activities such as Pakistan, Paraguay or the Philippines. Therefore care must be taken in transplanting estimates about the determinants of, the costs of and the impacts of preschool programs from one country context to another.

Conditional on the endowments, ECD is directly affected by investments in children related to factors such as the health care system, child care options, preschool and school systems, markets and the familial environment. Some of these factors are affected by public policy decisions (P), such as the accessibility and quality of preschool programs. Others reflect familial decisions (F), such as the nature and extent of stimulation and nutrition in the home environment and to what extent the child is exposed to the health care system and preschool programs, which in turn reflects responses by caregivers (often parents) to policies (P) and markets (M), given family resources (R), parameters for parental preferences and bargaining rules within the family and among kin (W), parameters for the technological and biological production functions (T) that determine the outcomes of the early childhood life-cycle stage (Y) conditional on the inputs at the start of the stage and the investments in the child during the stage, and a stochastic term related to shocks (U), such as variations in the disease environment in which the family lives.

Standard analyses suggest that parents (or other caregivers) will make these investment decisions in their children in part based on the resources that they have, the prices and policies that they face, and the motives that they have for investing in their children (including altruism and expected possible future benefits, such as old-age support from the children). Because these motives are likely to be forward-looking, the expected impacts of these decisions on outcomes over children's lives and the expected future school, work and other conditions that may affect the value of these impacts all enter into the parental decisions about investment in ECD. Of course parents make many decisions that affect many dimensions of ECD, but for simplicity we aggregate these dimensions of interest into four outcomes at the end of the early childhood life-cycle stage (Y): (1) cognitive and language skills, (2) socio-emotional skills, (3) health and nutritional status and (4) executive function/self-regulation. And, at least for some purposes, we assume that these four composite outcomes are sufficient statistics for all impacts of early childhood over all stages of later life. In such a case the inputs into the next life-cycle stage are these four outcomes at the end of the early childhood life-cycle stage. (If these four outcomes do not incorporate all the outcomes at the end of the early childhood life-cycle stage, other factors such as the genetic and environmental endowments also may be inputs into later stages.) The impacts of these four outcomes include effects on the *individual*, *economic* and *social* returns to preschool investments of interest in this study

Most related empirical studies estimate some variant of dynamic decision rules for the outcomes of the early childhood life-cycle stage, so we focus on these relations:³

3 Some, but relatively few, studies attempt to estimate the production technologies that produce outcomes at the end

$$(1) Y_s = f(P_s, M_s, R_s, W_s, T_s, I_s, U_s),$$

where all the variables are the vectors defined above for the s th life-cycle stage, most of the right-side vectors include not only values for the s th stage but also expected values for all future life-cycle stages if parents are forward-looking, and I_s is the vector of inputs at the start of this life-cycle stage that for the early childhood life-cycle stage includes genetic and environmental endowments.

Relation (1) with “ s ” = 2 indicating the preschool-age life-cycle stage represents the immediate outcomes of this life-cycle stage, with the inputs for stage 2 including the outcomes from stage 1 (i.e., (1) cognitive skills, (2) socio-emotional skills, (3) health and nutritional status and (3) executive function/self-regulation at the end of stage 1). As during stage 1, there are a number of policy-related, market and familial factors that, conditional on these inputs, affect the “outcomes” of stage 2. These factors may interact with the “inputs” of this stage (the “outcomes” of the previous stage with $I_s = Y_{s-1}$) so that there are dynamic complementarities of the types emphasized, for example, by Cunha and Heckman (2007; Cunha et al. (2006). The outcomes of stage 2, in turn are the inputs into stage 3, and so on through the life course (and possibly across generations). The outcomes of various stages may include not only the four noted above, but also outcomes such as labor force participation, wage earnings, marriage market outcomes, involvement in crime and violence, and parenting of the next generation.

It is possible to substitute into the relations for the outcomes of each later life-cycle stage (stages 3-6) all the links back to the preschool-age childhood life-cycle stage (stage 2) that are transmitted across stages by the inputs into any particular stage being the outcomes of the previous stage (since $I_s = Y_{s-1}$). Such substitution permits explicit expression of how the outcomes in each later life-cycle stage relate to factors such as policies, market and family resources that determine the outcomes in the preschool-age life-cycle stage. The vector variables on the right side of these relations also include the expectations held in each stage for future stages and the realizations in each intervening life-cycle stage, so * is used to reflect that the right-side variables include all these expectations and realizations:

$$(2) Y_s = h(P_2, M_2, R_2, W_2, T_2, U_2, P_s^*, M_s^*, R_s^*, W_s^*, T_s^*, U_s^*).$$

The partial derivative of relation (2) with respect to the component of P_2 that refers to whether a child attended a preschool program (or the quality of the program), for example, gives the impact of that program on outcomes in the s th subsequent life-cycle stage. To assess the total benefits of interventions or other decisions that affect ECD, a weighted average of all these possible relevant impacts over the life course across all the subsequent life-cycle stages and across generations should be considered. The benefits should include all the private effects on the child being considered and, from a social perspective, any broader “spillover” external effects.

This framework suggests that it is quite challenging to access the benefits of ECD or of interventions to enhance ECD such as preschool programs for a number of reasons that are now discussed.

of the early childhood life-cycle stage instead of estimating these dynamic decision rules.

A. Econometric or Estimation Issues: There are a set of econometric issues that make estimation of program impacts in general, including those in preschool programs in particular, difficult

(1) Decisions to invest in preschool programs or other dimensions of ECD are behavioral decisions that parents or other caregivers make in response to a number of factors, some important ones of which are likely not to be observed by analysts, such as innate abilities, innate health, and current or expected prices that directly or indirectly affect child development. If these unobserved factors have direct effects on outcomes either before the preschool-age stage or later in the life cycle in addition to any impacts in the preschool-age life-cycle stage, it may be difficult to identify confidently what are the impacts of the preschool-age investments versus what are the impacts of these unobserved factors either before or after the preschool age.

(2) To obtain estimates of the benefits of being sent to a preschool program on outcomes, there must be control for endogenous program placement (Rosenzweig and Wolpin (1986)). Endogenous program placement may bias estimates of program impact in either direction depending on the nature of the program placement and the correlation between program placement and unobserved (to the analyst) characteristics that influence program placement. The bias may be downward, for example, if the placement of public preschool programs is pro-poor in ways that are not observed in the data and those unobserved characteristics in themselves mean that poor children perform less well than comparison children with regard to outcomes such as cognitive or language skills, socio-emotional skills, health and nutritional status and executive function/self-regulation. On the other hand, if program placement favors those who are better off in unobserved ways, for example, because they have more political influence, the bias in estimated preschool program effects that do not control for endogenous preschool program placement is likely to be upwards.

(3) To obtain unbiased estimates of the benefits of preschool programs (or other interventions in the preschool-age life-cycle stage) on longer-run outcomes, in addition to controlling for unobserved endowments that might have direct impacts on outcomes later in the life cycle and for unobserved factors that may affect program placement, it is necessary to control for all the elements in the variables on the right side of (2). For example, if an observed investment in children in preschool programs is more likely, whether because of household decisions or public policies, to occur in contexts in which unobserved expected labor market returns to the investments (in the vector M^*) are higher and there are complementary unobserved investments (e.g., more time spent in parental home stimulation in the evenings for children who are enrolled in preschool programs, perhaps in response to the same expectations about future labor market returns), then standard estimates of the impacts of the preschool investment will be biased upwards because they will capture the effects of the unobserved complementary investment induced by the unobserved expected labor market returns in addition to the direct effects of the intervention. This bias could also be downward, for example, if the unobserved investments are substitutes rather than complements for the observed preschool investment.

(4) The effects of investments in the preschool-age life-cycle stage may be heterogeneous depending on characteristics of market, cultural and policy contexts, individual children or their families (e.g., Carneiro et al. (2003)). That is, there may be interactions between investments and such contextual

characteristics in relations (1) and (2), possibly because of interactions in the underlying production functions or perhaps because of heterogeneous impacts of markets and policies because families vary in their access to market and policies. Above in the discussion about the efficiency motive for policy it is noted, for example, that poorer families are less likely to have access to credit and insurance options than are better-off families. Possible heterogeneous impacts depending on market, cultural and policy contexts mean that estimates from one context, even if very good estimates for that context, should not be blithely assumed to hold for other contexts. Markets may differ importantly with regard to expected labor market outcomes, access to capital and insurance for human resource investments, and information. Policies may differ importantly with regard to general social support or particular provision and subsidization of goods and services particularly germane to preschool programs or other forms of investment in ECD. And within a particular context, impacts may vary considerably depending on individual and family backgrounds, which typically vary substantially even among poor households.

B. Multiple Impacts over the Life Cycle: The multiplicity of the possible impacts of preschool programs and the long-run nature of many of the relevant impacts of these programs pose a set of problems.

(1) To evaluate the total benefits, decisions have to be made regarding what are the relevant outcomes of interest and what are intermediate or mediating channels. For example, to what extent are cognitive skills at the end of the preschool-age stage an outcome of interest in itself versus a channel through which ECD investments such as preschool programs affect schooling success and adult productivities in labor markets and home activities? To the extent that these cognitive skills at the end of the preschool-age stage are mediating channels, it would be double-counting to include among the benefits both the impact on cognitive skills at the end of the preschool-age stage *and* changes in adult productivities.

(2) The outcomes of preschool-age investments probably vary considerably in kind, from labor market outcomes to less crime and violent behaviors to better health and reduced mortality. They also vary with regard to whom is directly affected. For example the discussion to this point focuses on the impacts on the children in whom preschool or other ECD investments are made. But there may be important effects on others, such as the mothers or other caregivers who may be able to divert time from child care to other uses including economic production and leisure. Or there may be gains to training the preschool staff. But to estimate the overall benefits or to be able to compare benefits with costs requires some weights or “prices” to combine the various impacts. For some possible impacts, such as increased wages in labor markets, valuing the impacts in monetary terms is relatively easy. But for other impacts, such as averting mortality and improving social relations, such valuations are difficult and controversial. For instance, the value of averted mortality at times is empirically measured by the cheapest alternative means of averting mortality and at times by what income-mortality risks adults accept in their occupational choices. The resulting range in the values of averted mortality is enormous.⁴

⁴ Some illustrations are given for estimating the benefits from improved early life nutrition in Behrman et al. (2004a) and Alderman and Behrman (2006). Summers (1992) uses the cheapest alternative way to avert mortality for estimates for Pakistan (vaccinations), which translates into \$1250 (2005 US\$). Perhaps at the other extreme is the “revealed-

(3) As is reflected in relation (2), to obtain direct estimates of the benefits of an intervention in the early-childhood life-cycle stage on outcomes in later life-cycle stages requires data over long stretches of the life cycle (ideally, all of it). Prospective data over long-stretches of the life cycle beginning in the early-childhood life-cycle stage that include preschool programs in developing countries are rare.⁵ In some cases recall data may help fill in some of the gaps though with the usual limitations of recall data.

The primary alternative to using the limited longitudinal data over long segments of individuals' life cycles to estimate the longer-run benefits of investments in the early childhood life-cycle stage, is to estimate impacts of early childhood investments on some intermediate outcomes such as cognitive and language skills, socio-emotional skills, health and nutritional status and executive function/self-regulation at the end of the preschool-age life-cycle stage and then to link those outcomes with other estimates of the relations between such intermediate outcomes and longer-run outcomes from other data sources. For this strategy to be effective, however, some strong assumptions are necessary for these linkages, including that the observed input variables for a given stage include all the relevant variables from previous stages. Moreover assumptions still have to be made that relations for later life-cycle stages based on past data will hold in the future when the children grow into those stages despite changing contexts in the future.

(4) Impacts of ECD investments such as preschool programs are posited to occur over many years in subsequent life-cycle stages in relations such as (2). If there is a return to using resources for other investments than investing in children during their early childhood life-cycle stage, then 1000 shillings received now is more valuable than 1000 shillings received, say in 40 years when the child becomes a prime-age adult because in the intervening decades the rupees received earlier can be re-invested. Therefore it is desirable to calculate the present discounted value (PDV) of investment impacts that occur with some lags into the future. This may affect the value of these investments considerably. Table 1 gives some illustrations of how the PDV of \$1000 received at some future date varies substantially (the range in this table is from \$0.02 to \$951.47) depending on (i) how long in

preference" model based on labor market choices and mortality risk-wage choices, probably the leading approach for estimates of the value of averting mortality in the United States developed and promoted most visibly by Viscusi (e.g., Viscusi and Aldy (2003)) and adopted for use by various United States governmental agencies.

⁵ But even if data do exist for, say five or six decades of individuals' lives and causal estimates of impacts can be made, there is somewhat of a problem in interpreting inferences made from these data for designing policies today. This is the case because of possible interactions with, say, a preschool program of interest and the market and policy context in which investments in individuals now in their 40s were when they were in the early-life cycle stage and since the time they were in the early life-cycle stage (the time series analogue to the cross-sectional discussion in the fourth point). The changes in contexts means that even if longitudinal data are available in some cases with which to make inferences about long-term impacts of such early-life investments, the implications for the different contexts of the 21st century need to be made with careful efforts to adjust for the changing contexts. Analyses in studies such as Hoddinott et al. (2008), Behrman et al. (2009) and Maluccio et al. (2009)) three-four decades later of the Guatemalan INCAP data based on nutritional supplementation in 1969-77, for example, provide evidence of long-run effects of that supplementation in the contexts in which children passed from the early-childhood life-cycle stage to the adult life-cycle stage. But care must be taken in making inferences from such studies about interventions for current children in the early-childhood life-cycle stage in the second decade of the 21st century because contexts now and in the future are likely different in important respects from those experienced three-four decades ago by the children in these studies.

the future is the impact and (ii) what is the appropriate discount rate. If the discount rate is 10% (what often is claimed to be a conservative estimate of the marginal rate of return to schooling), the PDV of a \$1000 impact 20 years hence (e.g. the value of improving maternal health for women in the early third of their childbearing years) is only about \$150 and the PDV of an \$1000 impact 60 years hence (e.g., reducing the probabilities of cardiovascular diseases in later stages of life) is only a little over \$3.00. If the discount rate is 5%, the PDVs are substantially higher -- \$377 and \$54, respectively – but still much less than if the impact were to occur sooner.

Years in Future	Annual Discount Rate					
	1%	2%	3%	5%	10%	20%
5	\$951.47	\$905.73	\$862.61	\$783.53	\$620.92	\$401.88
10	\$905.29	\$820.35	\$744.09	\$613.91	\$385.54	\$161.51
20	\$819.54	\$672.97	\$553.68	\$376.89	\$148.64	\$26.08
30	\$741.92	\$552.07	\$411.99	\$231.38	\$57.31	\$4.21
40	\$671.65	\$452.89	\$306.56	\$142.05	\$22.09	\$0.68
50	\$608.04	\$371.53	\$228.11	\$87.20	\$8.52	\$0.11
60	\$550.45	\$304.78	\$169.73	\$53.54	\$3.28	\$0.02

(5) Yet another factor is that obtaining these returns depends on survival, adjusting for which further reduces their PDVs. For example, based on the United Nations Population Division for Uganda about 91% of children survive to age 10, 83% to age 40 and 66% to age 60 [[These need to be checked]]. Both discounting and survival are relevant, of course, not only for developments over one's own life cycle, but also for parenting the next generation.

C. Efficiency as well as Distributional Motives for Policy Guidance: The ECD literature focuses for the most part on the distributional motive for policy in the form in particular of how ECD-related investments can reduce poverty (or, perhaps, inequality) in the next generation of adults. This motive is a major concern for the present study as well. But for the purpose of guiding policies, it is desirable to have estimates of the social benefits of ECD investments that include, for example, the spillover effects (whether negative or positive) on others (Behrman and Knowles (2005), Behrman and Knowles (2004)). This is the case because one major motive for policy interventions is the “efficiency motive.” Efficiency can be improved if there is a differential between the private and the social rates of return, a difference that may arise because of differences between the private and the social benefits.⁶ This is a major motive for policy because if differentials exist between the private and the social rates of return to an action, it would be possible to make everyone better off with the same resources and the same technology by reallocations. Or, to make the same point in a different way, if the private incentives are identical to the social incentives, there is no efficiency motive for changing policies to try to change private behaviors (though there may be distributional motives such

⁶ Private benefits are what individuals actually receive as the result of their actions. It does not include the benefits of the actions that might spill over to the other members of the community. These external benefits (also known as externalities) are captured in the social benefits.

as reducing poverty). Because limited access to capital and insurance markets is widely thought to lead to inefficiencies and poorer members of society generally have less access to these markets than do those who are better off, as noted above, efforts to address the efficiency motive well may reinforce efforts to address poverty concerns.

The available empirical estimates of the impacts of investments in ECD, even if they do deal with the econometric issues, generally do not deal well with the multiplicity of impacts over the life cycle and with the efficiency motive for policy. Instead they tend to focus on one or a few impacts usually for some relatively small age duration, generally early in the life cycle. Nevertheless, these estimates may be informative about some possibly key building blocks for obtaining estimates of the overall benefits of investing in ECD.

Finally it should be noted that the points discussed here in assessing the benefits for investments in the preschool-age life-cycle stage are generally parallel to those for investing in education (or other human resources such as health and nutrition) in later life-cycle stages. Also for investments in later life-cycle stages there may be complications because of the endogenous inputs from the earlier stages, including the preschool-age life-cycle stage. In practice, in assessing the impacts of education in subsequent life-cycle stages, often the effects of investments in the preschool-age life-cycle stage are not incorporated into the analysis. If, as seems plausible within life-cycle frameworks such as discussed in this section, investments in the preschool-age life-cycle stage are correlated with subsequent investments, this practice may lead to misleading attribution to later investments such as in schooling some of the effects of the preschool-age investments.

2.2. Costs of ECD Investments and Benefit-Cost Ratios

Estimates of impacts alone, or even the weighted average of impacts to obtain “benefits” in the sense that the term is used in Section 2.1 (and how it is used in benefit-cost analysis), do not provide enough information to judge whether programs are desirable or not, given that resources that might be used for preschool-age investments almost always have alternative uses. Quite aside from the challenges noted in estimating benefits in Section 2.1, to evaluate fully ECD interventions, such as preschool programs, and to compare them with alternative uses of public resources, it is necessary to also have estimates of resource costs in order to be able to calculate benefit/cost ratios or internal rates of return. We emphasize that the correct cost concept refers to the real resources that society uses for an intervention, whether public or private resources or distortions introduced by taxes and other means of financing public expenditures. The public real resource costs include the time of public employees and goods and services that have alternative uses, but NOT pure transfers that only redistribute purchasing power among members of society. For this reason the public budgetary costs do NOT necessarily represent the public real resource costs (to say nothing of the total real resource costs) because transfers may be important components of public expenditures – with many conditional cash transfer programs providing important examples. In addition to the public resource costs, the private resource costs may be considerable if, for example, mothers have to spend considerable time to assure that their children attend preschool centers or to participate in such programs. The distortion costs reflect the impacts of changed incentives due, for example, to taxes on labor efforts; these may be considerable – for example, some estimates suggest a quarter of public

sector expenditures or more (Harberger (1997)). For all of these reasons, studies that compare governmental budgetary costs across interventions are not comparing real resource costs and may be fundamentally misleading about the relative real resource costs across interventions.

We also note that, within the framework presented in Section 2.1, most of the real resource costs of ECD interventions occur in early childhood, not with lags of many years as for many of the impacts of interest for such interventions. Therefore the importance of discounting and adjusting for child survival are likely to be much less on the cost side than on the benefit side for ECD interventions. But they are not likely to be entirely absent. If ECD interventions result in subsequent increased schooling or training, for example, there are likely to be associated increased real resource costs in adolescence or adulthood for those activities. And, again, these are likely to include public-sector (in the form of teacher time and other school inputs), private (in the form of the opportunity costs of delayed labor force entry due to more schooling) and distortion costs (to raise the public funds for the additional public schooling expenditures).

Section 3. Benefits and Costs of ECD Programs in Other Developing Countries

3.1. Recent Evidence on ECD Impacts

Engle et al. (2007) and Engle et al. (2011) provide two recent reviews of ECD program impacts in developing countries. The studies included in these reviews had to: (1) relate to programs that promote child development through components of psychosocial support such as stimulation, responsive interaction, early education, or other social investments, often in combination with health, nutritional, social safety net, or educational interventions;⁷ (2) exist since 1990; (3) include what these reviews rated as adequate comparison groups to permit causal inferences; and (4) focus on children 0-6 years old and to report cognitive, language, social-emotional, or mental health outcomes (though analyses examining related outcomes, such as parent caregiving or preschool attendance, were also included). Engle, Black, Behrman, Cabral de Mello, Gertler, Kapiriri, Martorell and Young (2007) identify 20 studies that met these criteria and Engle, Fernald, Alderman, Behrman, O'Gara, Yousafzai, Cabral de Mello, Hidrobo, Ulkuer, Ertem, Iltus and the Global Child Development Steering Group (2011) identify 42 additional studies that met these criteria on a variety of ECD programs, not just preschool. Most of these studies are of programs that are directed considerably or even exclusively to children from disadvantaged backgrounds, particularly with regard to poverty, so in a gross sense, they deal with the fourth point in "I. Econometric Issues" above of heterogeneous impacts by focusing on children from poor backgrounds and with the concern of the present study regarding children from poorer families.

Despite the thorough search underlying these reviews, they located fairly few studies that permit even relatively crude comparisons because of the range of interventions considered and varying approaches to estimation (e.g., what assumptions are necessary for the estimation approach used, what controls are included). If all the studies using different measures for cognitive skills are considered together, there are eight studies for parenting/family strengthening programs (often part of primary health care or other programs) and 14 studies for organized early childhood learning centers (e.g., preschools) for which effect sizes (calculated using standard techniques) are presented.⁸ Table 2 gives the medians and the ranges for the effect sizes on cognitive skills from these studies. For both parenting and center programs, the ranges of estimated effect sizes are fairly large, but for both type of programs the median estimates are about 0.30, which is a considerable effect size.⁹

⁷ Thus, programs that have significant impacts on children in developing countries, such as salt iodization, but do not have a psychosocial program component are not included.

⁸ For no other outcome measure are there as many as five studies with effect sizes. The estimates for comprehensive programs in Engle et al (2007) are included with the early childhood learning centers in this summary.

⁹ For the other measures used, some of the median effect sizes are of the same general magnitude as for cognitive skills (e.g., for parenting 0.28 for motor skills in one study and 0.35 for socio-emotional skills for three studies) but not all of them (e.g., for parenting 0.17 for the HOME measure for three studies).

	Cognitive Skills Effect Sizes		
	Median	Range	No. Studies
Center-Based Preschool and Day Care	0.33	0.06 to 1.15	14
Parent and Parent-Child Interactions	0.28	-0.05 to 0.80	8
Sources: Compiled from Engle et al (2007, 2011)			

These estimates are promising, but – within the framework above – have a number of limitations. First, these estimates refer to but one of the major aggregate outcomes of the early childhood stage (cognitive development) discussed in Section 2.1, though perhaps the most predictive of the three aggregate outcomes considered. Second, they are mostly for outcomes for children still in the preschool-age life-cycle stage or not far beyond that stage. Therefore they provide very little direct information about the effects on longer-run subsequent outcomes of interest – schooling success, labor market outcomes, adult social behaviors, etc. – in the subsequent life-cycle stages. Third, though they are focused on disadvantaged children, the summaries in the *Lancet* articles do not report possible heterogeneous impacts among these families. Fourth, the estimates are conditional on the relatively few particular resource, market and policy contexts considered, and may not generalize to other contexts with different markets, policies, resources, cultures and institutions. The impacts for a context in which most women are active in labor markets, for example, may be much different than for a context in which almost no women participate in the labor market. Fifth, the estimates as summarized in these two *Lancet* articles generally do not provide much information about the dependence of the program impacts on the ages when children enroll, the duration of exposure, or interactions between program characteristics and family background, though a few studies that are included find these to be important factors (e.g., Armecin et al. (2006); Behrman et al. (2006); Behrman et al. (2004b); Ghuman et al. (2005); Noboa-Hidalgo and Urzúa (2012); Veramendi and Urzúa (2011).

Table 3 summarizes conclusions on program effectiveness from the *Lancet* reviews according to the strength of the evidence as perceived by the *Lancet* articles' authors: moderately-high, moderate, or low. The two moderately-high conclusions are that preschool programs can be effective, and that higher quality programs, as defined in each study, are associated with better outcomes for children, primarily cognitive but also socio-emotional. The reviews of studies in these *Lancet* articles also suggest at a “moderate” level of confidence that effects are larger for children who are poorer, and for programs that are formal rather than community-based. Also of “moderate” confidence is that benefits are greater than costs; there are several studies showing benefit-to-cost ratios that are within the four-to-one range. The number of questions with no clear answers, and therefore “low” evidence, ranges from how many years of preschool continue to be effective, at what age children should enter preschool, and how to integrate preschool programs with health and nutritional interventions.

Behrman, Fernald and Engle (2013) also consider in more depth the evidence about preschool program characteristics or program “quality.” Their Table 3 provides considerable additional detail

on a subset of the studies covered in the *Lancet* reviews for which there is some information on the impact of program characteristics and on an additional set of studies that are not covered in those reviews. They focus on the population of children attending preschool, and examine what elements of preschool quality are associated with child development. They consider three types of studies examining quality: 1) observational studies correlating variables relating to quality with child- or classroom-level outcomes; 2) intervention studies with a more comprehensive approach to educational improvement (e.g. facilities, curriculum, training); 3) intervention studies, usually focusing on improving one specific component of educational quality. They conclude that: (1) both comprehensive educational approaches and component-specific approaches to educational improvement have been shown to have an effect on child outcomes, particularly in cognitive development; (2) The value of involving families in improving preschool outcomes is not yet clear and has not been explicitly tested; (3) The most successful interventions in preschools used more child-centered methods adapted to the learning styles of young children, included teacher training and clearly defined interventions; (4) None of these studies, however, included an assessment of the cost of the quality improvement; and (5) More work is needed to determine the most cost-effective methods for improving preschool quality and the benefit-to-cost ratios of these improvements.

Table 3. Conclusions from Engle et al. (2007, 2011) on levels of knowledge regarding preschool programs for developing countries as presented in Behrman, Fernald and Engle (2013)

Level of knowledge	Intervention (preschool) type or characteristics	Findings
Moderately High	Preschool programs, both formal and non-formal	Exposure to preschool programs can result in improved child development, and can have long-term effects on child development and school performance
	Quality improvement in curriculum, training of staff, and program delivery in preschool programs	Higher quality results in improved outcomes for children
Moderate	Formal vs. informal preschool	Generally formal has stronger results but some informal programs are also found to have impacts
	Programs targeted at most disadvantaged	Some evidence for greater effects on poorest children; other studies show effects for all children.
	Cost of preschool compared to benefits	Ratio appears to be positive but relatively few studies and evidence from small-scale studies
	Long-term effects of preschool on early adulthood outcomes	Data from only very few studies
Low	Number of years of preschool	Possible more effects in first year; depends on quality, degree to which program changes with child age
	Number of hours per week of exposure by child age (can be too much)	No data from developing countries
	Age at which child begins to attend preschool (3, 4, or pre-primary)	Some evidence for greater impact for longer duration or earlier initiation for ECD programs but little evidence for younger children for day care
	Importance of having a culturally relevant curriculum	Often stated but little experimental evidence
	How to integrate preschool with health and nutrition programs	Some correlation but little causal data
	How to scale up programs and maintain	Unclear – appears to depend on each situation

	quality	
	Value of preschool for children with disabilities or special needs (e.g., HIV, malnutrition)	Almost no studies identified.

3.2. Costs and Benefit-Cost Ratios

Given that to calculate benefit-cost ratios or internal rates of return, the real resource costs are equally important as the benefits, it might seem that there would be more-or-less equal efforts to assemble information on real resource costs for ECD interventions throughout the developing world as for ECD impacts. But that is not the case. In sharp contrast to the reviews of impacts in Engle, Black, Behrman, Cabral de Mello, Gertler, Kapiriri, Martorell and Young (2007), Engle, Fernald, Alderman, Behrman, O'Gara, Yousafzai, Cabral de Mello, Hidrobo, Ulkuer, Ertem, Iltus and the Global Child Development Steering Group (2011) and elsewhere, we are unaware of any such surveys of real resource costs of individual ECD interventions in developing countries. Engle et al (2011) Engle, Fernald, Alderman, Behrman, O'Gara, Yousafzai, Cabral de Mello, Hidrobo, Ulkuer, Ertem, Iltus and the Global Child Development Steering Group (2011), however, provide some suggestive estimates based on aggregate data of the potential gains to be obtained based on earning-schooling relations from partially closing the gap between preschool participation rates for children from families in the top quintile of the income distribution and other children in each of 73 developing countries. Subject to caveats that they discuss, these imply benefit-to-cost ratios generally well above one, in the range of 14.3 to 17.6 for a 3% discount rate and in the range of 6.4 to 7.8 for a 6% discount rate. These are suggestive of significant potentially large gains, but are fairly far removed from the estimates for specific ECD interventions or even preschool intervention in particular in specific contexts in developing countries such as for Uganda that would be valuable for better policy guidance.

Section 4. Simulations of Possible Benefits and Costs for ECD Policies in Uganda

Much of the literature on early childhood investments has focused on short-run impacts of preschool programs on child characteristics such as cognitive skills, socio-emotional skills, physical development and executive function/self-regulation. These are important dimensions of child development and the assessments of the impacts of preschool programs on them are useful and suggestive. But such impact estimates do not provide much guidance about the longer-run impact of preschool programs, nor about the benefit-cost ratios of such preschool investments.

Benefit-cost estimates based on short and longer-run impacts and costs should be of substantial interest. They provide very useful information about the case for increasing investments in preschool programs as opposed to using resources for other perhaps worthwhile activities such as improving water supplies, transportation systems, maternal health services, and nutrition.

Estimating such benefit-cost ratios is challenging because of the paucity of information with which to assess both the longer-run benefits of preschool programs, as well as some of their cost components, in Uganda, as well as in other similar countries. The approach that we adopt, and indeed must adopt, is to base our estimates of benefits-costs for preschool programs in Uganda on a mixture of evidence that is available both from Uganda and from broader international experiences, and then to explore how sensitive our estimates are to variations in key assumptions. We first describe the basic components of our estimates and then present and discuss some alternative benefit-cost ratio estimates.

Benefits: We assume that the primary benefit of increasing preschool programs is through increasing life time productivities and therefore earnings through increasing schooling, along the lines of Engle et al. (2011) and indeed we build explicitly to a degree on the estimates in this study

There are two essential components of the estimates that we use to obtain the benefits: (1) The relation between preschool enrollment and schooling attainment and (2) the relation between schooling attainment and earnings or productivities.

(1) Relation between preschool enrollment and schooling attainment: Engle, et al. 2011 estimated the impact of preprimary enrollment on the gap between schooling attainment of the wealthiest quintile of individuals age 15-19 years in a country and others in the same age range for 73 low- and middle-income countries with a total population of 2.7 billion people based in part on the schooling estimates in Filmer (2010). Their impact estimate suggests that for every percentage point increase in preprimary enrollment, the schooling gap for 15-19 year olds declines 0.026 grades [5% -95% confidence interval = -0.014, -0.038]. This result is robust to using country fixed-effects regressions with countries for which two or more observations were available and to the inclusion of child mortality in the fixed-effects regressions. This finding of robustness provides some assurance that

the results are not driven by the nature of the school and health systems as does the fact that the outcome variable is a gap between two subpopulations in the same country. For our basic estimates of the benefits below, based on these estimates we assume that enrolling a child from a low-income family is equivalent for that child to increasing the enrollment rate from 0 to 100%, implying an increase of 2.6 grades of schooling when that child becomes 15-19 years of age. We assume that this increase in schooling attainment is the channel through which the effects of preschool enrollment on adult earnings/productivities pass. We explore how robust the estimates are to changing this estimated relation from over the 5% to the 95% confidence interval, that is from 1.4 to 3.8 grades,

(2) Relation between schooling attainment and adult productivities and earnings: We assume that the estimated rate of return to schooling in the labor market is also the rate of return to schooling in other activities (e.g., household productivity); this is the implication of the usual economics model in which at least approximately people allocate their time between wage activities and other activities so that at the margin the rates of return are equalized among all activities. This probably is a less strong assumption for an economy such as that of Uganda where the majority of the population of working age are engaged in small and medium-scale agricultural and other informal activities that are not characterized by the rigidities in work and pay schedules that dominate in, say, Western Europe. We assume a work life through age 64 years (but see the discussion below on survival rates). We use the estimates for rates of return to schooling attainment in developing countries that are summarized by Orazem, Glewwe and Patrinos (2008) for our base estimates: 7.5% for rural areas and 8.3% for urban areas. Given the dominance of rural areas in the distribution of population and of employment in Uganda, we focus on the former. We explore the robustness of our result to varying this rate of return over a $\pm 4\%$ interval (i.e., from 3.5% to 11.5% for rural areas).

Costs: Our cost estimates are based in part on information that we have assembled and analyzed elsewhere in this report. But because of the relatively limited coverage – and therefore cost experience – of preschool programs in Uganda, our assumptions about costs are also informed by international experience. The primary costs consist of three components, each of which we now consider in turn. Because the primary costs are time costs for preschool teachers, school-age students, and school teachers, we find it convenient to characterize the costs relative to wages of an adult with basic schooling levels, which we refer to as “basic wages.” This is a matter of convenience in order to give some perspective about how the costs that are discussed are assumed to relate to such a wage. Note that changing the basic wage on its own would not change any of the benefit-cost ratios that are presented below. However changing the percentages of the basic wage for different costs does have an impact, as is discussed below for the benefit-cost ratios.

(1) Direct costs of one additional year of preschool programs for one child: The costs on which there is primary emphasis in the literature are the supplier costs of providing preschool programs, which in turn is determined primarily by the time of the teachers and assistants in such programs but also include such variable costs as toys and other materials and fixed costs related to buildings used for such programs. However there also may be important private costs, such as the financial and

time costs that families (usually mothers) incur to assure that their children attend preschool programs. And there may be distortion costs of raising funds for public-sector expenditures on preschool programs that are estimated to be on average a quarter or more of public expenditures (Harberger 1997). For our basic simulations we assume that all these costs for an additional child per year in a preschool program total 0.1 of the basic wage. This is not far from the value of 0.125 found by van Ravens and Aggio (2008); the small difference might be explained by the fact that they assumed a salary for preschool teachers that is equal to that of primary school teachers, while in reality the former is often somewhat lower than the latter. We explore the sensitivity of our estimates to a range from 0.05 to 0.15 of the basic wage.

(2) Direct costs of one additional year of schooling for one child: As noted above in the discussion of benefits from expanding preschool programs, we emphasize the central role of the relation between attending preschool programs and the final schooling attainment of children. But, of course, there is an added direct cost of extending schooling, again most importantly including the time costs of additional teachers, but also including such variable costs as books and other materials and fixed costs related to school buildings. Again there also may be important private costs, such as the financial costs that families incur for transportation and school supplies. And again there may be distortion costs of raising funds for public-sector expenditures on schooling. For our basic simulations we assume that all these costs for an additional child per year in a school total 0.15 of the basic wage, but we explore the sensitivity of our estimates to a range from 0.1 to 0.2 of the basic wage. And we assume that these costs are incurred when the child is about age 14, completing basic schooling.

(3) Opportunity costs of time of extending schooling for a child: If schooling attainment is extended because of expanded preschool enrollment, not only are there additional direct schooling costs such as are discussed in the previous paragraph, but also there are the opportunity costs of the adolescent being in school instead of engaged in other activities including work. For our basic simulations we assume that these costs for an additional child per year in a school are 0.75 of the basic wage, but we explore the sensitivity of our estimates to a range from 0.5 to 1.0 of the basic wage. Again we assume that these costs are incurred when the child is about age 14, completing basic schooling.

Other Central Assumptions:

(1) Discount rates: Most of the benefits of preschool programs and some of the costs are incurred years after a child attends a preschool program. Most notably, if attending a preschool program increases adult productivities through increasing schooling attainment, the benefits in terms of increased productivities and earnings may be from one to six decades after attending the preschool program. Therefore our estimates must take into account the timing of the benefits and of the costs. One reason that timing is important is that receiving a benefit of 1000 shillings today is more valuable than waiting decades to receive the same 1000 shillings because, if the 1000 shillings are

received today, they can be reinvested and, with their earnings, be worth more than 1000 shillings received in the future. To account for this dimension of timing, discount rates are typically used to discount future benefits and costs back to the present. In the social sectors, discount rates of 3% and 6% are often used (Engle et al. 2011), though in other sectors higher rates such as 10% or 12% frequently are used. We use a 6% discount rate for our base estimates, but explore how robust our estimates are to using 3% and 10% (10).

(2) *Survival rates:* Another reason that timing may be important is that not all children will survive to be productive adults through age 64 years. Therefore for our estimates of future benefits and costs (but this is important primarily for the benefits given their timing) we adjust for the survival probabilities based on the World Health Organization Life Tables for Uganda for 2009 (<http://apps.who.int/gho/data/view.main.61730>; accessed 30-3-2013). This adjustment reduces the benefits from earnings when the children become 45-49 years of age by about 10% and those for when they become 55-59 years of age by about 15%.

(3) *Externalities:* There is a widespread view that schooling has positive externalities in the form of benefits to others in society beyond the person schooled through, for example, reducing crime or increasing political participation, though systematic empirical evidence on such externalities is difficult to obtain and is much more limited than often seems to be assumed. To illustrate the impact of possible externalities, in our base case simulations we assume that the social rates of returns to schooling increases induced by expansion of preschooling are 10% higher than the private rates of returns. To investigate the sensitivity of our estimates to this assumption we also present alternative estimates in which we assume that the social rates of return are 25% higher than the private rates of return.

(4) *Market-wide or macro effects:* The benefit-cost ratios presented below are based on the estimates for expanding preschool programs for an average child in the target population (e.g., from the bottom quintile of the income distribution). But if such programs were expanded broadly so most or all children were enrolled, the resulting expansion in schooling when these children became adults would be substantial, and possibly would reduce the rate of return to schooling due to the outward shift in the supply curve of more-schooled adults. We do not attempt to explore this possibility in our estimates for two reasons. First, if the population of more-schooled adults expanded, there also may be shifts in the demand for more-schooled adults because more-schooled consumers appear to consume more schooling-intensive goods and services – with the demand shift possibly offsetting the

10 We thank Jun Fan of UNICEF in Kampala for pointing us to some examples relevant for Uganda that use 10% -12% for infrastructure projects and, in one case, a post-primary educational and training project: African Development Fund (2005), **Error! Main Document Only.**Bosshard (2002), **Error! Main Document Only.**Ranganathan and Foster (2012) and **Error! Main Document Only.**Ssewanyana, Okoboi and Kasirye. (no date)

supply shift. Second, given the current very low enrollment rates in preschool programs in Uganda, it would take a very large increase in preschool enrollments to have any noticeable impact on the rate of return to schooling.

Benefit-cost estimates: Table 4 (next page) summarizes a set of benefit-cost ratios. Because they attempt to include all benefits and costs, including externalities, these are social benefit-cost ratios. Private benefits are assumed to be smaller because they do not include externalities, but private costs also may be smaller if any of the costs are covered by public subsidies as is likely. Therefore the private benefit-cost ratios may be larger or smaller than the public benefit-cost ratios in the table, depending on how these two factors balance out.

The first column gives what we define as the “base” estimates, with generally, if anything, somewhat conservative assumptions regarding the key parameters. The social benefit-cost ratio for the base case is 1.6, implying that the benefits are 60% greater than the costs. Thus even this base case, despite the possibly conservative assumptions, appears attractive.

The next five columns in the table vary one at a time one set of the critical assumptions underlying the base case by making them less conservative. For all five of these cases the benefit-cost ratios increase. The increase is relatively small to 1.8 for the first of these five, the case in which there is a higher impact of preschool programs on schooling attainment. This is because in this case the increase of almost 50% in the impact of the preschool program on schooling attainment not only increases the benefits due to the greater schooling attainment, but also increases the costs through both the direct cost of schooling and the opportunity costs of schooling. For the next three cases the benefit-cost ratios raise to 2.6-2.7, which implies benefits that are about 160% higher than the costs. If any of these assumptions are more appropriate than those in the base case, therefore, preschool programs look much more attractive. These three cases also highlight the different channels through which benefit-cost ratios might be higher: higher impacts (in the second case perhaps through improved school quality), reduced costs, and reduced discount rates. Not surprisingly, for calculating benefit-cost ratios, the costs are as important as the benefits both for being able to estimate the ratios and for considering means of improving them. The increase in the sixth column, for which case the assumed positive externalities cause the social rates of return to schooling to be 25% rather than 10% greater than the private rates of return to schooling, is to 1.9, about the same as for the second column.

The seventh column in the table gives the benefit-cost ratios if all five of the changes from the base simulation that are discussed in the previous paragraph are implemented together. Under this combined set of more optimistic assumptions the benefit-cost ratio is 8.6, suggesting that expanding preschool programs is a quite attractive investment.

While, as noted above, the discount rates typically used to evaluate social programs are in the 3-6% range. But higher discount rates often are used to evaluate other investments, such as in physical

infrastructure. Therefore in the last two columns estimates are presented with a 10% discount rate. The penultimate column makes the base case assumptions except for the more conservative assumption of a 10% discount rate. The estimated benefit-cost ratio is 1.1, with benefits slightly greater than costs. The last column makes all the assumptions in column 7 except that the discount rate is assumed to be 10% instead of 3%. This change reduces the estimated benefit-cost ratio from 8.6 to 3.6. The substantial reduction reflects the importance of the question of what is the appropriate discount rate. But even with this reduction, the benefit-cost ratio implies benefits 3.6 times as large as the costs.

These estimates are based on a number of assumptions, and illustrate substantial sensitivity to some of the assumptions, such as for the appropriate discount rate. But all in all they suggest fairly substantial potential gains for increasing preschool attendance with satisfactory – or possibly very satisfactory -- benefit-cost ratios.

Table 4: Benefit-Cost Ratios for ECD in Uganda under various assumptions

	Base Case	Base Case Except					Base Case with All Changes in Previous Five Columns	Higher Discount Rate	
		Higher Preschool Impact on Schooling	Higher Rate of Return to Schooling Attainment	Lower Costs	Lower Discount Rate	Higher Positive Externalities		Base Case Except Discount Rate=10%	Case in Column (7) Except Discount Rate = 10%
Assumptions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Impact of Preschool on Schooling Attainment (Grades)	2.6	3.8	2.6	2.6	2.6	2.6	3.8	2.6	3.8
Rate of Return to Increased Schooling Attainment (%)	7.5%	7.5%	11.5%	7.5%	7.5%	7.5%	11.5%	7.5%	11.5%
Direct Cost of Year of Preschool (% of Basic Wage)	10.0%	10.0%	10.0%	5.0%	10.0%	10.0%	5.0%	10.0%	5.0%
Direct Cost of Additional Grade of School (% of Basic Wage)	15.0%	15.0%	15.0%	10.0%	15.0%	15.0%	10.0%	15.0%	10.0%
Opportunity Cost of Additional Year of School (% of Basic Wage)	75.0%	75.0%	75.0%	50.0%	75.0%	75.0%	50.0%	75.0%	50.0%
Discount Rate (%)	6.0%	6.0%	6.0%	6.0%	3.0%	6.0%	3.0%	10.0%	10.0%
Externality as % of Labor Market Rate of Return	10.0%	10.0%	10.0%	10.0%	10.0%	25.0%	25.0%	10.0%	25.0%
Benefit-Cost Ratio	1.6	1.8	2.7	2.6	2.6	1.9	8.6	1.1	3.6

Section 5. A Scenario for the Expansion of Pre-primary Schooling in Uganda

5.1. Introduction

In this section, we develop a concrete and realistic scenario for the expansion of pre-primary schooling (11) in Uganda and we estimate the costs of implementing this scenario. What drives the current interest in benefit-cost analysis in pre-primary schooling is the assumption that potential contributors to pre-primary programs will become less reluctant to invest once they have a better understanding and clearer expectations of the benefits that these programs will yield. As the TORs for the study put it: *This study aims to trigger a shift in public investment to support the development and expansion of ECD in the country by sharing the individual, economic and social implications for future generations when investing in ECD.*

The emphasis on *public* investment must be understood in light of the current way of funding pre-primary schooling. In Uganda today, pre-primary schooling programs for children aged 3 to 5 - the focus of this study – are mainly financed by families, communities, NGOs, faith-based organizations, and the for-profit sector (12). This has resulted in a situation in which only a small proportion of the population has access to for-profit programs, while other groups are either excluded or have to rely on community-based *ECD centers that were being established at the village level by persons or communities with little training in ECD*, with the result that *most (of these) programmes were below standards* (Ejuu, 2012:252).

The picture that Ejuu paints regarding the community-based ECD centers – further referred to as CB centers - is in accordance with the findings from the site visits conducted for this report: on the one hand, the CB centers seem to be the key intervention that can make pre-primary schooling accessible to large numbers of children from less advantaged backgrounds. But on the other hand, the communities that have decided to follow this course are struggling to keep their centers up and running. Some are inclined to increase the fee in order to safeguard continuity, but thereby they jeopardize the accessibility that should be the hallmark of community-based services. In many if not most cases the assistance of an NGO is indispensable for the start-up of CB centers and often also their continuity. Moreover, the interviews with the headquarters of some of the main NGOs that are active in creating CB centers made clear that the NGOs' capacity to scale up further has its limitations. Starting up a CB center requires intensive support, and the NGOs have only a few community mobilizers to do this job. A rough estimation is that jointly the NGOs can start-up a few dozens of CB centers per year, not hundreds. Given the fact that the growth of the for-profit sector,

11 While the previous chapters used the term “preschool education” following the dominant terminology in the literature, this chapter uses the term “pre-primary education” or “pre-primary schooling” to follow the Ugandan terminology. The meaning of both terms is broadly the same.

12 We use the terms “for-profit sector” and “for-profit nurseries” instead of the term “private sector/nurseries”, because in the Ugandan context the word “private” has a broad meaning: it includes not only the for-profit sector but also communities and families; NGOs; faith-based organisations; and any other organizations that are not part of the state.

on its turn, is limited to those segments of the population that can afford commercial fees, we must conclude that at least some degree of government funding and seems indispensable if we want to provide access to pre-primary schooling to all children aged 3 to 5 within some decades.

A second set of arguments to look at the government for intensified support has to do with the nature of the benefits that arise from pre-primary schooling. Many of these benefits are long term benefits. Higher wages, increased income tax revenue, higher labor productivity; reduced spending on healthcare, less crime: all these benefits materialize many years after a child enters a pre-primary programme. Families, communities and NGOs usually do not have the possibility to bridge such a long period; they cannot make a high investment now and wait for decades until the benefits accrue. Hence it is typically the government that should plan and invest in pre-primary schooling across such a long time-span, the more so because an important share of the benefits is public, not private (13).

However, the role that government of Uganda sees for itself in funding ECD programs is not entirely clear. On the one hand, the Education Act of 2008 states in its Supplement of 28th August 2008 that it is the responsibility of the Government in the field of non-formal education (which includes CB centers) *to identify areas of communities where non-formal education programmes are required; (...) to establish non-formal education centers; to pay the teachers or instructors in non-formal education programmes* (MoES, 2008:13). This would point at an important Government role in funding - or at least co-funding – the CB centers, which are in essence non-formal institutions for pre-primary schooling. On the other hand, the ECD policy of 2007 states explicitly on page 1 that *the establishment of ECD centers for children 0-6 years has been left in the hands of the private sectors* (MoES, 2007:1). As the TORs for this study put it: *there is a strong ECD policy but not a budget to implement it*. More recently, a study by the Ministry of Education and Sports itself (2012:i) makes the point that the Government, while recognizing the importance of ECD, fails to promote it effectively, especially in terms of finance. The report adds that billions of tax payers' resources are wasted in the form of drop out and grade repetition in primary schooling.

But while there are tensions between the Education Act of 2008, the ECD policy of 2007, and the recent MoES report, the daily practice in Uganda is clear. It is entirely in accordance with the position that the Government has taken in the ECD Policy of 2007: there is no Government role in funding pre-primary schooling. Indeed it was found during the field work that is widely understood, by all actors at all levels, that no money can be expected from the Government to co-fund pre-primary schooling.

For the authors of this report, this creates a dilemma. On the one hand, one wants to fully respect the policy choices that the government of Uganda has made. On the other hand, by developing and testing scenarios that assume zero government input, it would not be possible to investigate the programs' benefits in a meaningful manner, since such scenarios are likely to be unsustainable and/or of sub-optimal quality, as this chapter will demonstrate.

For this reason, this chapter does explore the feasibility of a *modest* Government contribution to the

13 For instance, an analysis of the Perry Preschool Project (USA) showed that 75% of the program's benefits accrued to the general public, and 25% to the participants themselves.

scale up of pre-primary schooling. The chapter will develop the idea of a small per capita contribution, which should lower the financial threshold for parents to enroll their children. The authors were strengthened in this vision by a similar proposal made in a draft of the Saber report on Uganda by the World Bank which was kindly made available to them (World Bank, 2012:9).

As noted above, this chapter is largely based on work done during a mission to Uganda in October 2012. The data and information gathered during this mission are contained in three annexes:

- Annex 1: enrolment analysis
- Annex 2: cost structure and costs at micro-level
- Annex 3: information from interviews with NGOs

This chapter builds on these annexes and also on additional sources. For a good understanding of this chapter, it is not necessary to read the annexes first, but at some points the reader is referred to one of the annexes for more background information.

This chapter opens with a discourse on the focus of and the terminology for the work on the scenarios. This is followed by a broad description of the demographic and economic context in Uganda, as well as a quick assessment of the state of the education system. Section 3 unpacks the cost structure of the CB centers using a simple framework containing nine cost components. The hinge point of this chapter is section 4 which presents the idea of a “Pact for ECD in Uganda”. Based on the site visits, the interviews and the study of the documentation, this Pact proposes a division of tasks and responsibilities between the main stakeholders that should make it feasible to bring pre-primary schooling to all the children of Uganda in the coming years. Sections 5 and 6 are elaborations of one specific element of this Pact: a small “recurrent financial contribution” from the Government and its Development Partners that – with the assistance of the other participants in the Pact – should make the difference between stagnation and progress. Section 5 elaborates this recurrent contribution and section 6 links it with the macro-level, resulting in a number of scenarios. These scenarios are the stepping stone for the next chapter, which addresses the returns on this proposed investment.

5.2. Focus and Terminology

There is broad consensus that while learning begins at birth, age 3 is the time for children to commence learning through play and interaction in groups (Engle et al, 2007).

Age 6 is the official entry age for primary school in Uganda. In practice, a mere 50% of the six-year-olds and 70% of the seven-year-olds attend primary school, and it is only at age 10 that the attendance rate reaches its maximum of about 95% (Uganda Bureau of Statistics and Measure DHS, 2011:27). But although the timely and successful enrolment and attendance during these two transition years (i.e., ages 6 and 7) requires attention in Uganda, this report sees this primarily as a task for the primary schooling sector, even if good quality pre-primary schooling can play an important supportive role (MoES, 2012).

Hence, this report focuses on the children of ages 3, 4 and 5, and on the learning programmes for these age cohorts. According to the “typology of programmes” in the national ECD policy of October 2007 (MoES, 2007:10-11), these pre-primary programmes are:

- Community-based ECD centers. The Education Management and Information System (EMIS) reports that there were 1,230 such centers in Uganda in 2011. However, this is most probably an underestimation since the Demographic and Health Survey (DHS) of 2011 found that the number of children that attend pre-primary schooling is 23.4% which is almost four times higher than the official figure from the EMIS which stands at 6.6. See table 5. For an in-depth discussion of the remarkable difference between EMIS and DHS outcomes, see chapter 1 of Annex 1.
- Nursery schools and kindergartens, usually referred to in Uganda as “nurseries”. According to EMIS, there were 5,988 nurseries in Uganda in 2011. Again, this may be an underestimation.
- Home-based programmes. According to EMIS, there were 95 home-based programmes delivered in homes, though this too may be an underestimation.

Table 5: NER, GER, NAR and GAR (14) in pre-primary schooling in Uganda (2011)

	Net	Gross
Enrolment as per EMIS	6.6	8.6
Attendance as per DHS	23.4	41.4

Sources: MoES (2011) and Uganda Bureau of Statistics and Measure DHS (2011)

The typology of programs in the ECD policy of October 2007 also includes the daycare centers for the children of 0-3. However, although the period from birth to age three is critical in child development, it will not be addressed in this report. The argument is that it is an essentially different field, in which enrolling large numbers of children in programmes is unaffordable and not always desirable. Generally, the home environment is seen as the best place for children of ages 0-3 to develop. Even more affluent countries have difficulties covering this age range through daycare

14 NER/GER = Net/Gross Enrolment Rate. NAR/GAR = Net/Gross Attendance Rate.

centers, partly because of the much more labor intensive nature of caring for infants and toddlers and the high costs that this incurs. As of 2011, there were only 55 daycare centers in Uganda (presumably catering for middle and upper class children) and it seems unrealistic to scale this up. More interesting is the trend – often observed in resource constrained countries - to reach the 0-3 age group through parenting programmes (e.g., by integrating modules that address early stimulation and responsive care in existing programmes operated by the health sector). But as noted above, this report will not elaborate this.

The Ugandan terminology with regards to pre-primary schooling differs somewhat from that in other countries. The use of the term “private sector” is relatively broad, in that it concerns not only the for-profit institutions, but also the ones initiated by communities and/or faith-based organizations and/or NGOs. Since the Government of Uganda does not fund any pre-primary institutions, all of the pre-primary institutions are essentially “private” given the broad definition of “private sector”.

For this reason, this report avoids the term “private”. Instead it uses the term “for-profit” for those institutions that aim at making a profit. In Uganda, these are generally called “nurseries”. The term “kindergarten” is less common and will be avoided to prevent confusion with the for-profit daycare centers for the 0-3.

The community-based ECD centers (further referred to as CB centers) form the thrust of the pre-primary institutions that do not aim at making a profit. The remuneration that they provide to the caregivers is very modest, while caregivers in the poorer regions are often volunteers. In most cases the CB centers are initiated by an NGO that usually reduces its support after an initial phase of four or five years. After that initial phase, the community becomes responsible for operating the center, which justifies the term “community-based”. In some cases, however, the external support is more continuous, e.g. when a faith-based organization provides lasting assistance in the form of land and structures. But in keeping with the ECD Policy of 2007 we shall use the term “community-based” also in these cases.

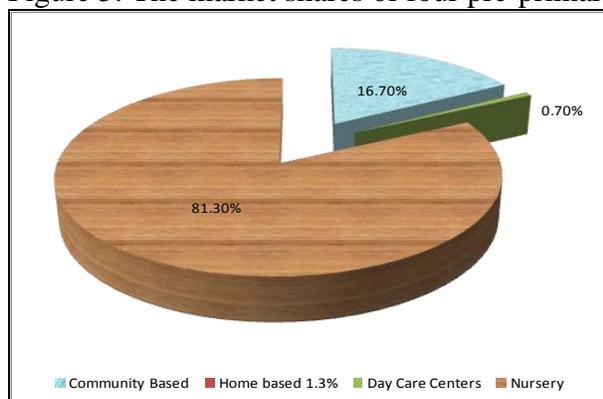
It must be noted that the demarcation between nurseries and CB centers is not always clear. E.g. an institution that we visited in a rural sub-county in Kumi district, had a clear “flavor” of a CB center for the way it looked, for the way it presented itself, and for the way in which it was operated. Yet it was providing an income for the person who owned and managed it, and it was difficult to tell whether that income was just enough to live from or more substantial. Whatever was the case, before the Law there is no strict distinction between nurseries and CB centers: both must utilize the national Learning Framework (i.e. the national curriculum), both must be licensed and registered, and neither receives public funding.

The home-based ECD center is a modality with an important potential to reach children in areas that are too sparsely populated to operate CB centers or nurseries in a cost-effective manner. In Uganda, however, home-based ECD has not yet picked up sufficient momentum to play a major part in this study, as figure 5 shows. We also exclude the so-called school-readiness (15) programs from our

15 These are programs that children typically follow during the last year – or last months – before entry in primary schooling. As their name suggests, they focus on preparing for school rather than on holistic child development.

analysis since these are not mentioned in the 2007 ECD Policy or the 2008 Education Act, and do not seem to be a topic in the public debate on ECD in Uganda.

Figure 5: The market shares of four pre-primary programmes in Uganda



Source: MoES 2012:10

According to figure 5, by far most of the children who are enrolled in pre-primary schooling find themselves in nurseries (81.3%). The second largest share is for the CB centers (16.7%). Daycare and home-based centers have only a marginal share of 0.7% and 1.3% respectively.

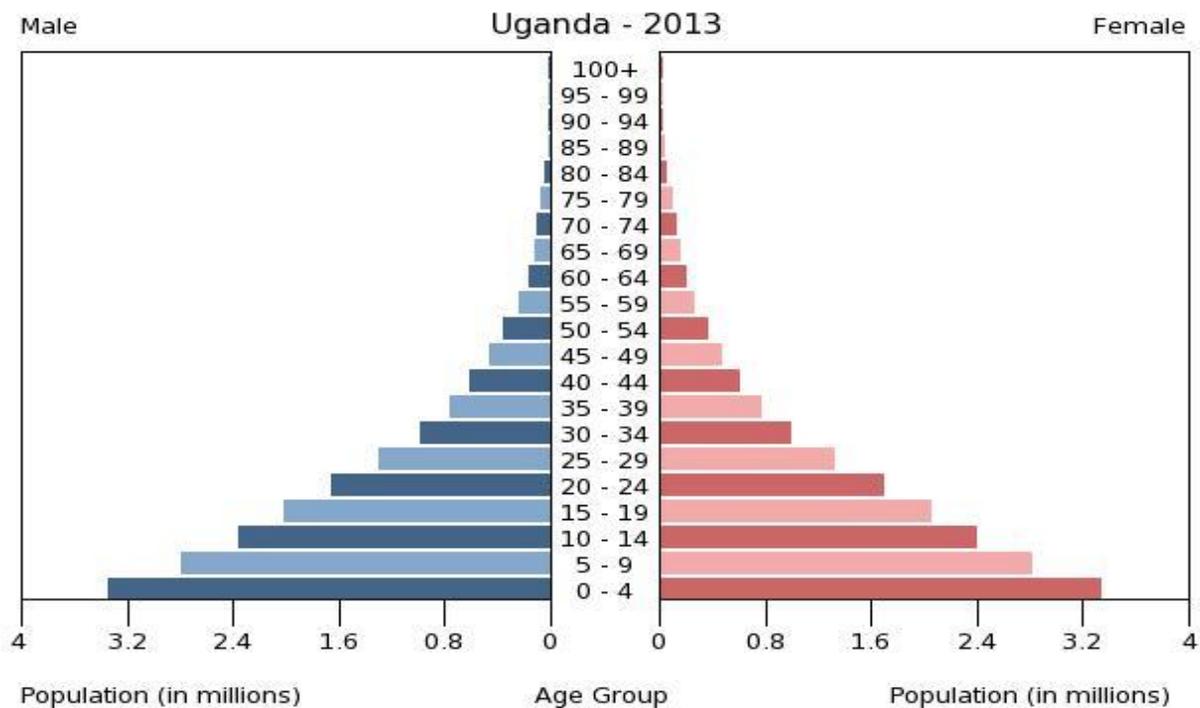
However, it must be noted once again that figure 5 is based on data from the EMIS while the DHS has different outcomes regarding pre-primary attendance. However, DHS does not contain data on attendance by type of institution. Therefore we do not know the current division of the market shares between nurseries and CB centers. Figure 5 serves merely as a rough indication of that division.

5.3. Context: Demography, Economy, and Status of the Schooling System

The government's scope for making financial contributions to the expansion of pre-primary schooling is co-determined by a number of factors. Without being exhaustive we (i) discuss the demographic context in Uganda; (ii) have a quick glance at the current status of the schooling system (enrolment at various levels); and (iii) conclude this section by looking at economic growth and public spending.

Uganda's demographic profile has the shape of the classical "population pyramid" as figure 6 shows. Every next cohort of newborns outnumbers the previous one by approximately 200,000 boys and girls.

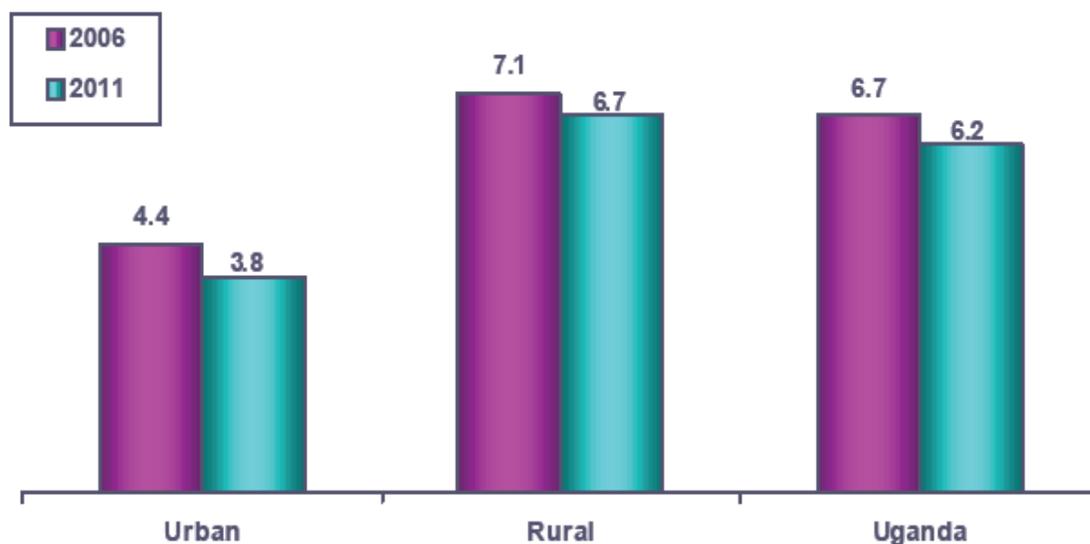
Figure 6: Population Profile of Uganda (2013)



Source: <http://www.census.gov/population/international/data/idb/region.php>

Figure 7 shows the cause of the pyramidal population profile: a very high Total Fertility Rate, especially in rural areas where most Ugandans live. The figure also shows that the decrease between 2006 and 2011 – from 6.7 to 6.2 – has been modest. Hence, a continuous growth of the school aged population is likely to remain a given fact for policy makers in Uganda for years to come.

Figure 7: Total Fertility Rates in 2006 and 2011



Source: Uganda Demographic and Health Survey 2011. Preliminary Report.

To have a closer look at the consequences of the demographic profile for the management and funding of the schooling system, we look at some selected core schooling indicators. Table 6 provides a snapshot; a discussion follows below the table.

Table 6: Selected Indicators Concerning the Ugandan Schooling System, 1999 - 2010

	1999	2010
Primary NER	-	91
Primary GER	130	121
Primary dropout rate	61.8	68.2
Secondary GER	16	28
Tertiary	-	4

Sources: EFA Global Monitoring Report 2012 (UNESCO); Global Education Digest 2012 (UNESCO Institute for Statistics)

It can be seen from table 6 that Uganda has not yet achieved universal primary education (UPE). The NER stood at 91 in 2010. The GER has decreased only slowly over the past decade, indicating that there are still a lot of over- and under-aged children in the school system. It has been argued that countries' tendency to prioritize UPE goes at the cost of investment in pre-primary schooling (16). In other words: there is competition for scarce resources between the two schooling sub-systems, and pre-primary schooling is the likely loser of that battle. Thus, one could argue that a primary NER of 91 is bad news for those who advocate for the expansion of nursery schooling. However, the large number of children that does not enter primary schooling in a timely manner (indicated by a GER that still is 30 percent points higher than the NER) should be a reason to attach more value to investment in pre-primary schooling: it is by investing in the latter that a country can promote timely entry in primary school.

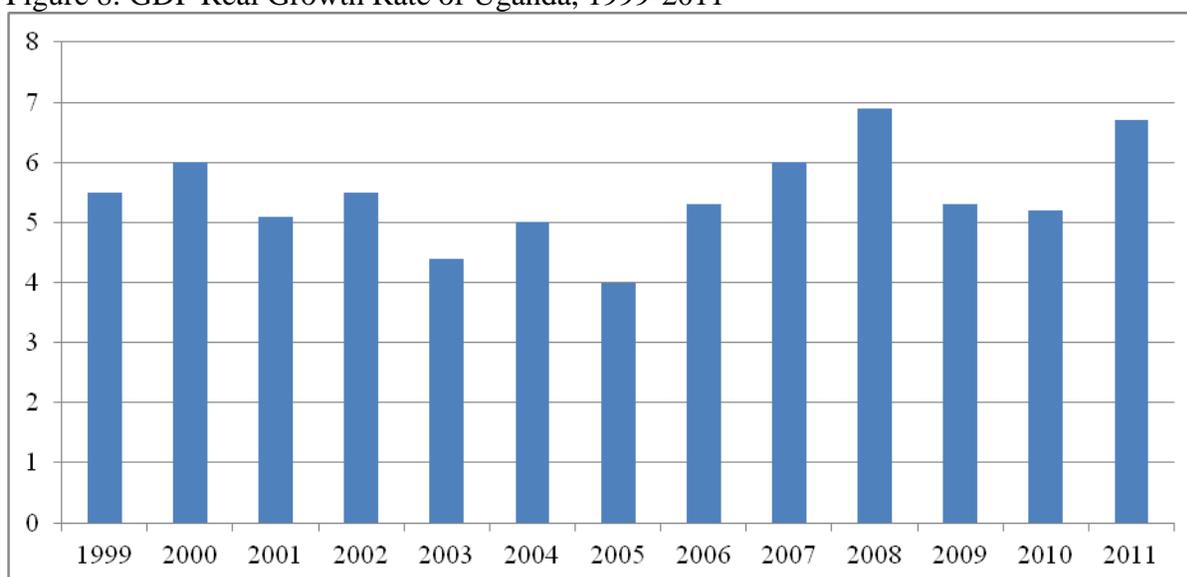
16 E.g. Ejuu (2012) makes this point in relation to Uganda, while Kaga (UNESCO, 2006) demonstrates this for Kenya.

Another argument to invest in pre-primary schooling in Uganda today is the exceptionally high and still increasing drop-out rate, as Table 1 shows. Again, investing in pre-primary schooling is one of the strategies that a country can apply to combat drop-out (ibidem) thus saving money that can be used to sustain the investment in pre-primary (MoES, 2012:3-6)

Enrolment in secondary schooling is still low in Uganda, though on a clearly upward trend: from 16% in 1999 to 28% in 2010. What is most remarkable is that the sum of the primary drop-out rate plus the secondary enrolment rate is almost 100. This means that nearly all of the children that complete primary schooling go on to secondary (17). In other words, secondary enrolment has reached its ceiling; the number of Ugandan children that enter secondary schooling can no longer increase substantially unless the primary drop-out rate is reduced. This again points at the strategic importance of investing in pre-primary schooling. In other words: the low enrolment rate in pre-primary schooling represents a bottle-neck for the entire schooling system up to secondary level. This, on its turn, limits the flow of young people into qualified jobs and into tertiary schooling where only 4% of the relevant age group enroll, which is below the regional average.

The extent to which Uganda can afford the investments in pre-primary schooling that are necessary for balanced growth of the overall schooling system, depends to a large extent on economic growth and the share of the nation's income that is invested in schooling. In as far as economic growth is concerned, we see a relatively favorable picture. Figure 8 shows that for more than a decade, GDP growth was seldom lower than 5% and peaked to close to 7% in 2008 and 2011.

Figure 8: GDP Real Growth Rate of Uganda, 1999-2011



Source: <http://www.indexmundi.com/g/g.aspx?c=ug&v=66>

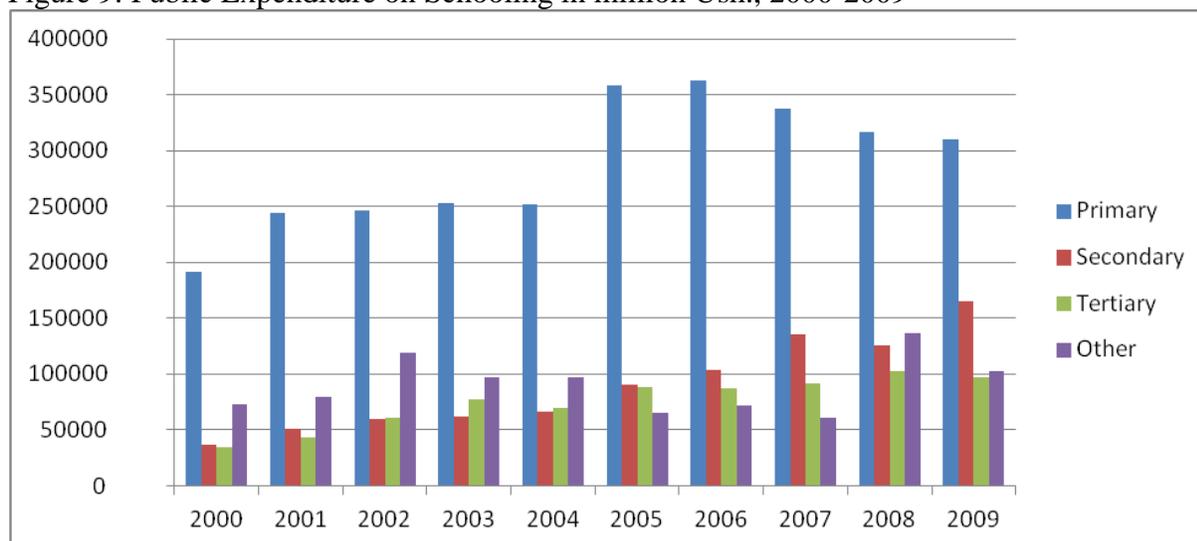
17 Note that the secondary GER concerns average enrolment across both junior and senior secondary schooling. Since some pupils drop-out along the way, the secondary *intake* rate is always higher – sometimes much higher – than the enrolment rate. This justifies the assumption that of the 32% (100% – 68%) of each age cohort that completes primary schooling, nearly all must at least enter secondary schooling if the average secondary enrolment rate stands at 28%.

As the population of age 0-19 (which can be seen as a rough proxy for the school-age population) grows by approximately 3% per year, this is clearly outpaced by an economic growth rate of 5% or higher. In other words: even if we take population growth into account *as well as* the political wish to prioritize increasing enrolment rates at primary, secondary and tertiary level, there might still be budgetary space left for pre-primary schooling. And given the fact that investment in the latter enhances efficiency at the other levels of the schooling system, there are strong arguments for at least some level of government spending in pre-primary schooling.

To assess the scope for public funding for pre-primary schooling, a number of sources are available. The aforementioned MoES-report on the role of ECD in UPE performance improvement (MoES, 2012:22) provides the budgets for pre-primary and primary schooling which are in one and the same budget line. However, the share of pre-primary in that budget is minuscule: in 2011/2012 it stood at 0.088% of the joint budget for pre-primary and primary, underscoring once again that the Government of Uganda does not invest in pre-primary.

However, the issue is not current investment in pre-primary, but assessing the scope for future investment. To this end, figure 9 presents the development of the schooling budget between 2000 and 2009, breaking it down into primary, secondary, tertiary schooling, and other.

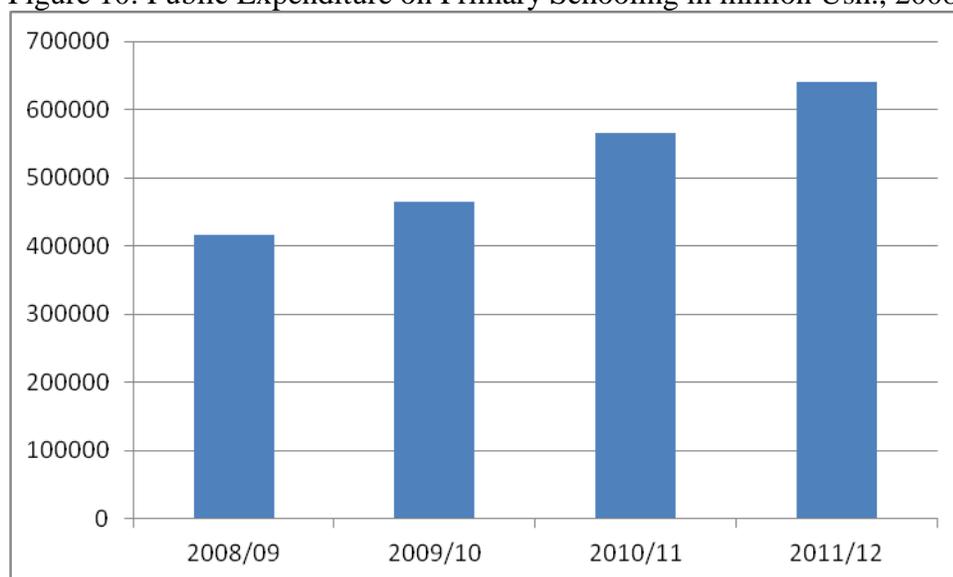
Figure 9: Public Expenditure on Schooling in million Ush., 2000-2009



Source: compiled with the use of table 2 of “State of Uganda Children, 2010/11” published by the National Council for Children (August 2012)

Figure 9 shows that after four years of stagnation the budget for primary schooling leaped from Ush 250 billion in 2004 to more than Ush 350 bln in 2005, but then decreased. The budgets for secondary and tertiary schooling increased much more gradually, while the budget for other forms of education has been more versatile. In order to double-check the decrease in the primary schooling budget since 2005, we used the MoES study of 2012 as an alternative source (MoES, 2012:22). Figure 10 is compiled with the use of data from this report.

Figure 10: Public Expenditure on Primary Schooling in million Ush., 2008-2012

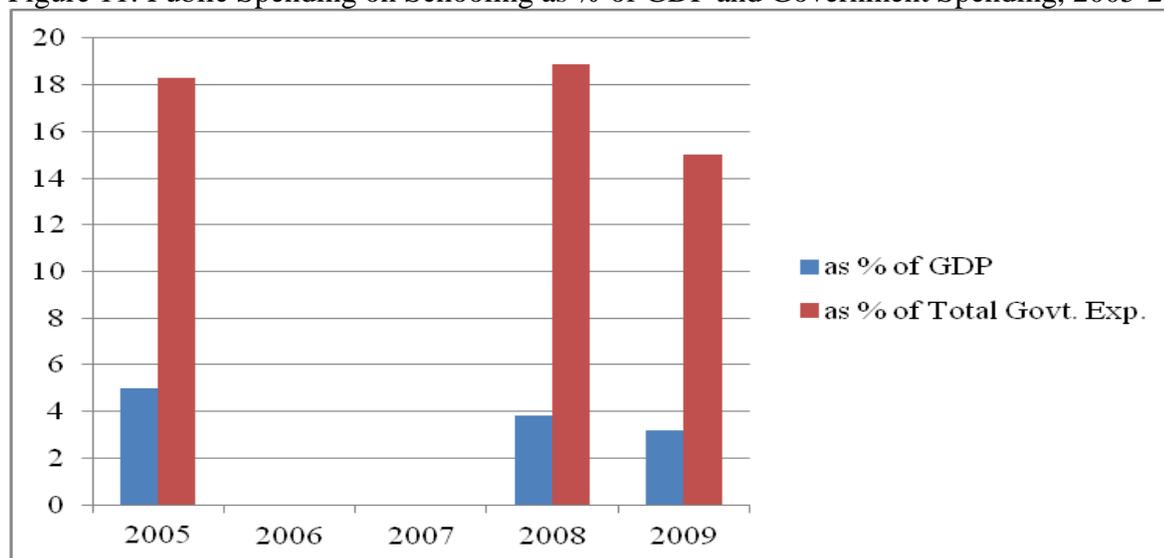


Source: compiled with the use of table 4.8 the report on “The role of ECD in UPE Performance Improvement in Uganda (MoES, 2012:22)

It can be noted that figures 9 and 10 present different spending levels for primary schooling, even in the two years for which they overlap (2008-2009). This may be caused by differences in terms of categorization. E.g. expenditure that figure 9 comprises under “other” could be included under primary schooling in figure 10. More importantly, figure 9 suggests a fairly steady and strong annual increase of the primary schooling budget in 2008-2012.

However, both figure 9 and figure 10 express schooling spending in absolute amounts of Ugandan shillings, accounting for inflation nor overall budget development. Expressing the schooling budget as a share of GDP or as a share of government spending is a common way to put spending in perspective. However, such data were only found for 2005, 2008 and 2009, as figure 11 shows.

Figure 11: Public Spending on Schooling as % of GDP and Government Spending, 2005-2009



Source: Unesco Institute for Statistics online database
<http://stats.uis.unesco.org/unesco/TableViewer/TableView.aspx>

The patchy data in figure 11 do not allow the drawing of strong conclusions, but in as far as the trend seems to be negative, it might be curbed in an upward direction in the near future: according to “State of Uganda Children” – quoting the National Development Plan - the education budget will grow as a share of total government spending from 16% in 2010/11 to 19% in 2014/15 (National Council for Children, 2012:89). This would imply more or less a confirmation and continuation of the positive trend suggested by figure 10 (for primary schooling). Also, the growth of the primary schooling budget would outpace the growth of the relevant population, leaving space for investment in pre-primary.

We will return to this perspective later in this chapter. A last relevant figure is the amount of donor support to education. In this respect, Uganda is in a favorable position, with 27% of the education budget funded through ODA (18). For comparison, the figure for Tanzania is 9.2 and that for Kenya is 4.3.

5.4. Cost Structure of Community-based ECD Centers

Given our axiom that the Government's contribution to pre-primary schooling will have to be modest, and given the probably limited financial possibilities of the parents of the currently excluded children, we focus our attention on the CB centers, since their unit costs are significantly lower than those of the (for-profit) nurseries. For reasons mentioned in section 2 of this chapter, we also exclude home-based and school-readiness programs from this analysis.

The cost structure of the CB centers is relatively simple, and this is mainly a result of the very basic nature of these programs. Table 7 provides a four quadrant framework in which the cost-components are divided over:

- initial costs occurring only once (at start of program) versus recurrent costs (continuous),
- and costs of material resources versus costs of human resources.

Table 7: Framework for Cost-components of ECD Centers

	Initial costs	Recurrent costs
Material Resources	1. Classroom 2. Yard and playground	3. Learning materials 4. Inventory
Human Resources	8. Initial training 9. Community mobilization	5. Caregiver's salary 6. Supervision 7. Refresher training

We now follow the framework clockwise, starting in the upper-left quadrant.

1. Classroom. Because of the climate, classrooms do not need closable windows and doors, and heating is not an issue. Many classrooms are simple structures with mud walls and a roof made either out of iron sheets or out of grass. Communities (parents) can make these constructions by themselves using locally available materials. The main investment is in the start up phase in which an NGO trains caregivers, sensitizes and mobilizes the community; and motivates people to invest their time in the ECD center. Obviously there are costs involved in this start up process to which we will return later under paragraphs 8 and 9. But once this initial phase has been completed successfully, parents are motivated to assist so that little or no out-of-pocket costs are made for building the classroom. The main exception is the roof for which usually iron sheets are used. Save the Children, and possibly other NGOs, manage to avoid even these costs by using grass to cover the roof. This needs to be replaced every one or two years, but again this can be done by parents and requires no out-of-pocket spending.

2. Yard and playground. The land on which the centers are located is usually made available by the local community or a faith-based organization. It can be fenced by parents, again using local materials such as branches and bush. The same goes for latrines and items for the playground. The yards of all the centers that were visited for this report were well-kept with a lot of dedication on the part of the parents. Investment costs for the yards are close to zero but the yards function well and are perfectly in harmony with the living conditions that are typical for that region. A number of CB centers also had a large tree under which a group of children can be attended. This allowed these centers to apply a rotation scheme for the three age groups: one in the classroom, one in the playground and one under the tree. This is a very efficient yet pedagogically sound way of utilizing scarce resources.
3. Learning materials. Many toys, posters and other learning materials can be made from locally available items and objects. But some materials must be purchased such as textbooks and stationary. In some cases NGOs provide (some of) these materials and in some other cases it is (supposed to be) covered by the fee. But in practice many CB centers end up lacking materials, while raising the fee is not an option as it affects accessibility. So here we note a first financial bottleneck. To sustain CB centers in the poorest areas, a small external contribution for learning materials is needed, on a recurrent basis.
4. Inventory. While some CB centers have benches and tables, many experts argue that Ugandan children at this age are better off sitting on the ground with their teachers while playing and learning. This requires floor-mats. These are less expensive than benches and tables, and can even be produced by parents. But in some cases they are purchased. It should be noted that floor-mats are usually replaced every 5 years. Strictly speaking, this would place this item under in the column of investment (initial costs), as this is the place for any items that last longer than one year. Our approach differs, in that we “annualize” the costs of floor-mats by taking their purchase value and dividing this by five (the number of years in which they can be used). By integrating this in the (recurrent) unit costs, we assume that ECD centers can save up this money during five years and use the accumulated amount of money to buy new floor-mats. In practice, things will of course be more fluid, in the sense that the centers are more likely to replace a part of the inventory every year. Other items that must be considered under the heading of depreciation of inventory are blackboards and jerry-cans (for hand-washing). For the rest, the CB centers require very little that they cannot produce themselves.
5. Caregiver’s salary. Of all the cost-components, the salary of the caregiver is the most critical when it comes to sustainability. As in many other countries, the CB centers in Uganda are based on the philosophy of self-reliance: they are for the community, by the community, and

of the community. By implication, caregivers are predominantly if not entirely paid from user fees. This causes a number of trade-offs:

- At a given fee-level, the caregiver may not earn a sufficient income. This creates the risk of attrition or – if the caregiver has no alternative job opportunities – dissatisfaction, a lack of motivation, and/or a lack of time devoted to teaching and preparation.
- One can resolve this by raising the fee, but this will immediately affect accessibility especially for the children who are most in need of the service: those with poor and/or poorly educated parents. In most of the CB centers that were visited there is already an important degree of exclusion; most Head-caregivers said that “many children” in the catchment area are not attending due to the fee. This is in conflict with the philosophy behind CB centers; they are meant to be inclusive.
- This dilemma could be resolved by increasing the number of children per caregiver beyond the desirable level of 15 or 20 – as we have observed in several cases - but this will seriously affect quality.

Based on the site-visits, interviews and additional documentation, we conclude that some external contribution is needed to safeguard the continuity, accessibility and quality of CB centers in the poorest areas. It is plausible at forehand that this component will be more substantial than the ones for learning materials and depreciation of inventory.

6. Supervision. The site visits revealed that many caregivers who work in CB centers have not attended the formal training at the Teacher Training Institutions. This was confirmed by the talks at the Headquarters of the NGOs that are active in community based ECD. These NGOs attach a lot of value to the motivation of caregivers and their affinity with the communities that they serve. They invest in that motivation through community mobilization and through tailored training that they provide themselves. The Aga Khan Foundation, for instance, stated that they do not make use of caregivers who are educated at the official Teacher Training Institutions as they consider their own teacher training to be their biggest strength and a condition for sustainability. An additional argument is that in the poorest and most under-served areas of Uganda, where the need for CB centers is the highest, schooling attainment is generally low so that few young people with a certificate or diploma from Teacher Training Institutions can be found.

To compensate for this relatively narrow basis of initial pre-service training, the NGOs provide frequent supervision and refresher training (next paragraph). With regards to supervision, a good standard could be (i) that each caregiver be visited at least once a month by a supervisor; (ii) that one supervisor can invest half a day for each session (preparation, observation, feedback, reporting, travel time); so that (iii) one supervisor can have a case load of about 40 caregivers.

7. Refresher or in-service training. In the previous paragraph we noted the relatively low level of initial training among caregivers. Frequent refresher or in-service training - in addition to

supervision – can offer compensation. Plan International, for instance, provides five days of refresher training quarterly, considering that this is a better way for caregivers to stay up to date with recent developments in the profession than a lengthy and expensive initial training. The main cost components of refresher training are the salary of the master-trainer and the per diem of the participants.

8. Initial or pre-service training. Generally, the caregivers in the CB centers have far less initial training than their colleagues in the for-profit nurseries, where two or three years of initial training at a Teacher Training Institution is the norm. But within the sector of CB centers there is variation as well. On one end of the spectrum, we find the model of Action for Children. This NGO provides several one week trainings throughout the year, both new caregivers and for those who are already practicing. Hence these trainings function as initial and refresher trainings at the same time, and the initial training trajectory is very short indeed. On the other end of the spectrum we find the Aga Khan Foundation which comes closest to the formal pre-service training by offering a very intensive initial trajectory of two days of training per week during two years. So the number of pre-service training days varies from five (Action for Children) to 80 to 100 (Aga Khan Foundation). The latter approach, however, may appear to be rather costly if it is to be replicated at a large scale by NGOs and communities who both have limited financial resources. Thus there is a risk that without further policy measures, the CB centers will have to live with suboptimal human resources. In this light, it is unfair that the state-funded Teacher Training Institutions cater for the for-profit nurseries that serve middle and upper class families, but hardly cater for the CB centers that serve disadvantaged communities. It is therefore imperative that a new balance is sought between initial training in the formal and sector and that in the nonformal sector.
9. Community mobilization. Together with the initial training, the community mobilization is the main upfront investment needed to start an ECD center. As noted earlier, by investing in the center's "foundation of social capital" (motivating community members and caregivers) much can be done to enhance long term sustainability. For instance, Save the Children and Aga Khan Foundation, provide intensive support to each new center during 4 to 5 years, partly prior to the start of the operational phase and partly during a few years afterwards. The main activities are sensitization of the community; developing an implementation plan for the center and galvanizing support for it; initial training of caregivers; and capacity building for the Community/School Management Committee. This work is done by specialized community mobilizers who can work on five new centers at the time. Compared to the caregivers, these professionals earn a higher salary and also need a motorcycle to visit the respective communities in which s/he works.

5.5. A pact for ECD in Uganda

Reflecting on the cost structure of CB centers as described in the previous section, we can develop the following list of five conditions that need to be fulfilled for expanding and sustaining pre-primary education in CB centers:

- Land must be made available,
- Communities must be mobilized,
- Initial training must be provided for new caregivers,
- Refresher training and supervision must be provided to practicing caregivers,
- A recurrent external contribution must be provided for remuneration of caregivers, learning materials and depreciation of inventory, to lessen the financial burden for the parents.

Looking at the strengths of various players in ECD in Uganda today, we propose the following “Pact for ECD”, which is in essence a division of the five abovementioned tasks across a number of actors:

A PACT FOR ECD IN UGANDA	
Task or responsibility	Actor
a. Land, space, classrooms	Communities, local chiefs and elders, private sector, faith-based organizations
b. Community mobilization	NGOs to share their expertise in this field with other NGOs, CSO, FBOs et cetera.
c. Initial Training	From just NGOs to Teacher Training Institutions and any others with accreditation
d. Refresher training and supervision	From NGOs to Teacher Training Institutions and District Inspectors respectively
e. Recurrent financial contribution	Government

Task A: providing land, space, classrooms for CB centers.

Various actors can provide the necessary land and/or the structures that can serve as classrooms: communities; prominent local individuals such as chiefs, elders and clan-leaders; a nearby company; et cetera. A special mention deserve the faith-based organizations. Recently, the three main religious communities in the country (Catholic, Muslim and Protestant) have agreed to support the government of Uganda in the creation of sustainable CB centers near most of the churches and mosques. More precisely, by 2014 there would ideally be 1500 ECD centers near Catholic churches; 400 near mosques; and 1000 near Protestant churches. Each center must have a minimum of 50 children, and it must also admit children from the other faith groups, as well as children without religious background. In addition to donating land (which is often already in the possession of the religious community) this could also include constructing a small building or refurbishing an existing one, although such is not always necessary as the previous section indicated.

Task B: community mobilization.

This is a competence that is unique to the NGOs that are active in community-based ECD in Uganda. Few other organizations are currently able to perform this task. Yet, even the joint capacity of the

NGOs is such that they can only create a few dozens of CB centers per year, and not the hundreds of CB centers that would be needed for a fairly rapid roll-out. It is therefore proposed, as part of the Pact for ECD, that the NGOs would increasingly focus their resources on this task, by gradually transferring some of their other tasks to the Teacher Training Institutions, as the two next paragraphs elaborate. To further increase Uganda's capacity for community mobilisation, the NGOs can share their expertise with other NGOs, Civil Society Organisations and faith-based organizations. The total costs of community mobilization are in the order of Ush 600,000 for a CB center with a capacity of 50 children (i.e. Ush 12,000 per "child-place") (19). This does not include transportation (motorcycle and gasoline: \pm Ush 2000 per child-place) but it does include the initial training of caregivers.

Task C: initial training.

The previous section noted the odd situation that the state-funded teacher training institutions cater for the for-profit nurseries and their middle and upper class clientele, leaving the caregivers at the CB centers with very limited initial training. It is therefore proposed that the Teacher Training Institutions and NGOs cooperate to close the gap between these "two different worlds" by jointly developing a solid preparatory course for young people who want to work as a caregiver in the CB centers. This course should be tuned to the specific needs of these centers, their children and their local contexts. With a duration of for instance one year, such a course would be shorter than the two or three year courses that are now on offer in the Teacher Training Institutions but it would be much longer than the initial training that many caregivers now receive. Moreover, it could be made possible for the graduates of this one year course to acquire the two-year degree through accreditation of further learning, e.g. through a combination of refresher training and on-the-job learning. Given the scarcity of young people with secondary schooling in the under-served areas, the entry requirement should be S1 rather than S4. Such a joint venture between the Teacher Training Institutions and the NGOs would gradually relieve the latter from the costly task of providing initial training, enabling them to invest more time in community mobilization. Eventually, the task of initial training could be extended to other organizations on the condition of course that they be accredited.

Task D: refresher training and supervision.

Usually, these tasks are performed by the NGOs that initiated the CB center in question. Yet there

19 The main upfront investment that needs to be made to start up an ECD center is the sensitization of the community, the mobilization of support from community and parents, and the initial training of caregivers and Community/School Management Committee. For all these activities, the main cost is the salary of the Community Mobiliser who calls meetings, talks with stakeholders, delivers the trainings, et cetera. The monthly salary of the Community Mobilizer ranges from Ush 460,000 (Save the Children) to Ush 750,000 (Aga Khan Foundation), which is broadly consistent with the salary of a professional trainer (around Ush 500,000). If we average the salaries paid by Save and Aga Khan Foundation, we arrive at Ush 600,000. The period of involvement of one Community Mobilizer in the start-up of a new center is four to five years, but it is plausible that his or her involvement in the last two years is less intensive. So if we assume an effective involvement of four years and a case-load of five centers at a time, the Community Mobilizer can start up 1.25 centers per year, on average. The average number of children per center varies from about 20 (Plan), 30 (BRAC) or 40 (Action for Children, Aga Khan, Save the Children), to 80 (Save the Children in Karamoya). Assuming that the average center has a capacity of 50 children, this would mean that through his/her work, one Community Mobilizer can create about $50 * 1.25 = 600$ "child-places" per year, for a salary of $12 * \text{Ush } 600,000 = \text{Ush } 7,200,000$. Thus, the costs of community mobilization for one child-place are Ush 12,000. The costs of starting up a CB center with 50 children would be Ush 600,000.

are existing formal institutions that are dedicated to perform these tasks: the Teacher Training Institutions for refresher training and the District Inspector of Education for supervision (20). It is proposed to gradually transfer these two tasks from the NGOs to where they belong: the Teacher Training Institutions and the Inspectors. This would allow the NGOs to focus even more on driving the expansion process through community mobilization. As in the case of initial training, the refresher training can be extended to other organizations on the condition of accreditation. But no such compromise should be made regarding supervision; this role is unique to the Inspector as only he or she is accountable to the Government of Uganda at the end of the day.

Task E: recurrent financial contribution.

Annex 2 and the previous section highlighted that many children are excluded, not only from the for-profit nurseries but even from the CB centers. The main reason is that their parents cannot afford the fee. This fee is meant to cover three elements in the cost structure framework (table 3 in section 3): learning materials, the depreciation of inventory, and above all the remuneration of caregivers. All three are recurrent costs: they need to be covered on a monthly basis or per term. It was argued that CB centers are caught in the following mechanism: lowering the fee would enhance access but affect quality in that it reduces the money available for materials and inventory. It would also jeopardize continuity in that it would lower the caregiver's remuneration to such an extent that s/he might leave the job or lose motivation. Increasing the number of children per group would raise total fee revenue even if the fee itself would be lowered, but this too would affect quality. The essence of our proposal is that the Government - and possibly its development partners - release the CB centers from this mechanism by covering a *part* of these recurrent costs. Parents would still pay a fee: they would top-up the government's contribution. But the government would lessen the burden of the parents by providing a basic subsidy. The government can do this against relatively modest costs. It is a cost-effective way of preventing the exclusion of the poorest while maintaining quality at an acceptable level. The next section elaborates this proposal. It will be the sole focus of the further scenario exercise, since it is the only element of the Pact for ECD which incurs "new" costs for the government. Land, community mobilization, initial training, refresher training, and supervision would all be covered by the other actors, according to the Pact.

20 One could argue (i) that supervision has two faces: assessing the quality of teaching versus improving it by supporting the caregiver; (ii) that the kind of supervision that is provided by the District Inspector stands closer to the former perception and (iii) that supervision as performed by the NGO stands closer to the latter perception. Yet it should be possible to overcome this contrast and gradually normalize the situation by bringing the CB centers entirely within the case load of the Inspector, who could do his/her best to blend the two perceptions. This dual role is sometimes referred to as "the critical friend".

5.6. A Recurrent Financial Contribution

As written above, the goal of the recurrent contribution is to provide a reasonable remuneration for the caregiver while keeping the fee low and reserving some money for stationary, water supply, depreciation of inventory, et cetera. The contribution will also make it easier for the Community Management Committees to pursue a local accessibility regime; e.g. they can decide to waive or diminish the fee for orphans, for children from extremely poor families, and for any other vulnerable children. The Government could decide to make such an accessibility regime a mandatory condition for eligibility for the contribution, and the District Inspector of Education can monitor whether his condition is sufficiently met.

The idea of a recurrent financial contribution is inspired by a number of concrete examples. Within Uganda, Save the Children provides a stipend of Ush 20,000 per quarter to each caregiver. Clearly this is not enough for the caregiver to live from but with additional income from user fees, caregivers can get by. The Aga Khan Foundation works with endowments (see Annex 3); the revenues from these endowments can be used as a basic salary for the caregivers. Again this must be topped up by parents, but their burden is significantly lessened by means of the endowment. According to some, BRAC, an NGO originally from Bangladesh, also provides a stipend, while it does not charge a fee.

The Government of Nepal provides a monthly amount of money for every caregiver that regularly attends a group of children (van Ravens, 2009). Again, this monthly amount is not sufficient for the caregiver to live from, so parents top-up. But it proves to be a solid enough basis for many communities to ensure sustainability.

Mauritius has a similar policy as Nepal, but here the contribution is not per teacher but per child. On the condition that parents enroll a child, they receive the equivalent of US\$ 6 per month which they can use to finance that child's participation in pre-primary schooling, which is predominantly private (for-profit) in Mauritius (World Bank, 2012:9). In Latin America, several countries have been successful using similar voucher schemes to increase enrolment, both in primary and pre-primary.

While the choice between the model of Nepal (subsidizing the teacher) and the model of Mauritius (subsidizing the child) is an important one from an operational point of view, it is not critical for our financial analysis since we assume a fixed number of children per caregiver. This number is 20. This is a fairly well accepted standard for this age range: having many more than 20 children in one group is not good for pedagogical reasons, while having far less than 20 children makes the service too costly. The government of Panamá has introduced an interesting financing mechanism to ensure that the group size stays within the favorable bandwidth of 15-25 (21) (van Ravens, 2011).

21 The Panamese mechanism is applied to the so-called CEFACEI, an institution that is comparable to the CB centers in Uganda. The CEFACEI receive a fixed amount of money for every regularly attending child, but there are two limitations. One, the maximum number of children for whom the subsidy is received is 25. So if a class has 32 children, the CEFACEI receives no money for seven of them. This is an incentive to hire an extra teacher and split the group into two of 16. Two, if the number of children drops below 15, the CEFACEI receives no money at all for this group. So this is an incentive to attract more children. As a result, the government of Panamá never pays for more than 25 children or for less than 15 children.

Assuming a fixed number of children per caregiver, we will further focus on the amount of money per child that needs to be subsidized rather than on the number of teachers needed. As said, this does not preclude that in reality the recurrent contribution can be disbursed on a per-teacher basis as in Nepal, nor does it say anything about possible conditionalities such as licensing and registration; compliance with the national Learning Framework; minimum teacher qualifications; a local accessibility regime, et cetera. It is just a working assumption.

Given our choice to focus on the per-child contribution, the next question is: how much money is needed per child? And related to this question: will that per-child amount be same for the whole country, or should it vary, e.g. according to the income level of districts or regions?

Starting with the latter question, it must be noted that the economy of Uganda is characterized by local differences, both in terms of income and in terms of costs of living. In Karamoya, both the remuneration of the caregivers and the fees were found to be much lower than in the Fort Portal area, while the highest fees and salaries were found in the capital²². In other words, even if we provide the same amount of money per child in all districts of Uganda, the intervention will have a much bigger impact in Karamoya than it will have in Kampala. By keeping the per-child contribution constant, it will automatically have a pro-poor effect in that it favors poorer areas more than the richer areas. In the poor districts of Karamoya, the contribution can make the difference between continuity and closure of a CB center, while in Fort Portal it could prevent communities from raising the fee – thereby limiting accessibility – in order to to keep their caregivers from switching to a for-profit nursery (see Annex 2, section 3.2).

To estimate the necessary size of the per-child subsidy, we first recapture the findings from the field visits with regards to fees and caregivers' earnings, in Table 8. Table 8 has five columns:

- In the first column we find the eight ECD centers and nurseries that were visited.
- The second column shows the fee per month (usually the fee is paid per term of three months, so we divided by three). We found that the fee is not always paid. Some of the attending children are orphans or have parents that are too poor to pay, so that the fee is waived. In other cases, parents have to pay but don't, usually as a result of poverty. This is confirmed by the ECD study of the MoES (2012:21-22). It must also be noted that fees are only paid during nine months per year, but the same goes for the caregivers. They are assumed to do other work during seasonal closure.
- The third column mentions the number of children per caregiver.
- The "Salary in Theory" – in the fourth column - is the multiplication of the fee per month with the number of children per caregiver. In other words: total fee revenue per caregiver. We call this "salary in theory" since caregivers are paid from the parental fees²³ so that the

²² To be more precise: basic food supplies tend to be relatively cheap in as far as they are home-grown so that transportation costs are low. This is why caregivers in remote areas can "survive" on lower income than their colleagues in the capital. But iron roof sheets need to be "imported" into remote areas, making them more expensive because of the higher transportation costs.

²³ Some NGOs already provide an additional stipend but this was not the case in any of the eight centers that were visited.

total fee revenue per caregiver is theoretically the maximum that caregivers can earn. In practice their salaries are lower since (i) not all children bring in a fee, as noted above, and (ii) some minor expenses such as stationary and water supply are also financed from the fee (although in some cases these expenses are covered from additional contributions).

- The fifth and last column contains the actual salary as reported by the caregivers. In some cases caregivers were shy to report their salary (Kotido) and in some cases the reported salary is higher than the theoretical maximum (Fort Portal I and II). In Fort Portal III and in Kampala the reported salary seems much lower than the theoretical salary, but this requires an explanation. Fort Portal III employs not only two caregivers (at Ush 70000 per month each), but also a cleaner (Ush 15000 per month) and a guard (Ush 60000 per month). So total monthly salary is in balance with total fee revenue. The center in Kampala also has support staff plus a head teacher, in addition to the three caregivers.

Table 8: Findings from the site visits with regards to fees and caregiver's salary.

Centers	Fee per Month	Children per Caregiver	Salary in Theory	Reported Salary
Karenge I	0	39	0	0
Karenge II	0	34	0	0
Kotido I	500	33	16500	-
Kotido II	1000	56/2824	28000/56000	-
Fort Portal I	2000	19	38000	50000
Fort Portal II	2667	18	48000	50000
Fort Portal III	5000	40.5	210000	70000
Kampala	11667	29	338333	80000

If we compare the outcomes of table 8 with the findings of the recent ECD study of the MoES (2012), we find that both the fees (see table 4.6 of the MoES report) and the salaries (table 4.4 of the MoES report) are significantly higher than in our sample. Only Fort Portal III and Kampala are in the same order of magnitude as the centers studied by the MoES. Without a doubt this is caused by our focus on CB centers in resource constrained areas. For reference, the typical salary of a caregiver in a for-profit nursery is in the order of Ush 150,000 per month and that of a primary school teacher is Ush 240,000. (Do note however that caregivers in a CB center work less hours per day than a primary school teacher).

These reference points (salaries in CB centers, in for-profit nurseries, and in primary school) enable us to attach a concrete price to the proposed recurrent financial contribution. If the Government and its development partners would make a monthly contribution of Ush 3000 per child enrolled in a CB center, this could be split into:

- Ush 500 per month for stationary, water supply and depreciation of inventory, and

24 This center (in Loodoi) applies a two-shift system. So while there are 6 caregivers for 340 children and hence a ratio of 1:56, the groups are in practice much smaller. Theoretically they should have 28 children on average.

- Ush 2500 per month as a basis for the caregivers' remuneration. With 20 children per caregiver on average, this results in a stipend of Ush 50,000.

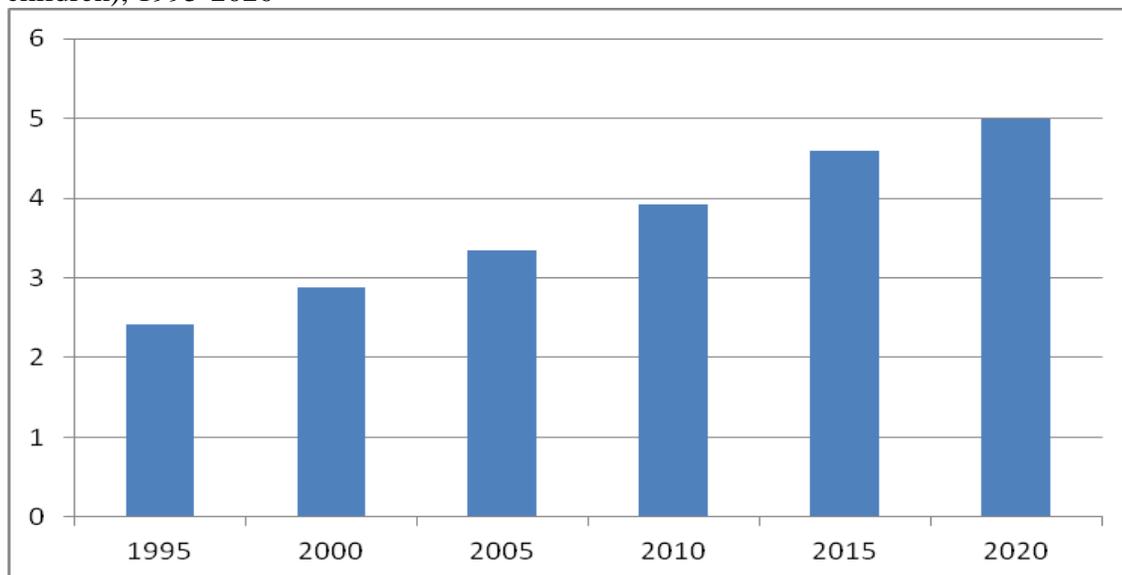
In the extremely poor district of Karenga, where both the fee and the remuneration are zero, the Ush 50,000 would make a substantial difference for the caregivers whom we met there. They would no longer have to come to the job without breakfast; they could buy some T-shirts that distinguish them as caregivers; they would find pride and motivation in their work. In the slightly less poor district of Karamoya, the parental fees would top-up the USh 50,000 to a level of about Ush 65,000. This would perhaps not make the difference between continuity and closure as in Karenga, but it would significantly improve the functioning of the center by enabling it to regularly purchase some learning aids and supplies. In Fort Portal I and II, the parental fees would double the caregivers' current income of Ush 50,000 to about Ush 100,000, which would come a long way in taking away the temptation among the caregivers to switch to for-profit nurseries. For Fort Portal III and the center in Kampala, the extra Ush 50,000 might make a lesser difference, except perhaps in disadvantaged neighborhoods.

This raises the question of targeting: will the recurrent contribution be made available to the whole country, or is it wise to start in targeting under-served areas? And how do we identify these areas? These are some of topics for the next and last section of this chapter.

5.7. A concrete and realistic expansion scenario

The first indicator that is needed for scenario development is the number of children in the relevant age bracket of 3-5 that will live in Uganda in the coming years. Figure 12 shows the development of this number for 1995-2015 as projected by the Uganda Bureau of Statistics, with an additional estimation for 2020.

Figure 12. Estimation and projection of the number of 3-5 year olds in Uganda (in millions of children), 1995-2020



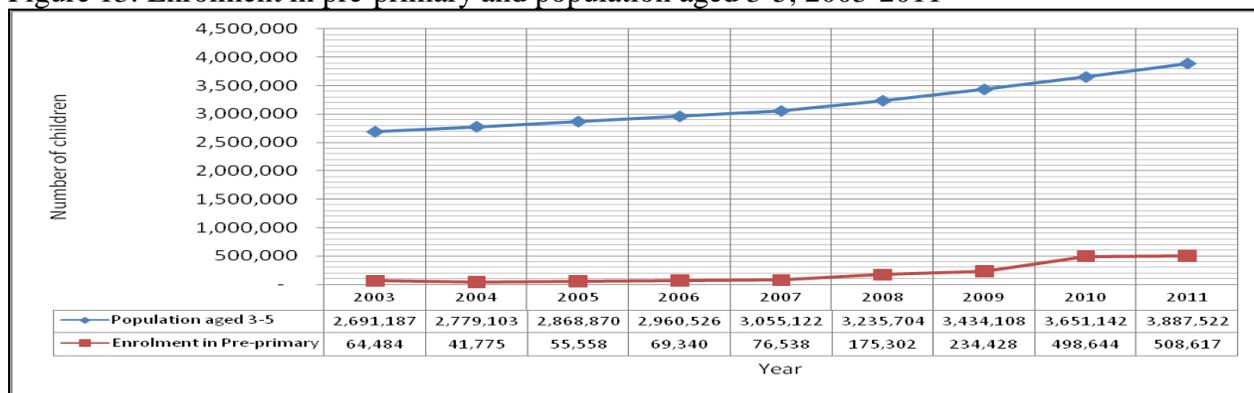
Source: compiled by the authors based on data from the National Development Plan 2010/2011-2014/2015 (page 212). Note: the values for 1995-2015 have been calculated by (i) multiplying the total population with the percentage of the 0-4 year olds among that population for each year, and (ii) multiplying the outcome with the factor 3/5 considering that 0-4 contains 5 age cohorts while 3-5 contains 3 age cohorts. The figure for 2020 is simply an extrapolation of the trend of 1995-2015.

It can be seen from figure 12 that about 4.5 million children of 3-5 will live in Uganda in 2015. However, this year is so near that even an ambitious expansion process cannot be completed by that time, which is why 2020 will be our target year. About 5 million Ugandan children will then have the age to go to a nursery or a CB center.

However, the recurrent financial contribution will not be needed for all of these 5 million children. There are several reasons for narrowing down the challenge, and the first step in that process is to take current enrolment into consideration. Many children are already on board. As we found in section 1 of this chapter (on focus and terminology), the Net Attendance Ratio reported in the Demographic and Health Survey of 2011 is the most valuable measure of current attendance. It stood at 23.4% in 2011. The question is: how will the Net Attendance Ratio develop in the coming years?

As figure 13 shows, there has been growth in pre-primary enrolment in the recent past, even in the absence of a powerful policy.

Figure 13: Enrolment in pre-primary and population aged 3-5, 2003-2011



Source: EMIS 2011

We could refer to the growth shown in figure 9 as “autonomous growth”: financed by parents and/or communities, and driven partly by the increasing awareness of the importance of early childhood development and partly by working parents’ increasing need for daycare. It is not unlikely that more and more families in Uganda will have both the motive and the means to enroll their children in for-profit centers. For them, the recurrent financial contribution would not be needed. However, it is difficult to predict this autonomous growth in a precise manner because figure 9 is based on EMIS data which provide an incomplete picture (see Annex 1 for a more detailed discussion about the difference between EMIS and the Demographic and Health Survey).

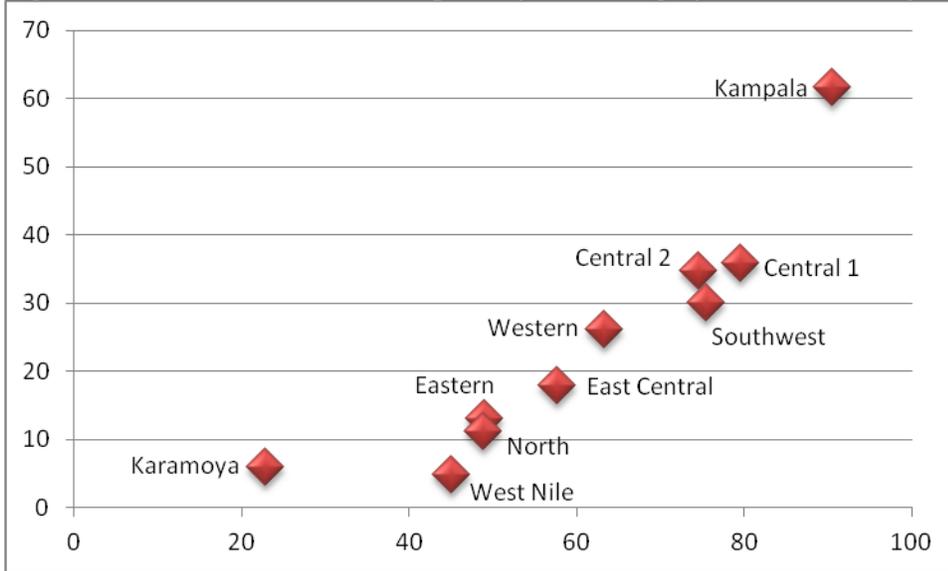
Yet, despite the caveats regarding figure 13, it is striking that even within the limited segment that is covered by the EMIS, enrolment in absolute numbers has increased ten-fold between 2004/2005 and 2010/2011. The high level of GDP growth and its likely impact on employment (see figure 4 of this chapter) may partly explain this autonomous expansion. Several interviewees confirmed that for-profit nurseries are booming as a result of economic development. According to some, quality tends to become a bigger problem than access, with many for-profit nurseries or daycare centers being located in shops and garages. Even in the small capital of rural Kumi district, enrolment was said to have reached levels of 80 to 90%, although rural enrolment in Kumi is significantly lower.

So if we would assume that autonomous growth will push up the Net Enrolment Ratio from 23.4% in 2011 to about 40% in 2020, this would not be overly optimistic. The implication of this assumption would be that 2 million of the 5 million children of 3-5 that live in Uganda in 2020 will already be covered by autonomous growth. This leaves 3 million children to reach out for. If the proposed recurrent contribution of USh 3000 per month would eventually be paid for all of these 3 million children, the annual financial burden for Government and Development Partners would theoretically be $\text{Ush } 3000 * 9 \text{ (months)} * 3 \text{ million} = \text{Ush } 81 \text{ billion}$, expressed in prices of 2013. This is about 12% of the primary schooling budget in 2011/2012 (see figure 6 of this chapter).

However, this figure can be seen as a theoretical maximum, because a second step can be made to narrow down the challenge: zooming in on sub-national levels. Figure 14 provides a first indication of where the excluded children are concentrated. The figure plots the Net Attendance Rates (vertical) of the 14 regions in which the DHS divided the country against their female adult literacy rates (horizontal). The reason to choose the female literacy as a reference point is that the schooling level

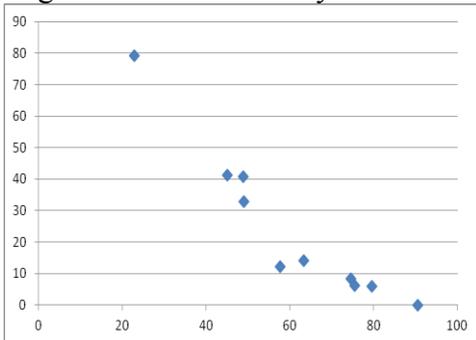
of mothers is one of the strongest determinants of child development. So the lower the female literacy rate, the higher the need for expansion of pre-primary schooling. Moreover, female literacy usually correlates strongly with another key variable: family income. Figure 15 shows that Uganda is no exception to this rule.

Figure 14. Net Attendance in Pre-primary Schooling by Female Literacy Rate.



Source: compiled with the use of data from DHS 2011

Figure 15. Shares of the Regions' Populations in the Country's Lowest Wealth Quintile, by the Regions' Female Literacy Rates.



Source: compiled with the use of data from DHS 2011

The message from figure 10 is very clear: the lowest attendance rates are found precisely in the regions where mothers have least benefited from schooling, hence where the need for pre-primary schooling is the highest. It seems clear that regions such as Karamoya, West-Nile, North and Eastern deserve to be prioritized in an expansion strategy. By contrast, the more prosperous regions of Kampala, Central 1 and 2, and Southwest seem to have picked up momentum by themselves. Policy attention in these regions may have to focus on pockets of exclusion, such as slum areas and specific groups. Local governments may take up this challenge, given the relative prosperity of these regions.

The next question is: how many 3-5 year old children live in the regions with the lowest pre-primary

attendance? An approximation can be given with the help of the State of Uganda Population Report of 2008 (Republic of Uganda, 2008:101-103), taking for granted that its figures may be somewhat outdated. This source provides population data by district, which can be consolidated into population data by the regions as defined by the DHS.

The results of the exercise can be found in table 9, which presents 4 sub-scenarios. These sub-scenarios can either be seen as alternatives or as phases (e.g. sub-scenario 1 by 2015, sub-scenario 2 by 2017, et cetera).

In the first sub-scenario we focus on the two most deprived regions: Karamoya and West-Nile. The estimated total population for 2010 (male and female, all ages) was generated using district level data from the Population Report 2008. The estimated total population is converted into the estimated population of children aged 3-5 in 2020, following the same logic as for figure 12 at the beginning of this sub-section. From this population aged 3-5, we subtracted the children who were already enrolled in 2011 according to the DHS.

Assuming that autonomous growth in these two poor regions will be limited, it is found that without a policy intervention the two regions together will be home to 563566 un-enrolled children aged 3-5 in 2020. The column on the far right hand side shows the total cost requirement: Ush 15.2 billion annually. This is the multiplication of the number of children with the per child contribution of Ush 3,000 per month, i.e. Ush 27,000 per year. In the second scenario we add the regions North and Eastern to the former two. North and Eastern sit very close to one another as figure 10 shows, both facing low attendance rates as well as a high level of female illiteracy. For these two regions we still assume no autonomous growth. The third scenario adds the somewhat more prosperous region of East Central, for which we assume an autonomous increase of the Net Attendance Ratio from 17.9 in 2011 to 25 in 2020. The fourth scenario adds Western, where we assume that the Net Attendance Ratio will grow from 26.1 to 35 in that same period. Finally, we assume that the four best performing regions (Kampala, Central 1 and 2, South West) keep pace within this expansion process through a combination of autonomous growth and efforts from local governments. Hence they are not found in table 9.

Table 9. Four Expansion Sub-scenarios and their Costs

Scenario	Regions	Total Population in 2010	Not enrolled children 3-5	Annual costs (Ush billions)
1	Karamoya and West Nile	3961000	563566	15.2
2	The above plus North and Eastern	9123500	1238573	33.4
3	The above plus East Central	12744600	1645947	44.4
4	The above plus Western	16769000	2038326	55.0

It can be seen from table 9 that the annual costs for the four neediest regions (sub-scenario 2) would be Ush 33.4 billion by 2020. This is in the order of 5% of the budget for primary schooling in 2011 (see figure 10 of this chapter). But based on section 2 of this chapter we can expect that the primary schooling budget will grow in the coming years, both as a share of total government spending (going from 16% in 2010/11 to 19% in 2014/15) and as a result of the GDP growth that Uganda might

foresee based on the past decade (figure 4). So come 2020, the current Ush 33.4 billion will no longer be 5% of the primary schooling budget, but about half of that share (25). Even the Ush 44.4 billion and the Ush 55 billion needed for sub-scenarios 3 and 4 may not be insurmountable by 2020.

It should be noted that these spending targets do not need to be realized in year one of the expansion strategy. Expansion takes time. Communities must be mobilized, parents sensitized, teachers trained, et cetera. So the budget line can start modestly, and steadily grow to the levels suggested in the right hand column of table 9.

The final question for this section and for the report is: can we readily apply the favorable benefit-to-cost ratios – ranging from 1.6 to 8.6 - that we found for Uganda in Section 4 to the amounts of money that we propose for the support of the community-based ECD centers? The answer would be negative if we look at some of the centers as they function now. In extreme cases, some of the staff are illiterate and received no more than a few days of initial training. Indeed, a general finding from the program reviews is that formal preschool tends to yield more powerful outcomes than non-formal. However, we assumed that a Pact for ECD in Uganda will improve classrooms; strengthen pre- and in-service training; enhance supervision; and provide a per child contribution that should make it easier for communities to attract and retain able and motivated caregivers. We also assumed the prioritization of disadvantaged children, which generally yields higher returns than otherwise. There is no way in which we can enter these assumptions in a model and calculate their impact. But there is every likelihood that if all actors in the Pact deliver their contribution, the per child subsidy of 3,000 Shillings will pay itself back entirely. In fact, regression analysis has suggested that investment in pre-primary schooling will pay itself back for 87% through reduction of drop-out and grade repetition in primary schooling alone (Jaramillo and Mingat, 2006). Given the high primary drop-out rates in Uganda this seem very relevant, and it suggests that the benefit-to-cost ratio may sit well above the lower bound of the range of 1.6 to 8.6.

25 We start with a primary schooling budget of about Ush 640 bln. We assume an economic growth rate of 5% (which is a modest assumption compared to past growth; in see figure 4). We assume that the primary schooling budget keeps pace with this growth rate. Finally we assume that the overall schooling budget grows from 16% to 19% of government spending (National Development Plan). On these assumptions, the primary schooling budget will double to Ush 1238 bln by 2020.

Section 6. Conclusions

1 Uganda's preschool system caters for children of ages three, four and five years old. This is the second stage of a life-cycle framework that can be used to understand the benefits of preschooling. It is preceded by the first thousand days of life and it is followed by late childhood, adolescence, adulthood and old age life-cycle stages. This illustrates that positive experience during preschool can have an impact throughout life, but at the same time this framework indicates that there are many uncertainties in the estimation of the benefits of preschooling.

2 Two prominent reviews of ECD programs in developing countries found effect sizes from preschooling on cognitive development in the order of 0.30 for 14 Center-based preschool and daycare programs and 8 parenting programs. Caution is needed as the reviews tended to focus on targeted programs; to look at short-term impact; and to ignore factors such as age of enrolment, duration of exposure, et cetera.

3 Suggestive estimations of benefit-to-cost ratios based on aggregate data for over 70 developing countries were found to be in the range of 14.3 to 17.6 for a 3% discount rate, and in the range of 6.4 to 7.8 assuming a 6% discount rate.

4 To estimate benefit-to-cost ratios for Uganda we departed from the findings above and focused on the benefits in terms of higher life time productivity and earnings that follow from the fact that children spend more years in school if they participate in preschooling. We took into account, among other things, the costs of both preschool education and the extra years of schooling, as well as the opportunity cost (the fact that children in school have less time to work) beyond the age of fourteen.

5 Assuming a discount rate of 6% and varying other relevant parameters, benefit-to-cost ratios sit in the range of 1.6 to 8.6. Under the assumption of a 10% discount rate, the benefit-to-cost ratios are in the range of 1.1 to 3.6.

6 In 2011, only 23.4% of the children of 3-5 attended preschooling in Uganda. Substantially increasing this number and including the children with the highest needs is possible. But it requires that all relevant actors work together within a Pact for ECD in Uganda which ensures the availability of land and classrooms, the provision of pre- and in-service training and supervision, and the supply of materials. Communities and parents would continue to make their contributions, but an essential element to make the Pact work would be a subsidy of 3,000 Shillings per child per month.

7 The costs of this per child subsidy would eventually range from 15 billion Shillings per year for the two poorest regions Karamoya and West-Nile, to 55 billion Shillings for the six most needy regions. By 2020, even the latter amount would only be about 4% of the primary school budget or about 2% of the overall education budget.

8 It is not certain that the benefit-to-cost ratios of 1.6 to 8.6 can be readily applied to this annual investment. But it is highly unlikely that the investment would not pay itself back, at the very least.

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